NUEVA EXPERANZA
POWER PLANT PROJECT
PROJECT and FACILITIES DESCRIPTION

0 General Project Information

LOCATION

Department:	Tumbes
Province:	Contralmirante Villar
District:	Zorritos
Sector:	Nueva Esperanza
Site:	Pan Viejo

PRESENT STATUS

Project Works Concluded and Operating:	December 2010
Start Up Date:	December 2010

TECHNICAL CHARACTERISTICS

Gas Turbine

Type:	LM-6000PD-SPRINT DLE
Manufacturer:	GE
Units:	3 (1st phase); +1 (2nd phase)
Power (kW):	45,000 per unit (rated)

Generator

Power (kVA):	60,000
Voltage (kV):	13.8
Speed (RPM):	3,600
Power Factor:	≥ 0.85
Frequency (Hz):	60
Year Start of Service:	2010

TOTAL INVESTMENT

Studies:	US$ 2.4MM
Civil Works:	US$ 25.9MM
Machinery and Equipment:	US$ 75.0MM
Other:	US$ 14.1MM
TOTAL[1]:	US$ 117.4MM

1 Introduction

Empresa Eléctrica Nueva Esperanza (EENE) plans to build and operate a simple-cycle thermoelectric power plant of a rated power reaching 135 MW (180

[1] Withholding & Value Added Taxes NOT included.

MW when the additional turbo-generator is added in the near future) on a property spanning approximately over 9.5 hectares in the upper area (approximately 48 meters of altitude) of Nueva Esperanza, Tumbes. Through third parties, BPZ will develop, build and operate these facilities. Because of Perú's present electricity generation deficit, this project is crucially important for the nation and, obviously, of sectoral and national interest. All the generated power will be used locally, regionally and nationwide. The Nueva Esperanza Thermoelectric Power Plant ("Central Termoeléctrica Nueva Esperanza-"CTNT", in Spanish, or "The Project") is not expected to have any adverse or unmitigated impacts on its physical or social surroundings or on the available energy resources. Nevertheless, BPZ will prepare an Environmental Management Plan ("Plan de Manejo Ambiental" – "PMA" in Spanish) to update a previous Environmental Impact Assessment (EIA) approved on August 2006 by (Ministry of Energy and Mines') Directoral Resolution No.498-2006-MEM/AAE.

BPZ Exploración y Producción, S.R.L. (BPZ) owns 100% of the hydrocarbon prospecting and development rights for Block Z-1 offshore Zorritos (Tumbes), in Perú's northwest, near the Ecuadorian border. Block Z-1 includes the Corvina gas field. Growing demand for power in Perú has created a market for the Corvina gas. BPZ has decided to monetize this gas by using it as fuel for electric power generation.

The Corvina gas field has great potential because of its significant probable and proven gas reserves that, at the middle of this year, reached a certified 224 billion cubic feet. Corvina's gas is dry with specific gravity of 0.566 and more than 98% methane content. Its volume of condensates is small, making it ideal for use as fuel.

The Nueva Esperanza thermal power plant is part of the Corvina GtP (Gas to Power) Project. The project, additionally, includes expanding the Corvina CX-11 offshore platform, installing gas dehydration and stabilization equipment on the deck, laying down an 8"[2] diameter and 18 kilometer long gas pipe line (16 kilometers of which will be laid down under water) connecting the Corvina offshore platform and the Charán creek mouth on the sea and an additional two kilometer underground pipe connecting the Charán creek mouth and the higher area of Nueva Esperanza town. The project will also set up an onshore gas metering and pre-conditioning station adjoining the Nueva Esperanza thermoelectric power plant and will share the property BPZ has purchased to erect the facility.

[2] The original gas line design involved a 10-inch diameter pipeline capable of feeding an onshore gas plant with up to 175 MMSCFD of non-associated (free) natural gas. Complete design documents were developed by US-based Upstream Engineering, UK-based Land & Marine, and Peru-based Inspectra. However, BPZ E&P is in the process of re-conceptualizing the entire gas delivery component, thus the still preliminary line pipe diameter of 8".

Conceptually, all electricity generated at the facility will be sold in the Peruvian market using some of the existing infrastructure. Power will be distributed as follows:

- 20 MW approximately for local consumption (resulting in the replacement of the existing diesel fuel power plant operated by Electroperú in Charán (La Cruz).
- 115 MW, in the first phase; 160 MW in the 2nd phase, and, potentially, up to 250 MW in the 3rd phase, to be sold to the Peruvian power grid through the National Interconnected Electricity System (Sistema Eléctrico Interconectado Nacional, SEIN, in Spanish).

Given the electric power CTNE will feed into SEIN (135 MW in the 1st phase, 180 MW in the 2nd phase, and potentially up to 270 MW if the CTNE is expanded to a total 6 units) and the limited transmission capacity at REP's existing Zorritos substation, the Nueva Esperanza thermoelectric power plant's switch yard will be designed to eventually replace the existing substation and thus become the new Nueva Esperanza Electricity Substation (SENE, in Spanish). Consequently, the plan to connect to the SEIN power grid includes intersecting the new SENE and the second 220 kV transmission line connecting Zorritos (Nueva Esperanza) and Talara, and also connecting SENE to the transmission line that presently runs toward the Ecuadorian border.

Once CTNE comes into service, the power transmission capacity between Zorritos and Chiclayo, and particularly between Talara and Chiclayo, will be constrained by the node congestion created by the Malacas thermoelectric power plant. This constraint will be overcome by adding, expanding and/or strengthening the following lines:

- Nueva Esperanza-Talara, 136-kilometer-long, 220 kV simple tern transmission line.
- Talara-Piura West, 104-kilometer-long, 220 kV double tern transmission line.
- Piura West-Chiclayo West, 211-kilometer-long, 220 kV transmission line, with the second tern piggybacking on existing structures.

In principle, at the beginning of 2009, Proinversión (Perú's investment promotion agency) will tender the second Zorritos (Nueva Esperanza) – Talara line, expected to become operational between 20 and 24 months later. Until this line is tendered, built and put into service, the Zorritos and Nueva Esperanza substations will be connected to a link approximately 100 meters long so that power generated by CTNE may be fully or partially dispatched. This link will be established by cutting the existing Talara line and redirecting and connecting the ends [of the cut line] with SENE.

