

TERMS OF REFERENCE, LOT No. 1

TECHNICAL AND OPERATIONAL EVALUATION OF THE ESMERALDAS STATE REFINERY PROJECT

PURPOSE:

Engage a consulting firm to conduct the technical, operational and financial evaluation of the **PROJECT TO REHABILITATE THE ESMERALDAS STATE REFINERY (REE), ESMERALDAS PROVINCE, ECUADOR**

The evaluation will require:

1. A full assessment of all actions taken during REE rehabilitation, analyzing whether established international standards were met, and the reasonableness of the investment cost.
2. Establish the current situation of facilities in terms of infrastructure and organizational management.
3. What actions must be taken so REE operates effectively and efficiently pursuant to international standards.
4. The approximate cost and estimated time to implement the recommended solutions.

IMPLEMENTATION DEADLINE:

The implementation period for the required evaluation is sixty (60) calendar days, counted from the contract signing date.

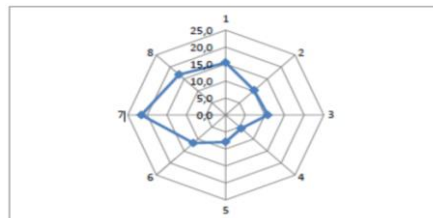
BACKGROUND:

The Esmeraldas Refinery is located in Simón Plata Torres parish, Esmeraldas canton, Esmeraldas Province in the coastal region, featuring the characteristics of a tropical region, with temperatures around 26°C and 77% average humidity, up to as high as 90%. Year-round precipitation averages 834 millimeters, according to Ecuador's National Meteorology and Hydrology Institute (INAMHI).

The study area is climatically influenced by Pacific Region 3. The monthly precipitation pattern is mono-modal, with peak rainfall from January to April, and a dry period from August to December.

The following Figure shows the predominant wind direction in the REE zone, taken from INAMHI reports on records from nine years of measurement (1993 – 2012). The main wind direction is westward, followed by northward and northwesterly.

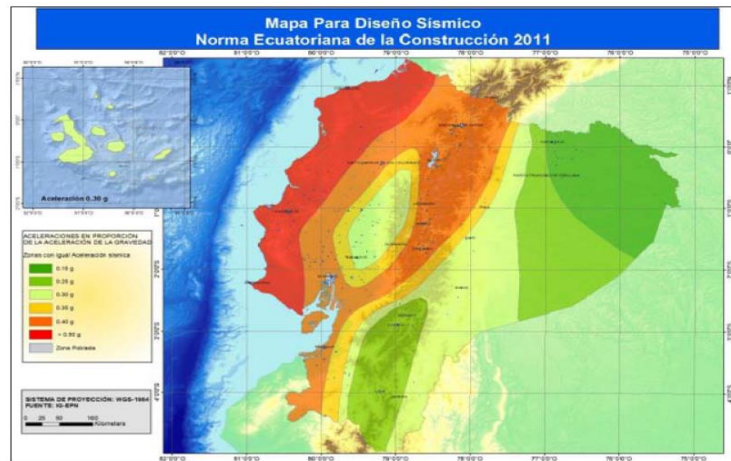
Illustration 1 Wind direction at the Esmeraldas Refinery



According to Ecuadorian Construction Standards (NEC), the design spectrum is determined by the following parameters:

Z Factor: 0.50, Seismic zone Six, Characterization of seismic risk: Very high

Illustration 2 Seismic activity in Ecuador



The Esmeraldas State Refinery (REE) was constructed from 1975 to 1977 with the capacity to process 55,600 barrels of petroleum per day (BPD). It was constructed by Japanese consortium SUMITOMO – CHIYODA, on the basis of a design by US company UOP (UNITED OIL PRODUCTS), which granted the process license.

In 1987, the first expansion installed additional atmospheric distillation, vacuum distillation and visco-reducer units. That increased the processing capacity to 90,000 BPD. That work was done by the Japanese SUMITOMO – CHIYODA company. Ten years later, in 1997, the second Industrial Plant expansion reached 110,000 barrels per day. That work was done by the Spanish TÉCNICAS REUNIDAS company.

Subsequently, from 2005 to 2015, the last Rehabilitation Program of the Esmeraldas Refinery, comprising thirteen projects, was done in several phases: Sustaining Phase, Phase I and Phase II. This consultancy is requested to evaluate this last Program.

SCOPE OF THE CONSULTANCY:

Evaluate the current situation of infrastructure and facilities of the REE by a technical and operational analysis of the last rehabilitation project's activities, starting by evaluating its current conditions, to issue an assessment of the Refinery's operating conditions, verify the installations' adequacy and working processes, and identify operating risks that might affect the operational continuity of the business and quality of service.

The evaluation will be done by checking existing documentation and making technical visits and inspections on-site, to determine whether the project followed international standards for project management and change management and whether the design and construction parameters were technically suited to international methodologies and standards governing this type of facilities. The above technical evaluation will contain principally the following topics:

- Evaluate the conceptual engineering of the rehabilitation and repowering.
- Validate the mechanical integrity of the facilities included in repowering and rehabilitating the REE.
- Validate the operational strategy, documentation, implementation and control systems established for this purpose.
- Evaluate compliance with international standards applicable to the Refinery's operation and processes, to ensure operational continuity and updating of processes, procedures and guidelines developed in each of the following areas:

✓ **Facilities considered in repowering the REE**

- Technical inspection of facilities
 - Mechanical integrity of the equipment
- Operating conditions of process units and auxiliary services
 - Physical measurement of critical variables
- Operating conditions of the main equipment
 - Physical measurement of critical variables
- Facility risk assessments
- Evaluation of unfinished work

✓ **Operational Planning**

Review guidelines and operating strategies for refining and the area of moving crude oil and products

✓ **Process Engineering**

- Process information (Piping and Instrumentation Diagrams (DTIs), Process Flow Diagram (DFP))
- Process Documentation, Procedures and Operational and Emergency Norms for the operational area.
- Operational guidelines with the operational guidelines and conditions for the different process units.

✓ **Control of Processes, Auxiliary Services and Automation**

Integrity and logic of control and verification systems in the Distributed Control System (DCS) and in the field.

Evaluating the electrical self-supply generation system.

Advanced control strategies and optimization

Control system for generation and distribution of electrical energy, vapor, water and air.

✓ **Operation**

Operational procedures

- Procedures to start up and stop units
- Emergency procedures

Process Risk Analysis

Operational reliability study

Efficiency and Productivity Indicators

Incident and Accident Rate Indicators

Safe Workplace Practices

✓ **Maintenance**

Preventive Maintenance, Corrective
Support Systems Maintenance

✓ **Management System and standards**

Indicators used for control, follow-up and optimization of the operational part of core processes.

Evaluate the organizational environment by reviewing operating and maintenance procedures, change management, maintenance and inspection plans and compliance with them, analysis of mechanical integrity, competencies of personnel regarding operation, maintenance and reliability of the REE

- e. Determine the costs of repairs and new units purchased during rehabilitation and repowering, on the basis of similar costs in the refining sector and analysis of the reasonableness of costs invested versus programmed costs and the benefits obtained.

INFORMATION THAT EP PETROECUADOR HAS:

- Records of inspections of the Refinery equipment.
- Annual maintenance plans and evidence of their implementation.
- Phase 1.- Survey of Requirements made by “mark-ups” in the existing Refinery blueprints, and specifications of equipment to be replaced.

For Phase 1 and 1.5 SK has construction blueprints over the blueprints issued by UOP.

In Phase II there are the deliverables from Phase I and additionally engineering blueprints for renewed or new facilities such as the DMZ, Effluents, Crude-oil furnaces and new turbogenerator.

- Contracts for repairs, modifications and purchases of new units during repowering of the REE
- Project management guide from the internal Petroecuador norms
- Change management procedure from the internal Petroecuador norms

EXPECTED OUTPUTS:

In the technical-operational evaluation, the Consulting firm must deliver the following reports:

- Detailed report of the technical-operational evaluation, including checklists taken as a reference
- Reports of the RBIs or the equivalent
- Report on Analysis of Alternatives for improvement and recommendations
- Report on environmental impact evaluation, before and after rehabilitation
- Report on evaluation of the organizational environment.
- Report on the reasonableness of the costs incurred during rehabilitation and repowering of the REE.
- Report on the costs and estimated times to implement the recommended technical solutions to achieve efficient operation and reliability.
- Detailed final report with conclusions and recommendations, Power Point presentation with an Executive summary.

During contract implementation, UNDP may require the Consulting firm to submit additional technical reports regarding the Consultancy outputs.

WORKPLACE:

Work will be done in the city of Quito and the Province of Esmeraldas, Republic of Ecuador.

PROFILE OF THE CONSULTING FIRM:

The Consulting firm must have at least **15 years’** experience in consultancies regarding project management or direction in the oil and gas sectors, implementing engineering, specialized studies, technical and economic

evaluations of downstream projects in the oil and gas sectors.

KEY STAFF REQUIRED:

To perform the purpose of the present Terms of Reference requires the Consulting firm to have the following key personnel:

- A Director of the Evaluation Consultancy
- A Quality Engineer
- A Maintenance Engineer
- A Refining Process Engineer
- A Cost Specialist

The Consulting firm must submit the CVs of the Key Personnel using the form called “Qualifications of Key Personnel” from Section 6, Technical Bid Form, Section 3, Personnel, from the Request for Proposals Document. The “Qualifications of Key Personnel” Form must be accompanied by certifications of their studies, work certifications, and of their knowledge of the Spanish language.

Any degrees, diplomas, certificates and/or records that are written in some language other than Spanish or English must be presented with a simple translation into Spanish.

The key personnel must meet the requirements described in the following table:

Director of the Evaluation Consultancy
- Education University Degree in Business Administration, Engineering or related areas
- Specialty Training: Master’s degree in Project Management, Business Management, Engineering or related areas
- Preferred Specialty Training: If the M.Sc. is related with the Petroleum, Natural gas, Petrochemical industry or related areas
- Courses and Training: Knowledge of Project Management Standards, ISO 10006, PMI, SGPMP International or the equivalent.
- Professional experience in this specialty: At least 15 years’ experience in Project management, Personnel management, Planning and Contract Administration in the Oil & Gas Industry.
- Knowledge of the region (Latin America): Preferably
- Language competence: Knowledge of the Spanish language, written and spoken, at a professional level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent
Quality Engineer
- Education University degree in Mechanical engineering, Chemical engineering, Industrial engineering or related areas
- Specialty Training: Master’s degree in Mechanical engineering, Chemical engineering, Industrial engineering, Project Management or related areas
- Preferred Specialty Training: M.Sc. in Quality Management
- Courses and Certifications: Knowledge of Quality Control System Norms in Refineries or Liquefied Petroleum Gas Plants or Liquefied Natural Gas Plants, API, ASME, ASTM, NFPA Standards, Quality Management Standards, ISO 9001, ISO 55000 or the equivalent.