Both SENE (up to the terminals of the switch yard transformers) as well as the connection between it and the Zorritos substation will be designed, installed, operated and serviced by REP through a [proposed] modified transmission concession contract with the government of Perú.

To build and operate the thermoelectric power plant, the Houston, TX-based headquarters (BPZ Resources, Inc.) agreed to split its business units so that hydrocarbon prospecting and production activities would be run independently from the electric power generation business. In November 2006, Empresa Eléctrica Nueva Esperanza S.R.L. was organized to undertake the design, building and operation of the abovementioned thermal electric power plant.

2 ***Main Project Objective***

BPZ's Nueva Esperanza thermoelectric power plant (CTNE) project will build and operate a thermoelectric power plant to initially generate 135 MW of net electric power. The energy generation system is a simple cycle type that uses natural gas as fuel and will be provided with the necessary ancillary facilities to take gas from the Corvina gas field located offshore Zorritos, Tumbes.

3 ***Location, Area and Access***

Before it was purchased by BPZ, the site chosen to build CTNE was owned by the Peruvian Government. This property is located upstream of the town of Nueva Esperanza, district of Zorritos, province of Contralmirante Villar, department of Tumbes. It is located between parallels N9597705.914 and N9597346.598 and meridians E543895.546 and E543895.546. The property is delineated by 12 vertices. The respective UTM coordinates are shown bellow:

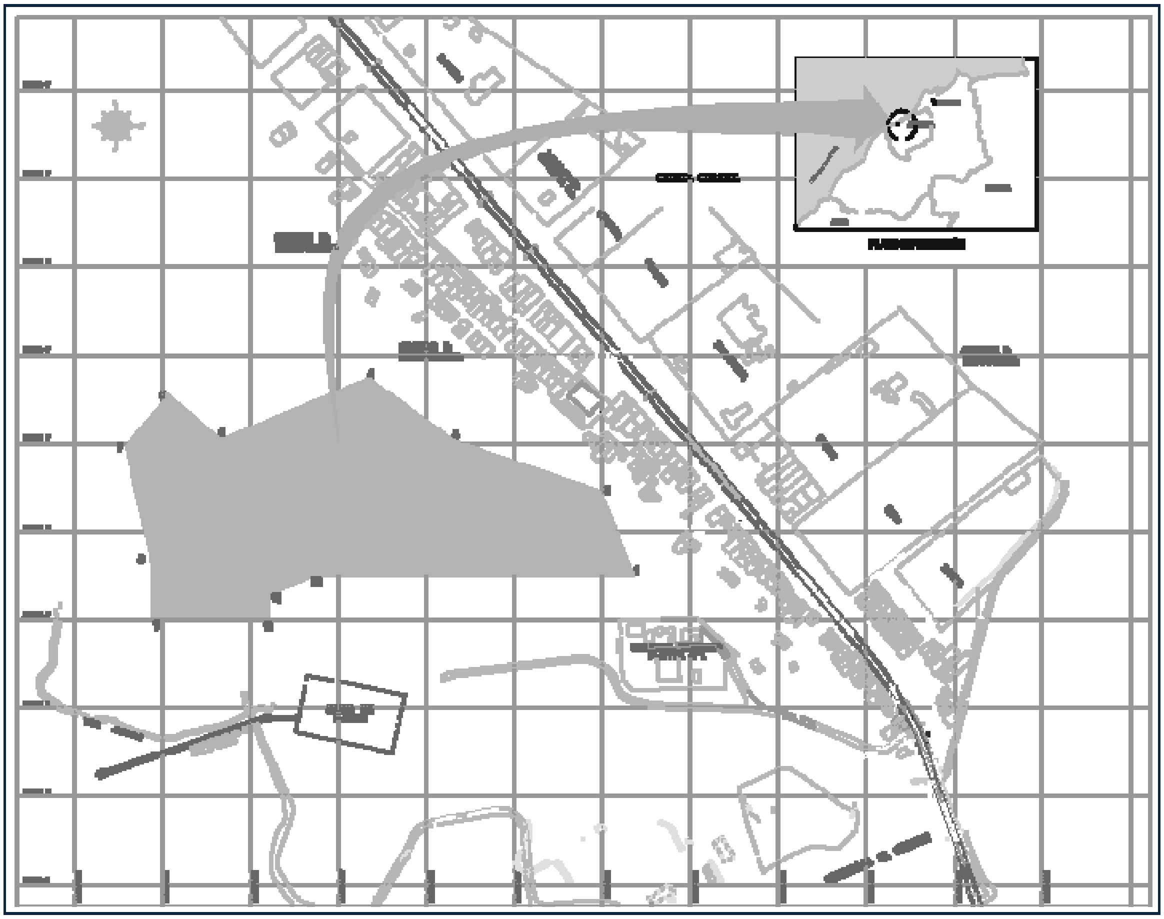
No.	East	North
1	544097.891	9597705.914
2	544004.871	9597669.188
3	543946.238	9597501.978
4	543876.139	9597406.632
5	543946.061	9597239.338
6	543895.546	9597179.140
7	543953.481	9597131.226
8	544079.237	9597159.793
9	544145.764	9597159.790
10	544147.320	9597291.616
11	544118.597	9597291.567
12	544097.773	9597346.598

CTNE will span approximately 2.2 hectares and will be located in the South-Southeastern tip of the Pan Viejo property. The lot on which the Nueva Esperanza Power Plant will be built covers 94,809.76 square meters and has a perimeter stretching 1,504.83 linear meters. The property may be reached from the North Pan-American Highway through a paved road connecting the highway and Electroperú's Charán thermoelectric power plant and then along a dirt road from Charán to REP's Zorritos substation. The borders and adjoining properties are described below.

- North: straight line between vertices 1 and 2 running along 100.01 linear meters, next to (but separated by a gorge from) Nueva Esperanza town.
- West: A broken line formed by segments 2-3, 3-4, 4-5 and 5-6, bordering a cliff that separates the terraced area from the gorge. Nueva Esperanza town is located at the foot of the cliff, between 20 and 100 meters away.
- South: A broken line created by segments 6-7, 7-8 and 8-9, running along 270.67 linear meters, and adjoining third party properties and uncultivated land.
- East: A broken line created by segments 9-10, 10-11, 11-12 and 12-1 running along 578.72 linear meters and adjoining Electroperú's property.

The property is crossed by two transmission lines: the Charán-(old) Zorritos substation 33 kV line owned by ENOSA and the Zorritos (REP)-Mancora substation 60 kV line owned by Electroperú. At present, both lines cross the area designated for building CTNE and consequently the segments of these lines that hamper building those facilities must be relocated. The detailed engineering for the relocation project for both lines was approved (or is in the process of being approved) by each of the owning companies. The project will relocate 5 or 6 wooden structures in each segment and redirect and lay down cable over a total slightly exceeding 1.5 kilometers in length (645 meters and 900 meters for the 33 kV and 60 kV lines, respectively), all of which runs through uncultivated of little or no potential use and/or value. As a consequence, the environmental impact resulting from the relocated lines is negligible.

Property and Project Location Map



4 ***Area of Influence***

The project's direct area of influence is limited to the uncultivated land located in the upper area of the town of Nueva Esperanza where the Nueva Esperanza power plant will be built and operated from.

The project's indirect influence area includes the adjoining basins of the Charán, Urbina and La Cruz creeks and the Zorritos, Caleta Miguel Grau, Nueva Esperanza, La Cruz and Caleta La Cruz coastal towns located in Zorritos and La Cruz districts, along the North Pan-American Highway.

In sum, the project's influence area includes the upper section of the Nueva Esperanza town and the area covered by the North Pan-American Highway segment running from Zorritos to La Cruz and the aforementioned creeks. The approved environmental impact assessment (EIA) identified a total influence area (direct + indirect) spanning 16,054.54 hectares.

Because the land in the project's area is uncultivated and the area under consideration has already been developed to build Electroperú's Charán thermoelectric power plant and REP's Zorritos substation, the project in its present design will not have a significant impact in that area, and may even have a smaller impact than identified in the original project.

5 *Overall Plant Layout*

In its first phase, the project will comprise three aero-derivative generators/combustion turbines, a site substation (switch yard), approximately a 100-meter-long 220 kV transmission line between Zorritos substation (REP) and Nueva Esperanza substation (BPZ) and administrative, workshop, and storage facilities. The second phase will add another turbogenerator of similar characteristics. The entire CTNE perimeter will be fenced and provided with a paved access road and appropriate car parking areas. Within the CTNE, paved and crushed stone roads will connect the generation blocks and provide access for maintenance. Eventual excess rainfall not naturally percolating through the crushed stone surface will be directed to the neighboring creek(s), or eventually to a holding/infiltration pond.

Energy for black starts will be provided by a diesel engine generator included in the CTNE's overall design. Maintenance of the 220 kV lines will be possible by linking the thermal power plant and the Charán-(old) Zorritos substation 33 kV line owned by ENOSA. Service water will be provided principally by condensation of the cooling coils at the turbine's intake mouth and/or 1 or 2 water wells that will eventually have to be drilled near the left bank of Tumbes river, in the San Isidro Pampa.

6 *Project Timeline*

Executing the CTNE Project (including facility design, turbo generator, transformer, coolers and other equipment supplies), building the CTNE substation (switch yard), and the linkage transmission line between BPZ's Nueva Esperanza substation and REP's Zorritos substation is expected to take approximately two years, starting on the day when a news release announced the purchase of the General Electric GE turbogenerators (late September, 2008) until the beginning of CTNE commercial operations (late December, 2010). The scheduled dates for the manufacturer's site delivery of the first three turbogenerators are September, October and November 2009. Civil works will start in the third quarter of 2009 while the units and plant equipment's electro-mechanical building will start at the middle of the first quarter, 2010.

7 Turbogenerator Package Description

7.1 Turbine

General Electric gas turbine model LM6000 is a two-shaft/two-spool engine consisting of a five-stage low pressure compressor, a fourteen-stage high pressure compressor, a two-stage high pressure turbine, and a five-stage low pressure turbine. The engine is equipped with a stainless steel mesh screen in the inlet air stream for "last chance" protection against foreign object damage. The engine is shock mounted and shipped in position, with the exception of the coupling spacer, which is removed and shipped in a separate container

7.2 Generator

Air cooled, 2-pole generator operating at 13.8 kV, 60 Hz. Generator is capable of handling customer power requirement throughout a wide ambient temperature range. The generator includes a brushless excitation system with permanent magnet generator. Neutral and line side cubicles are included.

7.3 Turbine/Generator Enclosure

The package is supplied with weatherproof, acoustic enclosures. The enclosures are designed to achieve noise abatement to an average of 85 dB(A) at 3 ft. (1.0 m) away and 5 ft. (1.5 m) above grade during full load operations. The enclosures are completely assembled and mounted over the equipment prior to testing and shipment. Both turbine and generator compartments are fully ventilated with redundant fans (one running, one stand-by). Explosion-proof lighting is provided in both compartments.

7.4 Turbine/Generator Baseplate

The package is supplied with the support structures for the gas turbine generator set consisting of a two-piece skid assembly, which is sectioned between the gas turbine and the generator. The full depth, bolted section is designed to provide the full structural properties of the wide flange I-beams. Full depth crossmembers are utilized to provide for a rigid design that is suitable for installation in earthquake areas (IBC2000) as well as providing a convenient structure for transportation.

7.5 Air Inlet System

The package is supplied with a modular, multi-stage filtration system consisting of inlet screens, a prefilter and a final barrier filter. All air for ventilation systems is filtered to the same level as turbine combustion air. An anti-ice, an evaporative cooling, a combustion air heating or a chilling system is available as an option. Filtered air is silenced before entering the turbine plenum. This design results in a compact arrangement and eliminates the need for customer supplied inlet ducting when the standard design is utilized. Internal lighting of the filter house is provided to facilitate inspection and service. Package is also supplied with platforms and ladders to service the inlet filter.

7.6 Turbine Exhaust

The package is supplied with a circular, axial exhaust outlet with connection flange to facilitate in-line mounting of an HRSG or simple cycle exhaust stack.

7.7 Fuel System

The package is supplied with a natural gas fuel system that utilizes an electronically controlled fuel-metering valve. For full-load operation, the gaseous fuel must be supplied to the baseplate at 675 psig±20 (4,654 ±138 kPag). Gas fuel must meet General Electric specification MID-TD-0000-1.