<p>- Professional experience in this specialty: At least 10 years' experience in designing and managing quality plans, implementing quality assurance and quality control systems, managing improvement processes to guarantee continual operation in Oil & Gas industry facilities.</p>
<p>- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent</p>
Maintenance Engineer
<p>- Education University degree in Mechanical engineering, or Electromechanical engineering</p>
<p>- Specialty Training: Master's degree in Mechanical engineering, Electromechanical engineering or related areas.</p>
<p>- Preferred Specialty Training: If the M.Sc. is related with maintenance systems for Oil & Gas industry equipment.</p>
<p>- Courses and Certifications: Knowledge of API, ASME, ASTM, NFPA Standards or the equivalent</p>
<p>- Professional experience in this specialty: At least 10 years' experience in Operations and Maintenance of Petroleum Refineries</p>
<p>- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent</p>
Refining Process Engineer
<p>- Education University degree in Mechanical engineering, or Chemical engineering</p>
<p>- Specialty Training: Master's degree in Mechanical engineering, Chemical engineering or related areas.</p>
<p>- Preferred Specialty Training: If the M.Sc. involves design and analysis of Petroleum Refining Processes</p>
<p>- Courses and Certifications: Knowledge of API, ASME, ASTM, NFPA Standards, Certification in Refineries, NACE Certification or the equivalent</p>
<p>- Professional experience in this specialty: At least 10 years' experience in operations involving designing Petroleum refining processes and Managing Process Simulator Software.</p>
<p>- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent</p>
Cost Specialist
<p>- Education University Degree in Business Administration, Accounting, Auditing, Finance or related areas</p>
<p>- Specialty Training: Master's Degree in Business Administration, Accounting, Auditing, Finance or related areas</p>
<p>- Preferred Specialty Training: If the M.Sc. involves Cost Analysis Processes and is applicable to the oil and gas industry</p>
<p>- Courses and Certifications: Knowledge of Budgeting, Accounting standards, Tax laws, Costs and Expenses, or the equivalent</p>

- Professional experience in this specialty: At least 10 years' experience in cost analysis, investments, budgets, cost allocation and management and if it is in the Petroleum Industry
- Knowledge of the region (Latin America): Preferably
- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent

ADDITIONAL PERSONNEL REQUIRED:

The Consulting firm must commit to supply the following additional personnel:

- A Specialist in operational reliability
- A process control and automation engineer
- A risks and SS&E consultant
- A refining operations engineer
- A mechanical engineer for piping and equipment
- A contracting specialist
- An electrical engineer for power systems
- An environmental engineer

The required additional personnel must present a university degree, at least 10 years' professional experience in the oil and gas industry relevant to the above-listed positions and knowledge of the Spanish language. The Consulting firm must submit the CVs of the Additional Personnel using the form called "Qualifications of Required Additional Personnel" from Section 6, Technical Bid Form, Section 3, Personnel, from the Request for Proposals Document. UNDP reserves the right to request, at any point, the supporting documentation accrediting the qualifications of the additional personnel required.

REGARDING THE PERSONNEL:

The Consulting firm may indicate additional personnel if it is considered necessary.

It will be the Consulting firm's responsibility to provide sufficient insurance as necessary to cover all personnel implementing activities and making the arrangements necessary for them to enter the country, in the case of foreign personnel.

SERVICE METHODOLOGY:

In its technical bid, the Consulting firm must present the methodology it will implement, with all necessary details, for Project evaluation. Please see the Technical Bid Form (Section 6 of the Request for Proposal Document), regarding the Implementation and Personnel Approach and Plan.

RECEPTION AND DELIVERY OF DOCUMENTATION:

The Consulting firm must implement a document control system for reception, review and return without alterations of the information from EP Petroecuador to be analyzed.

The document control system must include distribution of the reports that the Consulting firm must prepare during the project evaluation.

The Consulting firm will present progress reports on the work weekly and monthly in Word documents and PDF format, duly signed, and making a record of delivery, with the corresponding written communication and registered in the document control system.

The Consulting firm must present the results of its Final report in a Word document and PDF with the respective support media and in a Power Point presentation with an executive summary. It must include a detailed chronological listing of the activities carried out, indicating the deliverables. The executive summary will be presented at a meeting to be agreed upon between the parties. The Final report will be delivered in hard-copy physical format, duly signed, and also in a digital PDF format and an editable Word file.

CONFIDENTIALITY CLAUSE

All documentation or information that the Consulting firm receives from UNDP and PETROECUADOR, or that it may access while performing the contract function, must be treated by the Consulting firm and its employees, dependents, key personnel, additional personnel, as confidential information. The Consulting firm may not disclose, directly or indirectly, the information received to any person, without written consent from UNDP and PETROECUADOR, excepting their employees or hired personnel who need to receive that information to properly perform the contract, being directly responsible for the use of that information by its employees or contract personnel. The Consulting firm agrees to take measures to protect the confidentiality of this information, which – overall - will be framed within recognized best practices in the area of Information Security. This includes informing its employees or contract personnel about the confidential nature and the prohibitions to copy or disclose information and agree that this information will be kept in a safe place. The Consulting firm assumes, vis-à-vis UNDP and PETROECUADOR, the corresponding responsibilities for failure to fulfill this confidentiality clause.

APPLICABLE NORMS:

All work will be done according to the codes, norms and technical specifications listed below:

- Project Management Standards, ISO 10006, PMI, SGPMP.
- API Standards.
- ASME Standards.
- ASTM Standards.
- NFPA Standards.
- Standards for Civil Works.
- Standards for Fire-fighting Systems.
- Standards for Safety, Health and Environment.
- Standard API 580 Risk-Based Inspection.
- Standard API 581 Risk-Based Inspection Methodology.
- Standard ISO 55001 Asset management.
- Change management procedure from the internal Petroecuador norms.
- Project management guide from the internal Petroecuador norms.

CONTRACT ADMINISTRATION AND MEANS OF SUPERVISING EXPECTED OUTPUTS:

UNDP will directly supervise the Consulting firm's work. Once the consultancy contract is signed, UNDP will designate, at the starting meeting, the contract administrator and the technical team that will supervise project evaluation.

The UNDP supervision and the Consulting firm will hold technical meetings between the parties, to define and analyze criteria as the evaluation moves forward, and provide immediate solutions as the process continues, at the end of which the corresponding meeting minutes will be signed, which will include the actions, persons responsible and dates.

MEETING TO BEGIN THE EVALUATION:

Once the evaluation contract has been signed, and within no longer than 2 days after that signing, the Consulting firm must coordinate and carry out the kick-off meeting, attended by the key personnel of the Consulting firm, of UNDP and delegates of the Ministry of Hydrocarbons and of EP Petroecuador.

At this meeting, the Consulting firm will present the methodology to evaluate the Project, as well as the Project Director and his technical team, which appear in the technical bid.

This meeting will also establish the matrix for communications between the parties and the details for project site visits, logistics and other required field activities. The agreements will be signed in the memorandum of starting up the work to be done and issued at the kick-off meeting.

MEANS OF APPROVAL FOR THE EXPECTED OUTPUTS:

The expected Outputs from this consultancy will be reviewed by the UNDP supervision and contract administration team, which will have the opinion of governmental institutions (Ministry of Hydrocarbons and EP Petroecuador) to review the outputs. UNDP will make the last validation of the outputs generated under the consultancy.

TERMS OF PAYMENT:

Output / Milestone	Percentage of the contract	Deadline
Advance payment of up to 20% of the total Contract amount	20%	7 days after contract signing
Output 1- Technical Progress Report	20%	21 days after contract signing
Output 2 - Draft Final Report	30%	42 days after contract signing
Output 3 - Final report, Executive summary and Presentation of results	30%	60 days after contract signing
	100%	

ATTACHMENTS

Attachment 1: Summary of Rehabilitation of the Esmeraldas State Refinery

Attachment 2: Description of Phases of the Project to Rehabilitate the Esmeraldas State Refinery

Attachment 3: Current Situation of the Esmeraldas State Refinery

Attachment 4: Listing of contracts, amounts and scope of the Rehabilitation Program

Attachment 5: Organizational Structure of the Rehabilitation Program

Attachment 6: Organizational Chart of the Esmeraldas State Refinery

Attachment 7: Blueprint of the Esmeraldas State Refinery

Attachment 8: Processing Units and Utilities and Offsite Esmeraldas Refinery Summary

TERMS OF REFERENCE, LOT No. 2

TECHNICAL AND OPERATIONAL EVALUATION OF THE PACIFIC REFINERY PROJECT

PURPOSE:

Engage a consulting firm to conduct the technical, operational and financial evaluation of the **REFINERY OF THE PACIFIC (RDP) PROJECT LOCATED IN THE PROVINCE OF MANABÍ, ECUADOR.**

The evaluation will require:

1. A full assessment of all actions taken regarding the topics established in the scope of the consultancy, analyzing whether established international standards were met, and the reasonableness of the investment cost.
2. Establish the current situation of facilities in terms of infrastructure and organizational management.

IMPLEMENTATION DEADLINE:

The implementation period for the required evaluation is sixty (60) calendar days, counted from the contract signing date.

BACKGROUND:

- On 7 January 2008, the Memorandum of Understanding was signed between Petróleos de Venezuela S. A. and Petroeros sic del Ecuador. Clause One, the OBJECT, established that: "The parties agree to negotiate the terms and conditions to create a mixed public-private company as a strategic alliance, to construct a new refining complex on Ecuador's Pacific Coast, in the Republic of Ecuador, which will include the constitution and corporate by-laws, the Business Plan, Policies and Procedures of the mixed public-private company".
- On 9 February 2008, the PETROECUADOR Board of Directors, by Resolution 20-DIR-2008-02-09, authorized PETROECUADOR to constitute a mixed public-private company to implement the project of the new Refinery in Manabí Province.
- On 15 May 2008, the Universal Meeting of Shareholders was held, the minutes of which show that the constitution of a public-private company was approved, the "REFINERY OF THE PACIFIC (RDP) MIXED PUBLIC-PRIVATE COMPANY", of Ecuadorian nationality and with its legal domicile in the Metropolitan District of Quito in the Republic del Ecuador, its shareholders being PETROECUADOR with 51% and PDVSA Ecuador with 49%.
- On 15 July 2008, with public deed 2732, the constitution of the "REFINERY OF THE PACIFIC (RDP) PUBLIC-PRIVATE COMPANY" was registered, executed at Notary-Public Office Four in Manta Canton.
- On 23 June 2010, by Resolution DIR-EPP-011-2010-06-23, PETROECUADOR EP Board of Directors declared the Refinery of the Pacific Public-Private Company, with the State as majority shareholder, to be a Subsidiary of the Public Hydrocarbons Company of Ecuador, EP PETROECUADOR.
- On 1 August 2010, the Company changed its domicile from Quito to Manta, observing the decentralization and de-concentration policies proposed by the National Government.
- In July 2010, the Baseline Environmental studies were completed, defining the most suitable site from the socio-environmental impact standpoint to construct the new Refinery, in the El Aromo Sector, located between the cantons of Manta and Montecristi in Manabí Province.

To implement the Refinery of the Pacific Project, the implementation strategy normally used in Petróleos de Venezuela, S.A. (PDVSA), for this type of Projects which demand large monetary investment was followed, which is best known as the **FEL (front-end loading) Methodology.**

When an investment project is under way, errors may be made, such as omission of key factors in preliminary studies or deviations from the budget. How to identify these problems in time, before they cause irreparable consequences? One way to do this is through the front-end loading methodology, also known by its acronym, FEL.

To understand this methodology, we can apply the concept of open gates. To move on to the next hallway, we must first close the previous gate. The same logic is used in this methodology, where the prerequisite to move on to the next part of the process is approval of the previous point. This generates great savings for companies, because it makes it possible to keep the project on schedule, reduces risks, and ensures that each phase is duly planned and approved before beginning.

The stages of the **FEL** methodology are the following:

- **FEL 1** (Visualization): This first stage is known as the opportunity identification phase. On the basis of the technical and economic feasibility studies, the business opportunity is validated. This validates the business opportunity and is based on technical and economic feasibility studies. All possible options are proposed and the least attractive from an investment standpoint are progressively discarded down to one or two viable options from a technical and investment standpoint.