7.8 Lube Oil Systems

The package is supplied with two separate lube oil systems: one synthetic for the gas turbine and one mineral for the generator. The oil reservoirs and piping are all stainless steel, and the lube oil system valves have stainless steel trim. The turbine coolers, oil reservoir, and filters are mounted on the auxiliary equipment module. The mineral lube coolers, reservoir and filters are located on the main skid baseplate. The auxiliary equipment module provides simplified piping connections and reduces customer's installation time and costs. Customer must supply cooling water to the shell and tube coolers. Turbine lube oil must meet MID-TD-0000-6.

7.9 Electro-Hydraulic Start System

The package is supplied with an electric motor driven hydraulic pump assembly, filters, cooler and controls, mounted on the auxiliary equipment module. A hydraulic motor is also mounted on the gas turbine accessory gearbox. Hydraulic hoses are furnished to connect the auxiliary equipment module and the main baseplate.

7.10 Fire Protection System

The package is supplied with a factory installed fire protection system complete with optical flame detection, hydrocarbon sensing and thermal detectors, piping and nozzles in both the generator and the turbine compartments. The fire protection system includes cylinders containing CO2 mounted on a separate skid. A 24 V DC battery and charger to power the fire protection system is also included. All alarms and shutdowns are annunciated at the turbine control panel (TCP). An alarm sounds at the turbine if the gas detectors detect high gas levels, or if the system is preparing to release the CO2. When the system is activated, the package shuts down, and the primary CO2 cylinders are discharged into the turbine and generator compartments via multiple nozzles and the ventilation dampers automatically close. After a time delay and if required, the reserve supply of CO2 is discharged.

7.11 Digital Control System

The package is supplied with a free-standing control panel suitable for mounting in an indoor, non-hazardous area. The control system features an integrated turbine control system, vibration monitor, digital meter, digital generator protective relay module and an HMI (human machine interface) display of key discrete and analog data. The operator selects HMI displays with convenient touch screen control. Alarm and shutdown events are displayed on the HMI automatically. An Ethernet TCP/IP EGD or RS485 Modbus Port is provided to transmit unit conditions (status, pressures, temperature, etc.) to the customer's distributed control system. Power for the control panel is provided by a dedicated 24V DC battery system with dual 100% capacity chargers, which are shipped separately for installation by others.

7.12 Battery System

The equipment package is supplied with 24 V DC battery systems for the fire protection and gas turbine generator control systems, as described in those sections. All battery systems are valve-regulated lead acid (VLRA) type. Battery systems ship loose for indoor customer installation. If the optional Power Control Module is selected, GE Energy will install the GE supplied DC battery systems in that module.

7.13 Generator Protective Relays

The package is supplied with a microprocessor-based generator protective relay module, mounted in the TCP. The protective relay system includes functions necessary for protection of the generator.

7.14 Soak Wash System

The package is supplied with a turbine cleaning system, which allows customers to clean the compressor section of the turbine during full power operation. The same system reservoir and piping are utilized for off-line soak washing. Auxiliary skid connections are provided for customer supplied purified water at a maximum of 50 psig (345 kPag) and air at 100 – 120 psig (689 – 827 kPag). Customer is required to provide water meeting MID-TD-0000-4 (See Section 3.1.4), detergent meeting MID-TD-0000-5 (See Section 3.1.5), and air filtered to ISA S7.3 standards.

7.15 Component Testing and Package Set

Every new gas turbine is performance tested under load in a GE Test Cell, using procedures developed for flight turbine reliability. The generator is tested to ANSI C50.14 or IEC 34.3 standards at its factory of manufacture.

All gas turbine generator sets receive a static test including:

• Switch State (N.O. or N.C., actuation, wiring, and setpoint)

- Temperature element output and wiring
- Transmitter range, output, and wiring
- Solenoid operation
- Control valve torque motor, excitation, and return signal
- Fire system continuity, and device actuation
- System flushing verification
- Tubing integrity

7.16 Drawings, Data and Manuals

The package is supplied with a customer drawing package that includes general arrangement drawings, flow and instrument diagrams, electrical one-line drawings and interconnection plan drawings. Additional electrical schematic diagrams and logic drawings are provided for record.

Operation & Maintenance (O&M) and Installation & Commissioning (I&C) manuals are provided in the English language. The manuals cover operating concepts for power generating equipment, guides to troubleshooting, basic information on components, and equipment within the turbine generator set.

7.17 Variable Inlet Guide Vanes

GE Energy furnishes the LM6000 engine with variable inlet guide vanes (VIGV).

7.18 LM6000PD – Dry Low Emissions System (DLE)

A dry low emissions system is provided for use on gaseous fuel. This system reduces emissions over the entire power range without water or steam. NOx emissions can be guaranteed at 25 ppm (Ref. 15% O2).

A gas chromatograph is also included to monitor the heating value of the gas fuel and adjust combustor flame temperature.

7.19 SPRINT® Power Augmentation

SPRINT boosts engine performance up to 50.0 MW (ISO conditions) using a spray intercooling design that increases the mass flow by cooling the air during the compression process. The system is based on an atomized water spray injected through spray nozzles placed at two locations, one between the high pressure and low pressure compressors, and the second at inlet bellmouth. Water is atomized using high pressure air taken off of the eighth stage bleed. The water flow rate is metered, using the appropriate engine control schedules and at the inlet bellmouth. Bellmouth and interstage portions on SPRINT® alternate operation based on turbine inlet temperature. Customer supplies 22 gpm (83 lpm) of demineralized water to the connection on the unit. Water must meet GE specification MID-TD-0000-3.

7.20 Combustion Air Cooling – Chiller Coil

Lowering the combustion air inlet temperature can increase the power output of the LM6000 generator set. When specified, GE Energy can furnish high performance inlet air chilling coils as an integral part of the air inlet system. Customer provides adequate quantities of chilled water and interconnecting piping to GE Energy furnished chilling coils at the filter house. The same coils can be used for anti-icing.

7.21 Lube Oil Cooler – Fin/Fan

This replaces the standard simplex shell and tube coolers for the lube oil systems. A simplex core fin-fan cooler complete with changeover valve mounted on a separate base plate with dual fans is installed on a separate foundation.

7.22 Power System Stabilizer (PSS)

The power system stabilizer (PSS) sends supplementary control signals to the generator's voltage regulator to control power fluctuations and improve the stability of the power system. A power system study is to be completed by a third party. With the study complete, the PSS will be programmed with the set points established in the power system study.

8 Project Description

CTNE will comprise three General Electric LM-6000PD-SPRINT DLE turbogenerators including a SPRINT power augmentation system equipped with inlet air coolers, exhaust ducts, fuel gas treatment system to comply with proposed air emission limits, a cooling package with a cooling tower, water storage and treatment facilities, emissions' monitoring system, waste water treatment system, electric transmission system and related ancillary connection systems and equipment. Once the second phase is concluded, four of these turbogenerators will become available.

The net rated generation capacity of each turbogenerator will be approximately 45 MW at 32.1 ˚C (daily average ambient temperature at the project site). At 8,355 BTU/kW-hr and fuel consumption of approximately 8 MMSCFD (million of standard cubic feet per day) of natural gas per unit, these units are highly efficient.

Simple Cycle, 60 Gigahertz Gas Turbine General Electric Warranty				
Engine	**Fuel**	**Power**	**Heat Power LHV**	
		KW	**BTU/kW-hr**	**KJ/kW-hr**
Dry Low Emissions (DLE)	Natural Gas	47,925	8,355	8.815
Conditions: Power at Generator Terminals NO_x = 51 mg / Nm^3 (SAC-Water, SAC-Steam, and DLE) Ambient Temperature 32.1ºC, 60.4% RH (Relative Humidity) Air intake 7.8ºC, 95% RH (Relative Humidity) 13.8 kV, 0.90 pf (Power factor)				

(Source: Adapted from GE´s LM6000-60 HZ Gas Turbine Generator Set Product Specification; Typical Performance Specifications)

CTNE will be able to operate, if circumstances so require, with one, two or three turbines simultaneously. The plant will operate 24/7 at base load to meet growing (and unsatisfied) electricity demand. A dry low emissions system is available. NO_x emissions from the chimney(s) will be kept at 25 ppmdv (parts per million dry volume) corrected for 15% O_2. Carbon monoxide will be kept at 25 ppmdv corrected for 15% O_2. Fuel for the turbo generators will be pipe quality natural gas. Black start capacity at CTNE will be assured by a diesel engine generator, while maintenance start ups will be possible by connecting to the ENOSA 33 kV line which will supply electricity at 480V and 4160V.

Emissions Table LM6000OD-SPRINT Location: Caleta Cruz-Tumbes		
Parameters	**Concentrations**	
NOx	25 PPMDV at 15% O_2	51 mg/Nm^3
CO	25 PPMDV at 15% O_2	31 mg/Nm^3
VOC	3 PPMDV at 15% O_2	2 mg/Nm^3
HC	15 PPMDV at 15% O_2	11 mg/Nm^3
PM-10	4 LB/HR	2 kg/hr

(Source: Adapted from GE’s Engine Performance GUARANTEE)

Near field noise levels for both the generation unit and the auxiliary equipment, i.e. at a vertical distance (height) of 1 meter (3 feet) measured from the base of the turbo generator pack and a horizontal distance of 1.5 meters (5 feet) from the outside equipment surface, shall not exceed 85 dB (A).

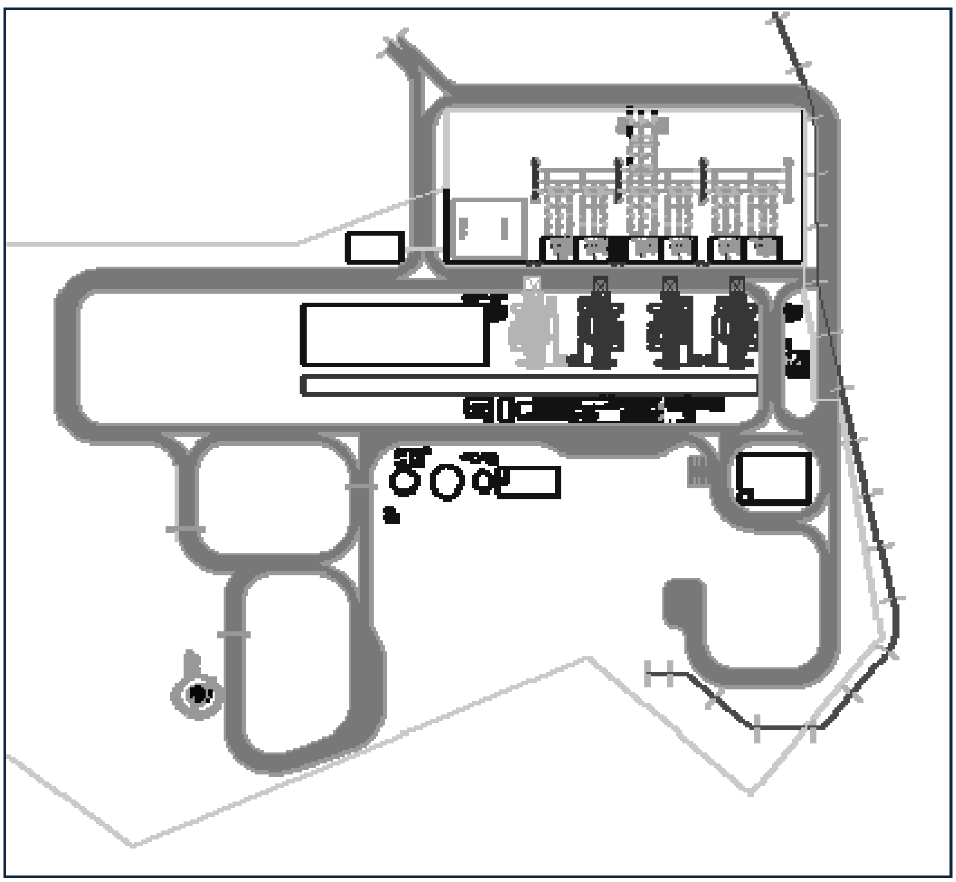
Discharge gases at the turbogenerator’s exhaust resulting from fuel combustion will be driven to a smoke stack and sent to the atmosphere at approximately 447.05°C (836.7°F) temperature.