Here, a project data sheet is prepared on the basis of a preliminary conclusion, for the purpose of verifying whether the idea has sufficient merit to continue analyzing and developing it. The activities to achieve this objective are:

1. Prepare the project scoping
2. Prepare the Class V cost estimate
3. Prepare the Class V implementation plan
4. Evaluate the technical and economic feasibility of continuing with the project.

- **FEL 2** (Conceptual Engineering): Known as the conceptual project phase, this is the beginning of project planning in order to select an alternative and move forward in defining it. So far, not much money has been spent.

Basically, this phase will meet two main objectives:

- Organizing for the project planning phase. Here, the main activities are: Forming the team, formalizing the objectives, roles, and responsibilities and preparing the plan to conceptualize and define the project. Select the preferred option(s) and request the funds to implement the activities to obtain a Class II cost estimate. Here, the main objectives are: Evaluate and select the technology, Evaluate the site, Prepare the conceptual scopes of the options selected and their Class IV cost estimates, and Evaluate the options' profitability.
- **FEL 3** (Basic Engineering): The basic project phase develops the details of the scope, prepares basic engineering, creates the implementation plan, and achieves a final estimate of investments with minimal error. Decisions made in the Conceptualization phase are the working inputs to continue the project and implement the Basic Engineering phase. The purpose of this phase is to develop the detailed scope and implementation plans for the option selected, to enable the Corporation to commit the funds or obtain the required financing to implement the project, prepare the documentation that will provide the basis for the detailed engineering, and the project implementation contract, and confirm whether the project's expected value meets the business objectives.

After completing the three phases, the project proceeds to implementation, considering the detailed engineering, construction and set-up. Although implementation represents over 80% of the investment, success depends largely on these three FEL stages. The work itself or IPC, includes the detailed engineering, procurement or

purchasing of equipment and materials and construction. This is the phase in which the most time and money are invested, and its success is partly determined by the quality of the preceding phases.



VISUALIZATION FEL 1 CONCEPTUAL FEL 2 BASIC ENGINEERING FEL 3 IPC IMPLEMENTATION OPERATION

Visualization Study:

To be able to determine whether the project was viable, the project visualization was done by the KBC Advanced Technologies, Inc. (KBC) company for the main purpose of evaluating the project's feasibility, developing strategies and arrangements to maximize the project's economic yields and establish both business opportunities and risks.

As a result of the visualization, RDP would have the necessary information to be able to continue on to the following phase (Conceptual Engineering) to establish the project's final configuration option.

During Visualization, KBC conducted a technological evaluation and an exercise to classify different plants with improvements of slops, conversion of gasoil, and options for using coke. This effort helped identify the routes and technologies for logical processing. The key parameters quantified in this selection were the yields, the costs of investment and operation, reliability and proven technology, as well as the quality of raw material for the Refinery and the products desired, on the basis of compliance with EURO V standards.

As part of that analysis for selection 10 configurations were identified to be evaluated, using Linear Programming Optimizations (LP Model). Each case was optimized regarding the source and type of crude oil, the production and management of Hydrogen, yields and distribution of products complying with the EURO V specifications for fuels, cost estimates for investment and internal rates of return for each configuration, and the cases were classified according to the suitability, viability and profitability, resulting in two possible configurations to be analyzed in greater detail in the following phase, namely:

- 1) Delayed Coking (DC), Mild Hydrocracking (MHC), FCC
- 2) Residue Hydrocracking followed by DC, MHC and FCC

The Conceptual Engineering began with these two configurations, for the purpose of more deeply exploring these two options in order to finally decide on one of them.

Conceptual Engineering:

This was done by the SK E&C Consultants Ecuador S.A. company (SK E&C). The scope of the Conceptual Engineering included developing the project description and conceptual design for the new 300,000 barrels Refinery to be constructed in Ecuador, on the basis of the results obtained from the Visualization Study done by KBC.

To develop the Conceptual Engineering and other project phases, a series of premises were established and maintained until after completing the Basic Engineering.

The most important premises were the following:

- The Refinery would be the Deep Conversion type.
- The crude oil to be processed is a mixture of NAPO, ORIENTE and ZUATA sweet
- Natural gas is not available in Ecuador.
- The Refinery must generate its own electricity for operation.
- The products must meet the EURO V standards.

- The coke produced will not be exported but will preferably be consumed by the Refinery itself.
- The only available water source is the ocean.
- Crude oil will enter, and products will leave through the marine facilities (mono-buoys).

With these premises in mind, SK E&C completed several important activities to be able to make headway in the Project stages. The most outstanding ones were:

- Finish defining which of the two options resulting from the Visualization Study was the most ideal from a technical and economic standpoint.
- Develop the economic sensitivity analysis of the configuration proving to be the best one.
- Develop, on the basis of the industry's best practices, external facilities, planning elements such as requirements for pipelines, multi-pipelines for crude oil and products, dock facilities to unload raw materials, catalysts and chemicals and to dispatch finished products, as well as the plugging and pigging requirements both for crude-oil reception and to dispatch finished products.
- Prepare the document on Bases and Design Premises to be used for the Project's development in the following phases.
- Prepare a document based on rigorous simulations, summarizing the most important information to be able to call for bids from the license-holders of the process unit technologies.
- Develop the documents corresponding to the Conceptual Engineering.
- Develop the Class IV Cost Estimate.
- Prepare the Decision Support Document (DSD 2).

At the same time, during the Conceptual Engineering phase, the license-holders were selected for the process unit technologies comprising the Refinery: UOP, AXENS, LINDE and FOSTER WHEELER were the license-holders selected to provide the technology for the Refinery process units.

Basic Engineering:

This was done by the SK E&C Consultants Ecuador S.A. company (SK E&C). The engineering was done on the basis of the site selected by the Environmental Baseline Study to construct the Refinery.

The scope of the Basic Engineering included the basic design of the licensed process units, as well as the basic design of the rest of the license-free units comprising the Refinery as shown below:

Unit No.	Unit Description (Abbreviation)	Design by
010	Crude and Vacuum Distillation Unit (CDU/VDU)	Open Technology
030	Naphtha Hydrotreater (NHT)	Axens
040	Diesel Hydrotreater (DHT)	Axens
050	Hydrocracker Unit (HCU)	UOP
055	VGO Hydrotreater (VHT)	UOP
070	Delayed Coker Unit (DCU)	Foster Wheeler
110	Saturated Gas Plant (SGP)	Open Technology
115	LPG Treating Unit (LPG)	UOP
120	C4 Isomerization (ISO)	UOP
130	Hydrogen Production Unit (HPU)	Linde
200	Naphtha Catalytic Reformer (NCR)	Axens
300	Fluidized Catalytic Cracker (FCC)	UOP
310	Unsaturated LPG Treating Unit (LEU)	UOP

320	FCC Naphtha Hydrotreater (CNH)	Axens
400	Alkylation Unit (ALK)	UOP
410	Selective Hydrogenation Unit (SHU)	UOP/Hüls
500	Aromatic Extraction Unit (AEU)	Axens/Uhde
510	Reformate Fractionation Unit (RFU)	Axens/Uhde
550	Propylene Propane Splitter Unit (PPS)	Linde
560	Polypropylene Unit (PPU)	Linde/DOW
610	Sulfur Recovery Unit (SRU)	Linde
620	Amine Regeneration Unit (ARU)	Open Technology
630	Sour Water Stripper (SWS)	Open Technology
650	Coke Fired Power Plant (CFP)	Open Technology
705	Brackish Water Reverse Osmosis (BWRO)	Open Technology
710	Potable Water System (PWS)	Open Technology
715	Demineralized Water System (DMW)	Open Technology
720	Cooling Water System (CWS)	Open Technology
730	Steam & Condensate (SCW)	Open Technology
735	Boiler Feed Water System (BFW)	Open Technology
740	Fuel Gas System (FGS)	Open Technology
745	Fuel Oil System (FOS)	Open Technology
750	Plant & Instrument Air System (IAS)	Open Technology
752	Air Separation Unit (ASU)	Open Technology
800	Sea Water Intake System (WIS)	Open Technology
805	Sea Water Reverse Osmosis (SWRO)	Open Technology
810	Refinery Tank Farm (RTF)	Open Technology
811	Interconnecting Pipelines between Refinery and Coastal Area	Open Technology
820	Vent & Relief System (VRS)	Open Technology
830	Coastal Area Tank Farm (CTF)	Open Technology
840	Sulfur Handling System (SHS)	Open Technology
850	Coke Handling System (CHS)	Open Technology
860	Polypropylene Product Handling (PPH)	Open Technology
880	Effluent Treatment Plant (ETP)	Open Technology
890	Fire Fighting & Protection System (FFS)	Open Technology

It was also part of the scope for SK E&C to develop a Class II cost estimate and prepare the Decision Support Document (DSD 3).

This also included coordinating and compiling the information developed by the Environmental Impact Assessment (EIA) and preparing a single document, so RDP could obtain its Environmental License. Developing HAZOP, PDRI and Constructability Analysis.

During this phase, SK E&C worked directly with the license-holders and other engineering companies to be able to conduct the studies within the planned timing. There was engineering being done in Houston, Chicago, Canada, Germany, Korea and Venezuela. They developed 3D models (although this was not part of the scope) to

be able to improve routing designs for piping and cables and thereby obtain the materials lists and counts with greater precision for the final cost estimate.

Additionally, SK E&C prepared the scope for the Detail Engineering, Procurement and Construction (IPC) packages according to the interested investors, who at the time were Germany, Korea and China.

SCOPE OF THE CONSULTANCY:

- The technical evaluation must focus mainly on an analysis of the reasonableness of the costs invested versus programmed costs and the expected benefits.

Evaluating the costs of the Refinery of the Pacific Project will include the following Contracts for Works, Operation, Services and Principal Studies conducted to date, namely:

- Design and Implementation of Earth Movement to prepare the site where the Refinery of the Pacific will be built.
- Design and Implementation of the Camp and Access roads, as well as maintenance of those Works.
- Design and Implementation of the Aqueduct from La Esperanza to the Refinery of the Pacific site.
- Operation and Maintenance of the Aqueduct from La Esperanza to the Refinery of the Pacific site.
- PMC Contract to manage the entire project and engineering review and work supervision.
- Implement the Environmental Impact Assessment.

The evaluation must also include an analysis of the costs of the following studies done to date, namely:

- Visualization
- Conceptual Engineering
- Basic Engineering
- Market
- Value Engineering
- Economic Studies
- Environmental Impact Studies
- Developing the ZEDE Eloy Alfaro
- Aqueduct from the La Esperanza Dam to the RDP - Study to determine water sources and costing.
- Oil pipelines, Product pipelines and Terminals – to supply crude oil to the Refinery, storage and distribution of products.
- Electrical Energy Supply
- Technical and financial feasibility study.

The evaluation must analyze whether the estimated costs are reasonable for the following licenses:

- Naphtha Hydrotreater
- Diesel Hydrotreater
- Naphtha Catalytic Reformer
- FCC Naphtha Hydrotreater
- Aromatics Extraction
- Reformate Fractionation

- Delayed Coker Unit
- Propylene Propane Splitter Unit
- Polypropylene Unit
- Sulfur Recovery Unit and Tail Gas Cleaning Unit
- Hydrocracker Unit
- VGO Hydrotreater Unit
- Saturated LPG Treating Unit
- C4 Isomerization Unit
- Fluid Catalytic Cracker Unit
- Unsaturated LPG Treating Unit
- Alkylation Unit
- Selective Hydrogenation Unit

The evaluation must also include an analysis of the Organizational Structure during the Early Works.

INFORMATION THAT EP PETROECUADOR HAS:

- Project technical and economic feasibility study
- Project Implementation Plan
- Pre-contractual documentation on the contracting processes for engineering and the EPC contracts for Earth Movement, Aqueduct, Camps and Roadways, PMC, official inspection and Environmental Impact Assessment.
- List of Deliverables and documentation on conceptual engineering
- List of Deliverables and documentation on basic engineering
- List of Deliverables and documentation on detailed engineering
- Main contract and complementary contracts for engineering
- Main contract and complementary contracts for Procurement, Construction and Start-up of existing facilities
- Main contract and complementary contracts for Operation and Maintenance of the Aqueduct
- Official project budgets for contracts: engineering, procurement, construction, start-up and operation and maintenance
- Delivery and reception memoranda for the contracts: engineering, procurement, construction and start-up of existing facilities.
- Minutes of relevant meetings and agreements about the established in the Scope
- Documentation of the complaints between EPP and the contractors involved
- Approved Environmental Management Plan
- Reports on compliance with the Environmental Management Plan
- Reports by the WorleyParsons contractor regarding the entire Refinery of the Pacific project process
- Project management guide from the internal Petroecuador norms.

EXPECTED OUTPUTS:

In the technical-operational evaluation, the following reports must be delivered:

- Detailed report of the technical-operational evaluation, including checklists taken as a reference
- Report on evaluation of the organizational environment.
- Report on the reasonableness of the costs incurred
- Detailed final report with conclusions and recommendations, Power Point presentation with an Executive summary.

During contract implementation, UNDP may require the Consulting firm to submit additional technical reports

regarding the Consultancy outputs.

WORKPLACE:

Work will be done in the city of Quito and the Province of Manabí, Republic of Ecuador.

PROFILE OF THE CONSULTING FIRM:

The Consulting firm must have at least **15 years'** experience in consultancies regarding project management or direction in the oil and gas sectors, implementing engineering, specialized studies, technical and economic evaluations of downstream projects in the oil and gas sectors.

KEY STAFF REQUIRED:

To perform the purpose of the present Terms of Reference requires the Consulting firm to have the following key personnel:

- A Director of the Evaluation Consultancy
- A Mechanical Engineer for Pipelines
- A Civil Engineer for Roadways and Platforms
- A Refining Process Engineer
- A Cost Specialist

The Consulting firm must submit the CVs of the Key Personnel using the form called "Qualifications of Key Personnel" from Section 6, Technical Bid Form, Section 3, Personnel, from the Request for Proposals Document. The "Qualifications of Key Personnel" Form must be accompanied by certifications of their studies, work certifications, and of their knowledge of the Spanish language. Any degrees, diplomas, certificates and/or records that are written in some language other than Spanish or English must be presented with a simple translation into Spanish.

The key personnel must meet the requirements described in the following table:

Director of the Evaluation Consultancy
- Education University Degree in Business Administration, Engineering or related areas
- Specialty Training: Master's degree in Project Management, Business Management, Engineering or related areas
- Preferred Specialty Training: If the M.Sc. is related with the Petroleum, Natural gas, Petrochemical industry or related areas
- Courses and Training: Knowledge of Project Management Standards, ISO 10006, PMI, SGPMI International or the equivalent.
- Professional experience in this specialty: At least 15 years' experience in Project management, Personnel management, Planning and Contract Administration in the Oil & Gas Industry.
- Knowledge of the region (Latin America): Preferably
- Language competence: Knowledge of the Spanish language, written and spoken, at a professional level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent

Mechanical Engineer for Pipelines
- Education: University degree in Mechanical engineering
- Specialty Training: Master's degree in Mechanical engineering, or related areas.
- Preferred Specialty Training: M.Sc. in Transport Systems for Petroleum and Products, or the equivalent.
- Courses and Certifications: Knowledge of API, DIN, ASME, ASTM, NFPA Standards or the equivalent
- Professional experience in this specialty: At least 10 years' experience in construction or operation of Transport Systems for Petroleum and Gas
- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent
Civil Engineer for Roadways and Platforms
- Education: University degree in Civil engineering
- Specialty Training: Master's degree in Civil engineering, or related areas.
- Preferred Specialty Training: If the M.Sc. involves the construction of Platforms, access roads and highways.
- Courses and Certifications: Knowledge of Standards for Construction of Highways, Access roads, Platforms, ASTM or the equivalent
- Professional experience in this specialty: At least 10 years' experience in projects involving construction of roadways, highways, platforms, and large-scale earth movement.
- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent
Refining Process Engineer
- Education: University degree in Mechanical engineering, or Chemical engineering
- Specialty Training: Master's degree in Mechanical engineering, Chemical engineering or related areas.
- Preferred Specialty Training: If the M.Sc. involves design and analysis of Petroleum Refining Processes
- Courses and Certifications: Knowledge of API, ASME, ASTM, NFPA Standards, Certification in Refineries, NACE Certification or the equivalent
- Professional experience in this specialty: At least 10 years' experience in operations involving designing Petroleum refining processes and Managing Process Simulator Software.
- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent
Cost Specialist
- Education: University Degree in Business Administration, Accounting, Auditing, Finance or related areas

- Specialty Training: Master's Degree in Business Administration, Accounting, Auditing, Finance or related areas
- Preferred Specialty Training: If the M.Sc. involves Cost Analysis Processes and is applicable to the oil and gas industry
- Courses and Certifications: Knowledge of Budgeting, Accounting standards, Tax laws, Costs and Expenses, or the equivalent
- Professional experience in this specialty: At least 10 years' experience in cost analysis, investments, budgets, cost allocation and management and if it is in the Petroleum Industry
- Knowledge of the region (Latin America): Preferably
- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent

ADDITIONAL PERSONNEL REQUIRED:

The Consulting firm must commit to supply the following additional personnel:

- 1 electrical / power engineer
- 1 mechanical equipment engineer
- 1 geo-technical engineer
- 1 instrumentation, automation and control engineer
- 1 environmental engineer
- 1 contracting specialist

The required additional personnel must present a university degree, at least 10 years' professional experience in the oil and gas industry relevant to the above-listed positions and knowledge of the Spanish language. The Consulting firm must submit the CVs of the Additional Personnel using the form called "Qualifications of Required Additional Personnel" from Section 6, Technical Bid Form, Section 3, Personnel, from the Request for Proposals Document. UNDP reserves the right to request, at any point, the supporting documentation accrediting the qualifications of the additional personnel required.

REGARDING THE PERSONNEL:

The Consulting firm may indicate additional personnel if it is considered necessary.

It will be the Consulting firm's responsibility to provide sufficient insurance as necessary to cover all personnel implementing activities and making the arrangements necessary for them to enter the country, in the case of foreign personnel.

SERVICE METHODOLOGY:

In its technical bid, the Consulting firm must present the methodology it will implement, with all necessary details, for Project evaluation. Please see the Technical Bid Form (Section 6 of the Request for Proposal Document), regarding the Implementation and Personnel Approach and Plan.

RECEPTION AND DELIVERY OF DOCUMENTATION:

The Consulting firm must implement a document control system for reception, review and return without alterations of the information from EP Petroecuador to be analyzed.

The document control system must include distribution of the reports that the Consulting firm must prepare during the project evaluation.

The Consulting firm will present progress reports on the work weekly and monthly in Word documents and PDF format, duly signed, and making a record of delivery, with the corresponding written communication and registered in the document control system.

The Consulting firm must present the results of its Final report in a Word document and PDF with the respective support media and in a Power Point presentation with an executive summary. It must include a detailed chronological listing of the activities carried out, indicating the deliverables. The executive summary will be presented at a meeting to be agreed upon between the parties. The Final report will be delivered in hard-copy physical format, duly signed, and also in a digital PDF format and an editable Word file.

CONFIDENTIALITY CLAUSE

All documentation or information that the Consulting firm receives from UNDP and PETROECUADOR, or that it may access while performing the contract function, must be treated by the Consulting firm and its employees, dependents, key personnel, additional personnel, as confidential information. The Consulting firm may not disclose, directly or indirectly, the information received to any person, without written consent from UNDP and PETROECUADOR, excepting their employees or hired personnel who need to receive that information to properly perform the contract, being directly responsible for the use of that information by its employees or contract personnel. The Consulting firm agrees to take measures to protect the confidentiality of this information, which – overall – will be framed within recognized best practices in the area of Information Security. This includes informing its employees or contract personnel about the confidential nature and the prohibitions to copy or disclose information and agree that this information will be kept in a safe place. The Consulting firm assumes, vis-à-vis UNDP and PETROECUADOR, the corresponding responsibilities for failure to fulfill this confidentiality clause.

APPLICABLE NORMS:

All work will be done according to the codes, norms and technical specifications listed below:

- Project Management Standards, ISO 10006, PMI, SGPMP.
- API Standards.
- ASME Standards.
- ASTM Standards.
- NFPA Standards.
- Standards for Civil Works.
- Standards for Fire-fighting Systems.
- Standards for Safety, Health and Environment.
- Project management guide from the internal Petroecuador norms.

CONTRACT ADMINISTRATION AND MEANS OF SUPERVISING EXPECTED OUTPUTS:

UNDP will directly supervise the Consulting firm's work. Once the consultancy contract is signed, UNDP will designate, at the starting meeting, the contract administrator and the technical team that will supervise project evaluation.

The UNDP supervision and the Consulting firm will hold technical meetings between the parties, to define and analyze criteria as the evaluation moves forward, and provide immediate solutions as the process continues, at the end of which the corresponding meeting minutes will be signed, which will include the actions, persons responsible and dates.

MEETING TO BEGIN THE EVALUATION:

Once the evaluation contract has been signed, and within no longer than 2 days after that signing, the Consulting firm must coordinate and carry out the kick-off meeting, attended by the key personnel of the Consulting firm, of UNDP and delegates of the Ministry of Hydrocarbons and of EP Petroecuador.

At this meeting, the Consulting firm will present the methodology to evaluate the Project, as well as the Project Director and his technical team, which appear in the technical bid.

This meeting will also establish the matrix for communications between the parties and the details for project site visits, logistics and other required field activities. The agreements will be signed in the memorandum of starting up the work to be done and issued at the kick-off meeting.

MEANS OF APPROVAL FOR THE EXPECTED OUTPUTS:

The expected Outputs from this consultancy will be reviewed by the UNDP supervision and contract administration team, which will have the opinion of governmental institutions (Ministry of Hydrocarbons and EP Petroecuador) to review the outputs. UNDP will make the last validation of the outputs generated under the consultancy.

TERMS OF PAYMENT:

Output / Milestone	Percentage of the contract	Deadline
Advance payment of up to 20% of the total Contract amount	20%	7 days after contract signing
Output 1- Technical Progress Report	20%	21 days after contract signing
Output 2 - Draft Final Report	30%	42 days after contract signing
Output 3 - Final report, Executive summary and Presentation of results	30%	60 days after contract signing
	100%	

ATTACHMENTS

Attachment 1: Presentation of the Refinery of the Pacific Project

Attachment 2: Listing of contracts, amounts and scopes of the consultancies engaged

Attachment 3: Clarifications regarding consultancies engaged for the Refinery of the Pacific project

Attachment 4: Aide-Memoire Report on the Refinery of the Pacific Project

Attachment 5: Organizational chart of the Refinery of the Pacific Project

TERMS OF REFERENCE, LOT No. 3
TECHNICAL AND OPERATIONAL EVALUATION OF THE
MONTEVERDE MARITIME TERMINAL

PURPOSE:

Engage a consulting firm to conduct the technical, operational and financial evaluation of the **MONTEVERDE MARITIME TERMINAL PROJECT, LOCATED IN SANTA ELENA PROVINCE, ECUADOR.**

The evaluation will require:

1. A full assessment of all actions taken regarding the topics established in the scope of the consultancy, analyzing whether established international standards were met, and the reasonableness of the investment cost.
2. Establish the current situation of facilities in terms of infrastructure and organizational management.
3. What actions must be taken to operate efficiently with international standards and
4. What would be the estimated cost and approximate time to implement the recommended solutions.