Preliminary conceptual engineering for the project's first phase would indicate the following main pieces of equipment for the CTNE Project:

- GE LM-6000 Turbogenerators (3)
- Raw Water Treatment Plant
- Demineralized Water Treatment Plant
- Chiller Transformers, 13.8/4.16 KV
- Administrative Office Building, Workshop and Warehouse
- GSU Power Transformers (3 [1st phase] + 1 [2nd phase])
- Control Room(s) and Electric Cabinet(s)
- Transformer 13.8/0.480kV
- Emergency Transformer 33/0.480kV
- Black Start Diesel Generator
- Diesel Fuel Storage Tank
- Cooler and Pumps (1 x 4 turbines)
- Oil/Water Separator
- Oil/Sediment Waste/Waste Water Overflow Vessel
- Gas Coalescent Filters (2)
- Gas Metering Equipment
- Air Compressors (2)
- GSUs Oil Pond
- Neutralizing Pond
- Chemicals Injection Skids
- Water Recovery Pumps (2)
- Oil/Sediment Waste Water Pump
- Water Pump
- Auxiliary Transformer Oil Pond
- Wash Water Vessels (2)
- GSU Oil/Water Pump
- Auxiliary Transformers' Oil/Water Pump
- Raw Water Storage Tank
- Demineralized Water Storage Tank
- Replacement Raw Water Pump
- Crude Water Dispatch Pumps (2)
- Demineralized Water Mixing Pump
- Demineralized Water Forwarding Pumps (2)
- Dry Air Vessel
- Humid Air Vessel
- Fire Fighting Water Storage Pump
- Fire Fighting Water Storage Tank
- Condensate Tanks (2)
- Condensate Recovery Pumps (4)
- Demineralized Water Filters (2)
- Diesel Fuel Pump

- CEMs (3) and Data Acquisition Systems
- Switchgear 13.8 kV (3)
- Gas Coalescent Filters (3)
- Auxiliary Skids (3)
- Generator/Lubricant Oil Switchgear Skids (3)
- CO_2-Fire Protection System Skids (3)
- Gas Heaters (2)
- Smokestacks, 60 feet high (3)
- Equipment Envelopes
- Parking Lot, and Access and Maintenance Paved Roads
- Lighting Systems
- Security Guard Facilities

Preliminary Equipment Layout of Power Plant



8.1 Combustion Turbo Generation Equipment

CTNE will comprise three (or four in case of a possible medium term expansion) General Electric LM6000PD-SPRINT DLE turbogenerators equipped with a Sprint power augmentation system. Demineralized water will be injected into the machines to increase power and control emissions. The rated net generation capacity will be approximately 135 MW (180 MW if the planned expansion is taken into account) at 32.1˚C annual ambient average temperature at the project site and will provide uninterrupted service operated at, or very close to, its maximum load, 18 hours per day (with a lower load only during the early morning hours). No peak loads or quick starts will occur (although the units can be quick started in just a few minutes).

The turbogenerators (3, or possibly 4) will share a cooling packaged or chiller. The chiller includes the necessary equipment to condition or cool down air coming into the gas turbines, and will be designed to keep energy output at desired levels in hot days. At design conditions (32.1 ˚C and 60% RH), electric power output will reach 33 MW per hour per turbine. At CTNE, increasing electricity output to 45 MW per unit will be possible by installing a SPRINT power augmentation system and a mechanical cooling system equipped with air-cooling condensers without requiring additional water. The SPRINT system increases output energy by spraying water in the inbound air stream and also between stages. It uses up to 22 gpm of demineralized water. Cooling inlet air prevents the decline in performance resulting from high ambient temperature and also reduces water demand from the SPRINT system, as water from humid air is condensed in the cooling equipment's coils, collected and used in the SPRINT system.

The cooling equipment control system has been designed to respond to load conditions. If ambient temperature drops and less cooling is needed, the control system will respond by switching on one or more compressors, thus reducing to a minimum the auxiliary load requirements and increasing the power plant's energy output.

Because the cooling equipment coils are located in the inlet plenum, it is not possible for water to reach the turbine's intake. Likewise, ammonia (R-717) will be used as a cooling element in a closed-loop configuration system comprised of compressors, condensers, expansion tanks and connecting pipelines, thus avoiding the possibility of catastrophic leaks or any other significant damage.

8.2 *Emission Control Equipment*

Air emissions resulting from natural gas combustion in the turbogenerators will be monitored to meet carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter under 10 micron diameter (PM10), volatile organic compounds (VOCs) and toxic compounds standards set by local and/or IFC regulations and guidelines. A continuous emissions monitoring system will be installed to monitor NO_x and CO emissions from the smokestack(s). Gas turbine combustors will keep CO and NO_x emissions exhausts from the turbogenerators at approximately 25 ppmdv.

PM10 emissions are principally hydrocarbon particles created during combustion. PM emissions will be kept under control by filtering intake air and by using pipeline quality natural gas as fuel, containing only traces of sulphur.

A CEMS system will be provided for each turbogenerator. The proposed CEMS uses extraction sample technology to monitor outbound NO_x, CO and O_2 concentrations. The smokestacks' flow rates will be determined based on measured fuel consumption rates and used to determine hourly mass emissions, pursuant to domestic regulatory standards. A shared data acquisition system will be located in the control room. CEMS will record emissions to meet established documention criteria and will trigger and alarm in the plant's control room should smokestack(s) emissions exceed specified limits. The DAS will compute the average emission rates and will be the source of historical data from the CEMS.

9 Fuel System

The natural gas fuel to be supplied by BPZ Exploración y Producción S.R.L., a subsidiary of BPZ Resources, Inc., as is also Empresa Eléctrica Nueva Esperanza S.R.L., will come from the Corvina gas field located offshore Zorritos, Tumbes, and will be transported to the onshore site located in higher Nueva Esperanza by an 8-inch diameter and 18-kilometer long (16 kilometers underwater and 2 kilometers underground) pipeline. A short service line, under 100 meters in length, will be built connecting the thermal power plant to the metering/custody transfer and preconditioning station, located just to the west of the former.