IMPLEMENTATION DEADLINE:

The implementation period for the required evaluation is sixty (60) calendar days, counted from the contract signing date.

BACKGROUND:

The Monteverde Maritime Terminal, located in Colonche parish, Santa Elena canton, Santa Elena Province, has a storage capacity of 61,000 metric tons of LPG, a 5,300 MT / day pumping station, which – through an LPG pipeline 124 Km long – supplies the El Chorrillo Terminal, and also distributes LPG by tank trucks in the Monteverde Station to supply this fuel to the provinces of Manabí and Santa Elena. The system guarantees the country approximately 20 days' reserve for the national demand.

The Monteverde dock is 1,300 meters long, supported by 436 metal piles. The metal piles are currently corroded in general, and especially in the zone where they are splashed and exposed to the environment.

The Monteverde Maritime Terminal dock was designed for the northern side to berth vessels up to 75,000 DWT, which are quite long, but most gas ships that dock there are lower-capacity.

Further, the sea water catchment system for temperature exchange has difficulties because sea life gets in. Further, the behavior of the electric power area and control and signaling linkages in the SCADA system must be analyzed.

SCOPE OF THE CONSULTANCY:

- Evaluate the current situation of the infrastructure and facilities at the Monteverde Maritime Terminal, comprising the dock and the LPG storage and processing plant, by checking existing documentation and making technical visits and inspections on-site, to determine whether the project followed international standards for project management and whether the design and construction parameters were technically suited to international standards governing this type of facilities. The above technical evaluation will contain principally the following topics:

- Analysis of the reasonableness of the costs invested versus programmed costs and the benefits obtained.
- Analysis of sizing the mooring platform on the northern side of the dock to receive gas ships of the required dimensions.
- Analysis of the requirement to implement a Cathodic Protection System for the dock's piles.
- Review of the operating philosophy, processes and sizing of rotary and static equipment.
- Review of the sea water catchment system for heat exchange, to make it possible to determine whether sea water is an adequate system for that purpose, and the impacts that the entry of marine life makes.
- Review of the chosen location on the basis of meteorological, climatic and deep-sea parameters.
- Review of the level of dock utilization at this time and analysis for use of the southern side of it.
- Review of the design of propane and butane tanks.
- Analysis of the auxiliary systems included in the Maritime Terminal that are not being used.
- Analysis of the behavior of the electric power area and control and signaling linkages in the SCADA system.
- Analysis of the efficiency of facilities regarding installed capacity and processes.

From this list, there are two priority issues that the Consulting firm must analyze in this project: 1. At this time, there is a high degree of corrosion of the metal piles due to a lack of cathodic protection and 2. The sea water catchment system passes water under the road to get to the plant.

For information purposes, it is reported that, at this date, the tender process is being held to "Implement a system of protection against corrosion of the metal piles of Monteverde Dock", which is in its precontractual phase. It is estimated that the work will take 330 calendar days to implement it.

Regarding the sea water catchment system route, there are 4 vertical pumps for sea water catchment located on the dock. The piping to the plant is a high-density 24" polyethylene line, through a box culvert under the road.

Regarding the dock, there are now studies to build two new dikes for mooring on the northern side to receive ships up to 75,000 TDW. At this time, the tender process is being done to construct these dikes.

- Further, the organizational environment must be evaluated through the operating and maintenance procedures, change management, maintenance and inspection plans and compliance with them, analysis of mechanical integrity, competencies of personnel regarding operation, maintenance and reliability of the Maritime Terminal.

INFORMATION THAT EP PETROECUADOR HAS:

- As Built and P&ID blueprints of the facilities.
- Basic and detailed engineering of the solution to implement the Cathodic Protection of Monteverde Dock, done by Morken.
- Studies and basic engineering of the solution to implement the Cathodic Protection of Monteverde Dock, done by Beicip Franlab.
- Basic and detailed engineering for construction of two Mooring Dikes on the northern side of the Monteverde Dock.
- Technical reports done by the WorleyParsons International, Inc. company.
- Project technical and economic feasibility study
- Project Implementation Plan
- Pre-contractual documentation of the processes to engage engineering and the EPC contract
- List of Deliverables and documentation on conceptual engineering
- List of Deliverables and documentation on basic engineering
- List of Deliverables and documentation on detailed engineering
- Main contract and complementary contracts for engineering

- Main and complementary contracts for Procurement, Construction and Commissioning.
- Main contract and complementary contracts for Operation and Maintenance.
- Official project budgets for contracts: engineering, procurement, construction, start-up and operation and maintenance
- Delivery and reception memoranda for the contracts: engineering, procurement, construction and start-up.
- Minutes of relevant meetings and agreements about the established in the Scope
- Documentation of the complaints between EPP and the contractors involved
- Approved Environmental Management Plan
- Reports on compliance with the Environmental Management Plan
- Studies under way on the status of the piles.
- Project management guide from the internal Petroecuador norms.

EXPECTED OUTPUTS:

In the technical-operational evaluation, the following reports must be delivered:

- Detailed report of the technical-operational evaluation, including checklists taken as a reference
- Reports of the RBIs or the equivalent
- Report on Analysis of Alternatives for improvement and recommendations
- Report on environmental impact evaluation, before and after rehabilitation
- Report on evaluation of the organizational environment.
- Report on the reasonableness of the costs incurred for the Monteverde Maritime Terminal Project.
- Report on the costs and estimated times to implement the recommended technical solutions to achieve efficient operation and reliability.
- Detailed final report with conclusions and recommendations, Power Point presentation with an Executive summary.

During contract implementation, UNDP may require the Consulting firm to submit additional technical reports regarding the Consultancy outputs.

WORKPLACE:

Work will be done in the city of Quito and the Province of Santa Elena, Republic of Ecuador.

PROFILE OF THE CONSULTING FIRM:

The Consulting firm must have at least **15 years'** experience in consultancies regarding project management or direction in the oil and gas sectors, implementing engineering, specialized studies, technical and economic evaluations of downstream projects in the oil and gas sectors.

KEY STAFF REQUIRED:

To perform the purpose of the present Terms of Reference requires the Consulting firm to have the following key personnel:

- A Director of the Evaluation Consultancy
- A Mechanical Engineer for Pipelines
- A Structural Civil Engineer
- A Quality Engineer
- A Cost Specialist

The Consulting firm must submit the CVs of the Key Personnel using the form called "Qualifications of Key Personnel" from Section 6, Technical Bid Form, Section 3, Personnel, from the Request for Proposals Document. The "Qualifications of Key Personnel" Form must be accompanied by certifications of their studies, work certifications, and of their knowledge of the Spanish language. Any degrees, diplomas, certificates and/or records that are written in some language other than Spanish or English must be presented with a simple translation into Spanish.

The key personnel must meet the requirements described in the following table:

Director of the Evaluation Consultancy
- Education: University Degree in Business Administration, Engineering or related areas
- Specialty Training: Master's degree in Project Management, Business Management, Engineering or related areas
- Preferred Specialty Training: If the M.Sc. is related with the Petroleum, Natural gas, Petrochemical industry or related areas
- Courses and Training: Knowledge of Project Management Standards, ISO 10006, PMI, SGPMI International or the equivalent.
- Professional experience in this specialty: At least 15 years' experience in Project management, Personnel management, Planning and Contract Administration in the Oil & Gas Industry.
- Knowledge of the region (Latin America): Preferably
- Language competence: Knowledge of the Spanish language, written and spoken, at a professional level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent
Mechanical Engineer for Pipelines
- Education: University degree in Mechanical engineering
- Specialty Training: Master's degree in Mechanical engineering, or related areas.
- Preferred Specialty Training: M.Sc. in Transport Systems for Petroleum and Products, or the equivalent.
- Courses and Certifications: Knowledge of API, DIN, ASME, ASTM, NFPA Standards or the equivalent
- Professional experience in this specialty: At least 10 years' experience in construction or operation of Transport Systems for Petroleum and Gas
- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent
Structural Civil Engineer
- Education: University degree in Civil engineering
- Specialty Training: M.Sc. in Structural Engineering
- Courses and Certifications: Knowledge of Standards for Construction, Structures, ASTM or the equivalent.

<p>- Professional experience in this specialty: At least 10 years; experience in analysis, design and evaluation of buildings and structures 25 points and if this experience involves Maritime Petroleum Terminals 15 points.</p>
<p>- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent</p>
Quality Engineer
<p>- Education: University degree in Mechanical engineering, Chemical engineering, Industrial engineering or related areas</p>
<p>- Specialty Training: Master's degree in Mechanical engineering, Chemical engineering, Industrial engineering, Project Management or related areas</p>
<p>- Preferred Specialty Training: M.Sc. in Quality Management</p>
<p>- Courses and Certifications: Knowledge of Quality Control System Norms in Refineries or Liquefied Petroleum Gas Plants or Liquefied Natural Gas Plants, API, ASME, ASTM, NFPA Standards, Quality Management Standards, ISO 9001, ISO 55000 or the equivalent.</p>
<p>- Professional experience in this specialty: At least 10 years' experience in designing and managing quality plans, implementing quality assurance and quality control systems, managing improvement processes to guarantee continual operation in Oil & Gas industry facilities.</p>
<p>- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent</p>
Cost Specialist
<p>- Education: University Degree in Business Administration, Accounting, Auditing, Finance or related areas</p>
<p>- Specialty Training: Master's Degree in Business Administration, Accounting, Auditing, Finance or related areas</p>
<p>- Preferred Specialty Training: If the M.Sc. involves Cost Analysis Processes and is applicable to the oil and gas industry</p>
<p>- Courses and Certifications: Knowledge of Budgeting, Accounting standards, Tax laws, Costs and Expenses, or the equivalent</p>
<p>- Professional experience in this specialty: At least 10 years' experience in cost analysis, investments, budgets, cost allocation and management and if it is in the Petroleum Industry</p>
<p>- Knowledge of the region (Latin America): Preferably</p>
<p>- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent</p>

ADDITIONAL PERSONNEL REQUIRED:

The Consulting firm must commit to supply the following additional personnel:

- A Mechanical Engineer for corrosion
- A naval Civil Engineer
- A Consultant on risks

- An electrical / power engineer
- An instrumentation, automation and control engineer
- An environmental engineer
- A contracting specialist

The required additional personnel must present a university degree, at least 10 years' professional experience in the oil and gas industry relevant to the above-listed positions and knowledge of the Spanish language. The Consulting firm must submit the CVs of the Additional Personnel using the form called "Qualifications of Required Additional Personnel" from Section 6, Technical Bid Form, Section 3, Personnel, from the Request for Proposals Document. UNDP reserves the right to request, at any point, the supporting documentation accrediting the qualifications of the additional personnel required.

REGARDING THE PERSONNEL:

The Consulting firm may indicate additional personnel if it is considered necessary.

It will be the Consulting firm's responsibility to provide sufficient insurance as necessary to cover all personnel implementing activities and making the arrangements necessary for them to enter the country, in the case of foreign personnel.

SERVICE METHODOLOGY:

In its technical bid, the Consulting firm must present the methodology it will implement, with all necessary details, for Project evaluation. Please see the Technical Bid Form (Section 6 of the Request for Proposal Document), regarding the Implementation and Personnel Approach and Plan.

RECEPTION AND DELIVERY OF DOCUMENTATION:

The Consulting firm must implement a document control system for reception, review and return without alterations of the information from EP Petroecuador to be analyzed.

The document control system must include distribution of the reports that the Consulting firm must prepare during the project evaluation.

The Consulting firm will present progress reports on the work weekly and monthly in Word documents and PDF format, duly signed, and making a record of delivery, with the corresponding written communication and registered in the document control system.

The Consulting firm must present the results of its Final report in a Word document and PDF with the respective support media and in a Power Point presentation with an executive summary. It must include a detailed chronological listing of the activities carried out, indicating the deliverables. The executive summary will be presented at a meeting to be agreed upon between the parties. The Final report will be delivered in hard-copy physical format, duly signed, and also in a digital PDF format and an editable Word file.

CONFIDENTIALITY CLAUSE

All documentation or information that the Consulting firm receives from UNDP and PETROECUADOR, or that it may access while performing the contract function, must be treated by the Consulting firm and its employees, dependents, key personnel, additional personnel, as confidential information. The Consulting firm may not disclose, directly or indirectly, the information received to any person, without written consent from UNDP and PETROECUADOR, excepting their employees or hired personnel who need to receive that information to properly perform the contract, being directly responsible for the use of that information by its employees or contract personnel. The Consulting firm agrees to take measures to protect the confidentiality of this information, which – overall – will be framed within recognized best practices in the area of Information Security. This includes

informing its employees or contract personnel about the confidential nature and the prohibitions to copy or disclose information and agree that this information will be kept in a safe place. The Consulting firm assumes, vis-à-vis UNDP and PETROECUADOR, the corresponding responsibilities for failure to fulfill this confidentiality clause.

APPLICABLE NORMS:

All work will be done according to the codes, norms and technical specifications listed below:

- Project Management Standards, ISO 10006, PMI, SGPMP.

- API Standards.

- ASME Standards.

- ASTM Standards.

- NFPA Standards.

- Standards for Civil Works.

- Standards for Naval Works.

- Standards for Fire-fighting Systems.

- International standards for Safety, Health and Environment.

- Project management guide from the internal Petroecuador norms.

CONTRACT ADMINISTRATION AND MEANS OF SUPERVISING EXPECTED OUTPUTS:

UNDP will directly supervise the Consulting firm's work. Once the consultancy contract is signed, UNDP will designate, at the starting meeting, the contract administrator and the technical team that will supervise project evaluation.

The UNDP supervision and the Consulting firm will hold technical meetings between the parties, to define and analyze criteria as the evaluation moves forward, and provide immediate solutions as the process continues, at the end of which the corresponding meeting minutes will be signed, which will include the actions, persons responsible and dates.

MEETING TO BEGIN THE EVALUATION:

Once the evaluation contract has been signed, and within no longer than 2 days after that signing, the Consulting firm must coordinate and carry out the kick-off meeting, attended by the key personnel of the Consulting firm, of UNDP and delegates of the Ministry of Hydrocarbons and of EP Petroecuador.

At this meeting, the Consulting firm will present the methodology to evaluate the Project, as well as the Project Director and his technical team, which appear in the technical bid.

This meeting will also establish the matrix for communications between the parties and the details for project site visits, logistics and other required field activities. The agreements will be signed in the memorandum of starting up the work to be done and issued at the kick-off meeting.

MEANS OF APPROVAL FOR THE EXPECTED OUTPUTS:

The expected Outputs from this consultancy will be reviewed by the UNDP supervision and contract administration team, which will have the opinion of governmental institutions (Ministry of Hydrocarbons and EP Petroecuador) to review the outputs. UNDP will make the last validation of the outputs generated under the consultancy.

TERMS OF PAYMENT:

Output / Milestone	Percentage of the contract	Deadline
Advance payment of up to 20% of the total Contract amount	20%	7 days after contract signing
Output 1- Technical Progress Report	20%	21 days after contract signing
Output 2 - Draft Final Report	30%	42 days after contract signing
Output 3 - Final report, Executive summary and Presentation of results	30%	60 days after contract signing
	100%	

ATTACHMENTS

Attachment 1: Description of the Monteverde Maritime Terminal Project

Attachment 2: Listing of contracts and amounts of the Monteverde Maritime Terminal Project

Attachment 3: Organizational chart of the Monteverde Maritime Terminal Project

TERMS OF REFERENCE, LOT No. 4
TECHNICAL AND OPERATIONAL EVALUATION OF THE
PASCUALES – CUENCA PRODUCT PIPELINE

PURPOSE:

Engage a Consulting firm to conduct the technical, operational and financial evaluation of the **PASCUALES – CUENCA PRODUCT PIPELINE**.

The evaluation will require:

1. A full assessment of all actions taken regarding the topics established in the scope of the consultancy, analyzing whether established international standards were met, and the reasonableness of the investment cost,
2. Establish the current situation of facilities in terms of infrastructure and management,
3. What actions must be taken to operate efficiently with international standards, and
4. What would be the estimated cost and approximate time to implement the recommended solutions.

IMPLEMENTATION DEADLINE:

The implementation period for the required evaluation is sixty (60) calendar days, counted from the contract signing date.

BACKGROUND:

With Resolution 450-CAD on 2006-12-08, the Administration Council of EP Petroecuador approved the construction project.

In 2013, the contract was signed to Construct the Pascuales-Cuenca Product Pipeline, with the Constructora Norberto Odebrecht company.

The Provisional Reception and Delivery Memoranda were signed as itemized below:

- TRA ZSU 2016132- SECTION I of the Pascuales-Cuenca Product Pipeline and its Stations, registered on 30 May 2016.
- TRA ZSU 2017032- SECTION II of the Pascuales-Cuenca Product Pipeline and its Stations, registered on 02 March 2017.

Memorandum TRA ZSU 2017032 SECTION II determined the listing of pending issues (PUNCH LIST), itemizing all points that needed to be resolved by the final reception of the Project. The Contract for Construction of the Pascuales–Cuenca Product Pipeline stipulated a six-month period of operation as the time for operational testing, after having done the Provisional Reception of the Product Pipeline facilities. Once the project began operating during the 6 months’ trial period, the user area presented reports with difficulties that were forwarded to the Contractor and have to do with:

- Construction problems and flaws, according to reports from the operational part.
- Infrastructure that does not operate at its design capacity, especially problems with the pumping groups.
- Premature deterioration of the plant and equipment, according to reports from the operational area.
- The Automated System for dispatch and reception of products from the pipeline is not operating 100%, etc.

SCOPE OF THE CONSULTANCY:

- Evaluate the current situation of the infrastructure and facilities of the Pascuales-Cuenca Product Pipeline and its terminals and stations, by checking existing documentation and making technical visits and inspections on-site, to determine whether the project followed international standards for project management and whether the design and construction parameters were technically suited to international standards governing this type of facilities. The above technical evaluation will contain principally the following topics:
 - Analysis of the reasonableness of the costs invested versus programmed costs and the benefits obtained.
 - Review of the operating philosophy.
 - Study of operational reliability of stations, terminals and the product pipeline
 - Analysis of construction risks and the process in stations, terminals and the product pipeline route
 - Review of the sizing and selection of rotary and static equipment to comply with the operating philosophy.
 - Evaluation of the systems to stabilize steep slopes at the stations and terminals of La Troncal and Cuenca.
 - Evaluate water filtrations and drainage solutions at the Cuenca terminal.
 - Review the location of the pumping stations and pressure reducing station with the hydraulic profile.
 - Evaluate the communications and leak detection systems.
- Further, the organizational environment will be evaluated through the operating and maintenance procedures, change management, maintenance and inspection plans and compliance with them, analysis of mechanical integrity, competencies of personnel regarding operation, maintenance and reliability of the Pascuales-Cuenca Product Pipeline.

INFORMATION THAT EP PETROECUADOR HAS:

- Project technical and economic feasibility study
- Project Implementation Plan
- Pre-contractual documentation of the processes to engage engineering and the EPC contract
- List of Deliverables and documentation on conceptual engineering
- List of Deliverables and documentation on basic engineering
- List of Deliverables and documentation on detailed engineering
- Main contract and complementary contracts for engineering
- Main and complementary contracts for Procurement, Construction and Commissioning.
- Main contract and complementary contracts for Operation and Maintenance.
- Official project budgets for contracts: engineering, procurement, construction, start-up and operation and maintenance
- Delivery and reception memoranda for the contracts: engineering, procurement, construction and start-up.
- Minutes of relevant meetings and agreements about the established in the Scope
- Documentation of the complaints between EPP and the contractors involved
- Approved Environmental Management Plan
- Reports on compliance with the Environmental Management Plan
- Project management guide from the internal Petroecuador norms.

EXPECTED OUTPUTS:

In the technical-operational evaluation, the following reports must be delivered:

- Detailed report of the technical-operational evaluation, including checklists taken as a reference
- Reports of the RBIs or the equivalent
- Report on Analysis of Alternatives for improvement and recommendations
- Report on environmental impact evaluation, before and after rehabilitation
- Report on evaluation of the organizational environment.
- Report of the reasonableness of the costs incurred in the Pascuales-Cuenca Product pipeline project.
- Report on the costs and estimated times to implement the recommended technical solutions to achieve efficient operation and reliability.
- Detailed final report with conclusions and recommendations, Power Point presentation with an Executive summary.

During contract implementation, UNDP may require the Consulting firm to submit additional technical reports regarding the Consultancy outputs.

WORKPLACE:

Work will be done in the city of Quito and the Provinces of Guayas, Cañar and Azuay, Republic of Ecuador.

PROFILE OF THE CONSULTING FIRM:

The Consulting firm must have at least **15 years'** experience in consultancies regarding project management or direction in the oil and gas sectors, implementing engineering, specialized studies, technical and economic evaluations of downstream projects in the oil and gas sectors.

KEY STAFF REQUIRED:

To perform the purpose of the present Terms of Reference requires the Consulting firm to have the following key personnel:

- A Director of the Evaluation Consultancy
- A Quality Engineer
- An Engineer Specializing in Geotechnology
- A Mechanical Engineer for Pipelines
- A Cost Specialist

The Consulting firm must submit the CVs of the Key Personnel using the form called "Qualifications of Key Personnel" from Section 6, Technical Bid Form, Section 3, Personnel, from the Request for Proposals Document. The "Qualifications of Key Personnel" Form must be accompanied by certifications of their studies, work certifications, and of their knowledge of the Spanish language. Any degrees, diplomas, certificates and/or records that are written in some language other than Spanish or English must be presented with a simple translation into Spanish.