The pipelines operating conditions are as follows:

- At CX-11 Platform Outlet:
  Q = 60 MMSCFD
  P = 1,172.0 psig
  T = 125.2 ºF (Mix of free and associated gas at the compressor's outlet)

- Underwater Gas Pipeline:
  L = 16 Km
  Q = 60 MMSCFD
  P inlet = 1172.0 psig and T inlet = 125.2 ºF
  P outlet = 808.9 psig and T outlet = 67.64 ºF (Shoreline)
  Diameter = 8" schedule 80 with min. 2.5mm thermal insulation

- In-Land Gas Pipeline:
  L = 2 Km
  Q = 60 MMSCFD
  P inlet = 808.9 psig and T inlet = 67.64 ºF
  P outlet = 751.5 psig and T outlet = 67.47 ºF
  Diameter = 8" schedule 80 buried underground

- At Power Plant Inlet
  Q = 60 MMSCFD
  P = 751.5 psig (750 psig objective)
  T = 67.47 ºF (min. 60 ºF)

Pipeline design pressure will be 2,175 psig, and operating pressure between 1,172 and 751.5 psig. The underwater pipeline will be designed to carry a max. 80 MMSCFD. An 8-inch diameter pipeline has been deemed appropriate to carry gas to the onshore facilities located 18 kilometers away while preserving the pressure needed for the selling of the commercial gas (provided wellhead flow pressure will not flow below 750 psig). Gas to be sent onshore includes non-associated (free) gas from the gas wells and, to a much smaller extent, associated gas from the oil wells that are not re-injected into the underground. These wells (both gas and oil, [or dual wells]) will be drilled from the Corvina CX-11 deck. Of the eight scheduled wells, five have already been drilled and are in production.

After separating liquids (water and condensates) and dehydrating, non-associated (free) gas will be sent onshore through the 8-inch diameter pipeline. Non-associated gas will not require compression. However, associated gas will require compression whether it is sent to the onshore metering station or re-injected into the formation. The minimum suction pressure measured at the manifold will be 50 psig, while maximum discharge pressure will be 3000 psig. Associated gas will have to be separated from the crude product, treated and compressed before dehydrating. Dehydrating prevents icing and hydrate-formation in the underwater pipeline. Water in gas will be brought down to acceptable levels (under 0.1 ppmdv). Gas will flow along the pipeline free of liquids, thus reducing potential pipeline corrosion and increasing its efficiency by cutting down liquids accumulation in the lower line segments sitting on the ocean floor.

At the onshore gas metering and custody transfer station (right next to the power plant) fuel gas will be measured, sampled and analyzed to ensure it meets appropriate commercial gas specifications. Consequently, natural gas will be filtered to remove 98% of all solid particulate matter under 1 micron size, measured with an ultrasound meter and analyzed by a chromatographer up to C6+ (for calculating gas specific gravity and thermal power value). A flow computer will process data from the chromatographer and meters to bring gas to standard conditions.

Control of the gas processing, transportation and metering facilities will be fully automated. A SCADA system will be installed offshore to gather, send and report operating and control functions throughout the entire gas process. Operating conditions will be monitored from the central control room located at the gas metering and custody transfer station or, alternatively, at the power plant.

Turbogenerators will be supplied equipped with a fuel gas system using an electronically controlled fuel metering valve. For operations at peak load, natural gas will be fed to the turbogenerators at 751.5 psig pressure (objective: 750 psig) and 67.47 ºF (min. 60 ºF).

Description	Specifications
Useful Life	30 years
Materials	API - 5L X42 Seamless
Outside Diameter	8 5/8”
Wall Thickness	12.70 mm (0.5”)
Cathode Protection	Impressed current
Design Pressure	2,175 psig.
Temperature (Min. / Max.)	-20 / 50°C
Flow (Min. / Max.)	25 / 80 MMSCFD

10 Water Supply and Use

Water will be provided principally by the cooling coils at the turbines’ inlets. Condensed water from the coils will be gathered and sent to the service tank. During normal plant operation, these coils will produce approximately 17 gpm of condensation water. A number of water conservation measures will be enforced as part of efforts to limit demand for produced condensed water. In addition, for plant start up, consideration is given to supplying additional crude water from the water well(s) located a few kilometers north of CTNE. This water will be transported to the plant using cistern trucks. Physical and chemical analyses of water samples taken from local wells in the area show good quality water from the higher aquifer, with low dissolved salts contents, well within local and international guidelines for potable water.

Water at the power plant will be used principally for injecting into the SPRINT power augmentation system, the closed heat exchange systems, for washing turbine compressors and for the potable (treated raw) and demineralized water systems (for sanitary and process use), and for firefighting water.

A connection to the cistern truck will allow on site water supply to the plant's raw water tank of nominal 475,000-gallon capacity and 48-hour contingency time. Raw water will fill the 200,000-gallon nominal capacity, 4-hour contingency period firefighting storage tank. The firefighting water storage tank will send water to the gas turbine, main ancillary transformer, oil waste storage and maintenance building areas.

The raw water storage tank will also feed the 58,000-gallon nominal capacity, 12-hour contingency demineralized water tank. Water for this tank will be previously added biocide chemicals, passed through multimedia filters, added anti-scaling and caustic soda, and treated by double reverse osmosis. Demineralized water will feed the emergency generator, the chiller (as replacement water), and, through the latter, the air coolers and turbogenerators. The three turbo generators will need 54 gpm (72 gpm when four units are installed). Likewise, it will feed the SPRINT power boosters (and from these, the turbines' combustion chambers), as well as the wash water system.

Finally, a 6,600-gallon capacity potable water tank will be available. Potable water resulting from flowing raw water through the chlorine dosage and multimedia filter package will be sent to the administrative building, workshop areas, turbogenerators and air compressors, eye-washing stations located in the water treatment plant and the hazardous materials area, and the neutralization pond area.

Because the raw water transfer pumps have a maximum capacity and rated power of 165 gpm and 15 HP, respectively, it is estimated that under scheduled 24 hour per day uninterrupted operation, raw water consumption will not exceed 0.24 million gallons per day (MMGPD) in a 24-hour contingency. Likewise, demineralized water transfer pumps, with maximum capacity and rated power of 79 GPM and 3 HP, respectively, will allow a maximum consumption of demineralized water reaching 0.12 MMGPD (0.06 MMG in a 12 hour contingency).

11 Waste Water

Plant waste water comes from the following sources:

- Rain water from the equipment's skid trays.
- Turbine dripping collection tray.
- Auxiliary transformer drainage compartment.

These discharges will be directed to the oil/water separator system and contaminants will be properly collected/stored in contaminated-water holding tanks for subsequent proper disposal away from site.

Additionally, the rainwater collection system will be designed to gather and drive rain water following the ground's slope towards creeks adjoining the property or, if so required by the project engineering, to a holding/infiltration pond.