The key personnel must meet the requirements described in the following table:

	Director of the Evaluation Consultancy			
	- Education: University Degree in Business Administration, Engineering or related areas	Complies / Does not	-	

	- Specialty Training: Master's degree in Project Management, Business Management, Engineering or related areas	Complies / Does not	-	
	- Preferred Specialty Training: If the M.Sc. is related with the Petroleum, Natural gas, Petrochemical industry or related areas	20		
	- Courses and Training: Knowledge of Project Management Standards, ISO 10006, PMI, SGPMP International or the equivalent.	10		
	- Professional experience in this specialty: At least 15 years' experience in Project management, Personnel management, Planning and Contract Administration in the Oil & Gas Industry.	60		
	- Knowledge of the region (Latin America): Preferably	10		
	- Language competence: Knowledge of the Spanish language, written and spoken, at a professional level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent	Complies / Does not		
	Quality Engineer			
	- Education: University degree in Mechanical engineering, Chemical engineering, Industrial engineering or related areas	Complies / Does not		
	- Specialty Training: Master's degree in Mechanical engineering, Chemical engineering, Industrial engineering, Project Management or related areas	Complies / Does not		
	- Preferred Specialty Training: M.Sc. in Quality Management	10		
	- Courses and Certifications: Knowledge of Quality Control System Norms in Refineries or Liquefied Petroleum Gas Plants or Liquefied Natural Gas Plants, API, ASME, ASTM, NFPA Standards, Quality Management Standards, ISO 9001, ISO 55000 or the equivalent.	5		
	- Professional experience in this specialty: At least 10 years' experience in designing and managing quality plans, implementing quality assurance and quality control systems, managing improvement processes to guarantee continual operation in Oil & Gas industry facilities.	35		
	- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent	Complies / Does not		
	Engineer Specializing in Geotechnology			
	- Education: University degree in Civil Engineering, Geological Engineering, Geotechnical Engineering	Complies / Does not		

	- Specialty Training: M.Sc. in Geotechnical Engineering	Complies / Does not		
	- Courses and Certifications: Geotechnical Studies, ISO 14688, ASME Standards or the equivalent	10		
	- Professional experience in this specialty: At least 10 years' experience in geotechnical analysis, evaluation of buildings and structures and implementing Geotechnical Calculation Programs.	35		
	- Knowledge of the region (Latin America): Preferably	5		
	- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent	Complies / Does not		
	Mechanical Engineer for Pipelines			
	- Education: University degree in Mechanical engineering	Complies / Does not		
	- Specialty Training: Master's degree in Mechanical engineering, or related areas.	Complies / Does not		
	- Preferred Specialty Training: M.Sc. in Transport Systems for Petroleum and Products, or the equivalent.	5		
	- Courses and Certifications: Knowledge of API, DIN, ASME, ASTM, NFPA Standards or the equivalent	10		
	- Professional experience in this specialty: At least 10 years' experience in construction or operation of Transport Systems for Petroleum and Gas	30		
	- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent	5		
	Cost Specialist			
	- Education: University Degree in Business Administration, Accounting, Auditing, Finance or related areas	Complies / Does not		
	- Specialty Training: Master's Degree in Business Administration, Accounting, Auditing, Finance or related areas	Complies / Does not		
	- Preferred Specialty Training: If the M.Sc. involves Cost Analysis Processes and is applicable to the oil and gas industry	5		
	- Courses and Certifications: Knowledge of Budgeting, Accounting standards, Tax laws, Costs and Expenses, or the equivalent	10		

	- Professional experience in this specialty: At least 10 years' experience in cost analysis, investments, budgets, cost allocation and management and if it is in the Petroleum Industry	30		
	- Knowledge of the region (Latin America): Preferably	5		
	- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent	Complies / Does not		

ADDITIONAL PERSONNEL REQUIRED:

The Consulting firm must commit to supply the following additional personnel:

- A Mechanical Integrity Engineer
- A Mechanical Engineer for Pipelines (in addition to the key personnel)
- A Consultant on risks
- A Specialist in Operational Reliability
- An electrical engineer specializing in power
- An instrumentation and automatic control engineer
- An Engineer specializing in Geotechnology (in addition to the key personnel)
- An environmental engineer
- A contracting specialist

The required additional personnel must present a university degree, at least 10 years' professional experience in the oil and gas industry relevant to the above-listed positions and knowledge of the Spanish language. The Consulting firm must submit the CVs of the Additional Personnel using the form called "Qualifications of Required Additional Personnel" from Section 6, Technical Bid Form, Section 3, Personnel, from the Request for Proposals Document. UNDP reserves the right to request, at any point, the supporting documentation accrediting the qualifications of the additional personnel required.

REGARDING THE PERSONNEL:

The Consulting firm may indicate additional personnel if it is considered necessary.

It will be the Consulting firm's responsibility to provide sufficient insurance as necessary to cover all personnel implementing activities and making the arrangements necessary for them to enter the country, in the case of foreign personnel.

SERVICE METHODOLOGY:

In its technical bid, the Consulting firm must present the methodology it will implement, with all necessary details, for Project evaluation. Please see the Technical Bid Form (Section 6 of the Request for Proposal Document), regarding the Implementation and Personnel Approach and Plan.

RECEPTION AND DELIVERY OF DOCUMENTATION:

The Consulting firm must implement a document control system for reception, review and return without alterations of the information from EP Petroecuador to be analyzed.

The document control system must include distribution of the reports that the Consulting firm must prepare during the project evaluation.

The Consulting firm will present progress reports on the work weekly and monthly in Word documents and PDF format, duly signed, and making a record of delivery, with the corresponding written communication and registered in the document control system.

The Consulting firm must present the results of its Final report in a Word document and PDF with the respective support media and in a Power Point presentation with an executive summary. It must include a detailed chronological listing of the activities carried out, indicating the deliverables. The executive summary will be presented at a meeting to be agreed upon between the parties. The Final report will be delivered in hard-copy physical format, duly signed, and also in a digital PDF format and an editable Word file.

CONFIDENTIALITY CLAUSE

All documentation or information that the Consulting firm receives from UNDP and PETROECUADOR, or that it may access while performing the contract function, must be treated by the Consulting firm and its employees, dependents, key personnel, additional personnel, as confidential information. The Consulting firm may not disclose, directly or indirectly, the information received to any person, without written consent from UNDP and PETROECUADOR, excepting their employees or hired personnel who need to receive that information to properly perform the contract, being directly responsible for the use of that information by its employees or contract personnel. The Consulting firm agrees to take measures to protect the confidentiality of this information, which – overall – will be framed within recognized best practices in the area of Information Security. This includes informing its employees or contract personnel about the confidential nature and the prohibitions to copy or disclose information and agree that this information will be kept in a safe place. The Consulting firm assumes, vis-à-vis UNDP and PETROECUADOR, the corresponding responsibilities for failure to fulfill this confidentiality clause.

APPLICABLE NORMS:

All work will be done according to the codes, norms and technical specifications listed below:

- Project Management Standards, ISO 10006, PMI, SGPMP.
- API Standards.
- ASME Standards.
- ASTM Standards.
- NFPA Standards.
- Standards for Civil Works.
- Standards for Fire-fighting Systems.
- Standards for Safety, Health and Environment.
- Project management guide from the internal Petroecuador norms.

CONTRACT ADMINISTRATION AND MEANS OF SUPERVISING EXPECTED OUTPUTS:

UNDP will directly supervise the Consulting firm's work. Once the consultancy contract is signed, UNDP will designate, at the starting meeting, the contract administrator and the technical team that will supervise project evaluation.

The UNDP supervision and the Consulting firm will hold technical meetings between the parties, to define and analyze criteria as the evaluation moves forward, and provide immediate solutions as the process continues, at the end of which the corresponding meeting minutes will be signed, which will include the actions, persons responsible and dates.

MEETING TO BEGIN THE EVALUATION:

Once the evaluation contract has been signed, and within no longer than 2 days after that signing, the Consulting firm must coordinate and carry out the kick-off meeting, attended by the key personnel of the Consulting firm, of UNDP and delegates of the Ministry of Hydrocarbons and of EP Petroecuador.

At this meeting, the Consulting firm will present the methodology to evaluate the Project, as well as the Project Director and his technical team, which appear in the technical bid.

This meeting will also establish the matrix for communications between the parties and the details for project site visits, logistics and other required field activities. The agreements will be signed in the memorandum of starting up the work to be done and issued at the kick-off meeting.

MEANS OF APPROVAL FOR THE EXPECTED OUTPUTS:

The expected Outputs from this consultancy will be reviewed by the UNDP supervision and contract administration team, which will have the opinion of governmental institutions (Ministry of Hydrocarbons and EP Petroecuador) to review the outputs. UNDP will make the last validation of the outputs generated under the consultancy.

TERMS OF PAYMENT:

Output / Milestone	Percentage of the contract	Deadline
Advance payment of up to 20% of the total Contract amount	20%	7 days after contract signing
Output 1- Technical Progress Report	20%	21 days after contract signing
Output 2 - Draft Final Report	30%	42 days after contract signing
Output 3 - Final report, Executive summary and Presentation of results	30%	60 days after contract signing
	100%	

ATTACHMENTS

Attachment 1: Description of the Pascuales-Cuenca Product pipeline Project

Attachment 2: Listing of contracts, amounts and scope of the Pascuales-Cuenca Product pipeline Project

Attachment 3: Organizational chart of the Pascuales-Cuenca Product pipeline Project

TERMS OF REFERENCE, LOT No. 5
TECHNICAL AND OPERATIONAL EVALUATION OF THE
NATURAL GAS LIQUEFACTION PLANT IN BAJO ALTO

PURPOSE:

Engage a consulting firm to conduct the technical, operational and financial evaluation of the **NATURAL GAS LIQUEFACTION PLANT PROJECT LOCATED IN BAJO ALTO, EL ORO PROVINCE, ECUADOR.**

The evaluation will require:

1. A full assessment of all actions taken regarding the topics established in the scope of the consultancy, analyzing whether established international standards were met, and the reasonableness of the investment cost.
2. Establish the current situation of facilities in terms of infrastructure and organizational management.
3. What actions must be taken to operate efficiently with international standards and
4. What would be the estimated cost and approximate time to implement the recommended solutions.

IMPLEMENTATION DEADLINE:

The implementation period for the required evaluation is sixty (60) calendar days, counted from the contract signing date.

BACKGROUND:

The Bajo Alto Natural Gas Liquefaction Plant has the purpose of liquefying natural gas from the Amistad Field located in the Gulf of Guayaquil. The liquefied natural gas (LNG) that is produced is dispatched in tank trucks to the industrial clients in different parts of the country. The planta was constructed to produce 200 MTD (metric tons a day) of LNG and at this time is producing an average of 120 MTD.

The land where the Bajo Alto Natural Gas Liquefaction Plant is located has generated problems with the foundations and the infrastructure in general, caused by differential settling (sinking).

The initial supply of electrical energy for Plant operation caused a number of difficulties so an electrical sub-station was built to obtain electricity from the National Interconnected System (SIN), which, due to voltage variations, causes the Plant to shut down sometimes.

Attachment 1 presents a more detailed description of the project, its scope, amounts invested and implementation.

SCOPE OF THE CONSULTANCY:

- Evaluate the current situation of the infrastructure and facilities of the Natural Gas Liquefaction Plant, by checking existing documentation and making technical visits and inspections on-site, to determine whether the project followed international standards for project management and whether the design and construction parameters were technically suited to international methodologies and standards governing this type of facilities. The above technical evaluation will contain principally the following topics:

- Analysis of the reasonableness of the costs invested versus programmed costs and the benefits obtained.
 - Analysis of the differential settling of the platforms and immediate solutions.
 - Analysis initial and current electrical supply to Operate the Plant (Self-Supplying Generation System using Gensets and then the Electrical Substation – SIN).
 - Gas Regeneration or Rejection. Analyze alternatives for utilization.
 - Analysis of the water catchment and treatment system for cooling and for the fire-fighting system.
 - Analysis of the Boil-off Gas System
 - Review of the operating philosophy, processes and sizing of rotary and static equipment to achieve the Plant's design production.
 - Evaluate the existing risk plan and emergency plan.
- Further, the organizational environment will be evaluated through the operating and maintenance procedures, change management, maintenance and inspection plans and compliance with them, analysis of mechanical integrity, competencies of personnel regarding operation, maintenance and reliability of the Plant.

INFORMATION THAT EP PETROECUADOR HAS:

- PI&D blueprints (at the Plant)
- Plant operating manuals and procedures
- Electrical diagrams
- Grounding system diagrams
- Pre-contractual documentation of the processes to engage engineering and the EPC contract, main contract and complementary contracts for engineering.
- Main contract and complementary contracts for Operation and Maintenance.
- Documentation of the complaints between EPP and the contractors involved
- All documentation regarding Civil Rehabilitation of the Plant.
- All documentation regarding construction of generation facilities and the electrical substation.
- Project management guide from the internal Petroecuador norms.

EXPECTED OUTPUTS:

In the technical-operational evaluation, the following reports must be delivered:

- Detailed report of the technical-operational evaluation, including checklists taken as a reference
- Reports of the RBIs or the equivalent
- Report on Analysis of Alternatives for improvement and recommendations
- Report on environmental impact evaluation, before and after rehabilitation
- Report on evaluation of the organizational environment.
- Report on the reasonableness of the costs incurred in the LNG Plant.
- Report on the costs and estimated times to implement the recommended technical solutions to achieve efficient operation and reliability.
- Detailed final report with conclusions and recommendations, Power Point presentation with an Executive summary.

During contract implementation, UNDP may require the Consulting firm to submit additional technical reports regarding the Consultancy outputs.

WORKPLACE:

Work will be done in the city of Quito and the Province of El Oro, Republic of Ecuador.

PROFILE OF THE CONSULTING FIRM:

The Consulting firm must have at least **15 years'** experience in consultancies regarding project management or direction in the oil and gas sectors, implementing engineering, specialized studies, technical and economic evaluations of downstream projects in the oil and gas sectors.

KEY STAFF REQUIRED:

To perform the purpose of the present Terms of Reference requires the Consulting firm to have the following key personnel:

- A Director of the Evaluation Consultancy
- A Quality Engineer
- An Engineer Specializing in Geotechnology
- A Mechanical Engineer for Gas Facilities.
- A Cost Specialist

The Consulting firm must submit the CVs of the Key Personnel using the form called "Qualifications of Key Personnel" from Section 6, Technical Bid Form, Section 3, Personnel, from the Request for Proposals Document. The "Qualifications of Key Personnel" Form must be accompanied by certifications of their studies, work certifications, and of their knowledge of the Spanish language.

Any degrees, diplomas, certificates and/or records that are written in some language other than Spanish or English must be presented with a simple translation into Spanish.

The key personnel must meet the requirements described in the following table:

Director of the Evaluation Consultancy
- Education: University Degree in Business Administration, Engineering or related areas
- Specialty Training: Master's degree in Project Management, Business Management, Engineering or related areas
- Preferred Specialty Training: If the M.Sc. is related with the Petroleum, Natural gas, Petrochemical industry or related areas
- Courses and Training: Knowledge of Project Management Standards, ISO 10006, PMI, SGPM International or the equivalent.
- Professional experience in this specialty: At least 15 years' experience in Project management, Personnel management, Planning and Contract Administration in the Oil & Gas Industry.
- Knowledge of the region (Latin America): Preferably
- Language competence: Knowledge of the Spanish language, written and spoken, at a professional level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent
Quality Engineer
- Education: University degree in Mechanical engineering, Chemical engineering, Industrial engineering or related areas

- Specialty Training: Master's degree in Mechanical engineering, Chemical engineering, Industrial engineering, Project Management or related areas
- Preferred Specialty Training: M.Sc. in Quality Management
- Courses and Certifications: Knowledge of Quality Control System Norms in Refineries or Liquefied Petroleum Gas Plants or Liquefied Natural Gas Plants, API, ASME, ASTM, NFPA Standards, Quality Management Standards, ISO 9001, ISO 55000 or the equivalent.
- Professional experience in this specialty: At least 10 years' experience in designing and managing quality plans, implementing quality assurance and quality control systems, managing improvement processes to guarantee continual operation in Oil & Gas industry facilities.
- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent
Engineer Specializing in Geotechnology
- Education: University degree in Civil Engineering, Geological Engineering, Geotechnical Engineering
- Specialty Training: M.Sc. in Geotechnical Engineering
- Courses and Certifications: Geotechnical Studies, ISO 14688, ASME Standards or the equivalent
- Professional experience in this specialty: At least 10 years' experience in geotechnical analysis, evaluation of buildings and structures and implementing Geotechnical Calculation Programs.
- Knowledge of the region (Latin America): Preferably
- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent
Mechanical Engineer for Gas Facilities.
- Education: University degree in Mechanical engineering
- Specialty Training: Master's degree in Mechanical Engineering, or related areas.
- Courses and Certifications: Knowledge of API, ASME, ASTM, NFPA Standards or the equivalent
- Professional experience in this specialty: At least 10 years' experience in operation and maintenance of facilities with pressurized piping and recipients and handling liquefied natural gas.
- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent
Cost Specialist
- Education: University Degree in Business Administration, Accounting, Auditing, Finance or related areas
- Specialty Training: Master's Degree in Business Administration, Accounting, Auditing, Finance or related areas

- Preferred Specialty Training: If the M.Sc. involves Cost Analysis Processes and is applicable to the oil and gas industry
- Courses and Certifications: Knowledge of Budgeting, Accounting standards, Tax laws, Costs and Expenses, or the equivalent
- Professional experience in this specialty: At least 10 years' experience in cost analysis, investments, budgets, cost allocation and management and if it is in the Petroleum Industry
- Knowledge of the region (Latin America): Preferably
- Language competence: Knowledge of the Spanish language, written and spoken, at an intermediate level, accredited by certifications, courses, Spanish proficiency tests, mother tongue or equivalent

ADDITIONAL PERSONNEL REQUIRED:

The Consulting firm must commit to supply the following additional personnel:

- A risks and SS&E consultant
- An instrumentation and automatic control engineer
- An electrical engineer specializing in power
- A contracting specialist
- An environmental engineer

The required additional personnel must present a university degree, at least 10 years' professional experience in the oil and gas industry relevant to the above-listed positions and knowledge of the Spanish language. The Consulting firm must submit the CVs of the Additional Personnel using the form called "Qualifications of Required Additional Personnel" from Section 6, Technical Bid Form, Section 3, Personnel, from the Request for Proposals Document. UNDP reserves the right to request, at any point, the supporting documentation accrediting the qualifications of the additional personnel required.

REGARDING THE PERSONNEL:

The Consulting firm may indicate additional personnel if it is considered necessary.

It will be the Consulting firm's responsibility to provide sufficient insurance as necessary to cover all personnel implementing activities and making the arrangements necessary for them to enter the country, in the case of foreign personnel.

SERVICE METHODOLOGY:

In its technical bid, the Consulting firm must present the methodology it will implement, with all necessary details, for Project evaluation. Please see the Technical Bid Form (Section 6 of the Request for Proposal Document), regarding the Implementation and Personnel Approach and Plan.

RECEPTION AND DELIVERY OF DOCUMENTATION:

The Consulting firm must implement a document control system for reception, review and return without alterations of the information from EP Petroecuador to be analyzed.

The document control system must include distribution of the reports that the Consulting firm must prepare during the project evaluation.

The Consulting firm will present progress reports on the work weekly and monthly in Word documents and PDF format, duly signed, and making a record of delivery, with the corresponding written communication and registered in the document control system.

The Consulting firm must present the results of its Final report in a Word document and PDF with the respective support media and in a Power Point presentation with an executive summary. It must include a detailed chronological listing of the activities carried out, indicating the deliverables. The executive summary will be presented at a meeting to be agreed upon between the parties. The Final report will be delivered in hard-copy physical format, duly signed, and also in a digital PDF format and an editable Word file.

CONFIDENTIALITY CLAUSE:

All documentation or information that the Consulting firm receives from UNDP and PETROECUADOR, or that it may access while performing the contract function, must be treated by the Consulting firm and its employees, dependents, key personnel, additional personnel, as confidential information. The Consulting firm may not disclose, directly or indirectly, the information received to any person, without written consent from UNDP and PETROECUADOR, excepting their employees or hired personnel who need to receive that information to properly perform the contract, being directly responsible for the use of that information by its employees or contract personnel. The Consulting firm agrees to take measures to protect the confidentiality of this information, which – overall – will be framed within recognized best practices in the area of Information Security. This includes informing its employees or contract personnel about the confidential nature and the prohibitions to copy or disclose information and agree that this information will be kept in a safe place. The Consulting firm assumes, vis-à-vis UNDP and PETROECUADOR, the corresponding responsibilities for failure to fulfill this confidentiality clause.

APPLICABLE NORMS:

All work will be done according to the codes, norms and technical specifications listed below:

- Project Management Standards, ISO 10006, PMI, SGPMP.
- API Standards.
- ASME Standards.
- ASTM Standards.
- NFPA Standards.
- Standards for Civil Works.
- Standards for Fire-fighting Systems.
- Standards for Safety, Health and Environment.
- Project management guide from the internal Petroecuador norms.

CONTRACT ADMINISTRATION AND MEANS OF SUPERVISING EXPECTED OUTPUTS:

UNDP will directly supervise the Consulting firm's work. Once the consultancy contract is signed, UNDP will designate, at the starting meeting, the contract administrator and the technical team that will supervise project evaluation.

The UNDP supervision and the Consulting firm will hold technical meetings between the parties, to define and analyze criteria as the evaluation moves forward, and provide immediate solutions as the process continues, at the end of which the corresponding meeting minutes will be signed, which will include the actions, persons responsible and dates.

MEETING TO BEGIN THE EVALUATION:

Once the evaluation contract has been signed, and within no longer than 2 days after that signing, the Consulting firm must coordinate and carry out the kick-off meeting, attended by the key personnel of the Consulting firm, of UNDP and delegates of the Ministry of Hydrocarbons and of EP Petroecuador.

At this meeting, the Consulting firm will present the methodology to evaluate the Project, as well as the Project Director and his technical team, which appear in the technical bid.

This meeting will also establish the matrix for communications between the parties and the details for project site visits, logistics and other required field activities. The agreements will be signed in the memorandum of starting up the work to be done and issued at the kick-off meeting.

MEANS OF APPROVAL FOR THE EXPECTED OUTPUTS:

The expected Outputs from this consultancy will be reviewed by the UNDP supervision and contract administration team, which will have the opinion of governmental institutions (Ministry of Hydrocarbons and EP Petroecuador) to review the outputs. UNDP will make the last validation of the outputs generated under the consultancy.

TERMS OF PAYMENT:

Output / Milestone	Percentage of the contract	Deadline
Advance payment of up to 20% of the total Contract amount	20%	7 days after contract signing
Output 1- Technical Progress Report	20%	21 days after contract signing
Output 2 - Draft Final Report	30%	42 days after contract signing
Output 3 - Final report, Executive summary and Presentation of results	30%	60 days after contract signing
	100%	

ATTACHMENTS

Attachment 1: Description of the LNG Plant
Attachment 2: Detailed description of Process 0902-S130-04
Attachment 3: Plant Remediation Costs
Attachment 4: Layouts LNG Plant
Attachment 5: Organizational chart of the LNG Plant
Attachment 6: Coordinates of the Bajo Alto Plant