12 Hazardous Materials Handling

During CTNE's construction and operation, several chemicals will be stored and utilized. All chemicals will be stored in appropriate warehousing facilities. Bulk materials will be stored in tanks or containers made with appropriate materials for holding their designated contents.

In general, amounts under 55 gallons will be stored in their delivery containers. All hazardous materials storage facilities and the areas where they may be employed will be designed for efficient leak and spill containment. Containment structures will be provided of sufficient volume to contain a spillage of an entire tank without overflow. All onsite chemicals will be stored, manipulated and used in compliance with existing laws, provisions, regulations and standards. Among chemicals used at CTNE, ammonia, chlorine, biocide and caustic soda (to be used in the chillers and the demineralized water system) will be the most abundant. However, these chemicals will be utilized in closed systems. They will not be stored in tanks or similar containers (and therefore the potential for spills is practically negligible).

Chemicals used at the power plant in smaller amounts will be stored in their original containers to minimize contingencies. All hazardous material storage containers will be designed in compliance with local regulations. There will also be safety showers and eye wash facilities in all chemical storage areas. Connections to service water hoses will be provided in the vicinity of the chemical storage areas to facilitate pressure water jet rinsing of leaks and spills of non-water reactive materials. Appropriate safety clothes and gear will be provided to plant personnel for use during handling, utilization and cleaning of hazardous materials. Plant personnel will be conveniently trained in handling, using and cleaning hazardous materials or wastes used at the plant and on procedures to be followed in case of leaks and spills. Adequate gear made of appropriate materials for cleaning chores will be kept at the plant.

Building, operating and maintaining the plant will generate non-hazardous solid waste typical of thermal electricity generation facilities. Waste from the construction stage typically includes dirt, timber, waste concrete, empty containers, scrub metal and insulation material. Typical waste during operation and maintenance includes scrub metal and plastic, insulation material, paper, glass and empty containers, in addition to other small-size solid waste. These materials will be collected for recycling or taken to landfills, in compliance with applicable regulatory standards.

Building, operating and maintaining the project will also generate hazardous waste materials. Most of these hazardous wastes created from the construction project will be liquid wastes, such as excess oil and other lubricants used in machine operation, solvents for cleaning and preparing material surfaces, paint and other materials' protective coating. Plant waste during the operation stage includes used oil filters, spent oil and waste cleaning chemicals among others. All these will be recycled or disposed off site. Waste cleaning chemical include acid and alkaline cleaning solutions used in pre-operation pipeline cleaning. These wastes, which may contain high metal concentrations, will be assessed. If dangerous, they and all other solid and liquid wastes will be disposed off and transported following the applicable regulations.

13 Auxiliary Plant System

13.1 Lighting System

The lighting system will be comprised of regular and emergency lighting systems. Indoor lighting will be provided by high pressure sodium or fluorescent type lighting. Control room lighting will be equipped with dimmers and feature an incandescent emergency lighting system. In other indoor areas, emergency lighting will be provided by fixed battery devices. Outdoor lighting will be provided by high pressure sodium vapor lamps and will provide lighting in pedestrian and personnel traffic areas, such as the perimeter fence (including lighting for security cameras), the generation block, and operation and maintenance areas.

13.2 Firefighting System

The raw water tank will feed the firefighting water storage tank. This tank will have a 200,000-gallon rated capacity (or 180,000-gallon operating capacity) sufficient for a 4-hour contingency. Design will comply with NFPA standards for this type of facility.

Firefighting water pumps will provide water to the plant's firefighting ring, the sprinkler systems and the hose stations. The firefighting pump system will be comprised of an electric motor centrifuge pump and, as back up equipment, in case of temporary electricity outage at the plant, a diesel engine centrifuge pump. Additionally, there will be a pressure auxiliary pump. The firefighting pump system will provide 750 gpm (maximum flow) and include all electric, cabling and control components needed for reliable and uninterrupted operation. Alarms and signals warning of system problems will be included in the plant's control system.

Piping of the firefighting water loop will be made of ductile iron with self-bracing mechanical joints and buried underground. Above ground piping will be galvanized steel. Isolation valves will be provided and located so as to allow isolating segments for repairs without restricting firefighting water supply in the non-isolating segment. All piping, accessories, valves, hydrants, etc. will be UL and/or FM approved.

All materials used in CTNE's permanent constructions will be fireproof. Two-hour firewalls will be installed in control rooms.

14 Electric System

Electricity will be generated at 13.8 kV, triphase, 60 Hz. The generator will connect to a 15 kV switch in sync with the 220 kV grid (this voltage will be attained by means of GSU transformers). Energy for the facilities will be fed from the grid for start ups, stops and maintenance downtime. The plant's distribution system will be 13.8 kV, 4160 V and 480 volts, triphase and will be comprised of transformers, switches and engine control centers. The switch yard includes SF-6 sections, switches, CTs and PTs.

In addition, the following will be supplied:

- Electric boxes for the neutral and live lines, including the cabinet, connections, CTs, PTs, ground transformer and resistor. Life line exit from the boxes will be connected to the generator isolation (or breaker) switch.

- Mid-voltage switches.

- Auxiliary distribution transformers at 13.8 kV/480 V and 13.8/4160 V.

- Low voltage equipment (low voltage CCM) to meet the turbogeneration and plant load balance equipment, located in the electric building. This equipment includes the 480 VAC, 220 VAC and 120 VAC distribution panel.

- Redundant UPS system comprised of a battery and charger bank at 125 VDC to provide safe back up power supply and protection for the plant's control systems.

- Voltage transformers, including transformers to 220 kV, protections and transformer oil systems for each generator.

- Cathode protection for underground steel pipes. Depending on the soil resistivity test, sacrificial or impressed current anodes will be in selected.

- Grounding system to prevent human and equipment damage in case of electric equipment failure and to prevent fire damage caused by atmospheric discharges and/or static electricity.

- Insulation copper cable for power distribution throughout the plant. The cabling system will be comprised of trays, conduits and underground concrete-box duct banks, as required. Underground conduits will be a minimum 5-centimeter diameter. Overhead conduits will be a minimum 1.9 centimeter. Flexible conduits will be metal, PVC-lined and waterproof, suitable to their respective corresponding area class. All cabling will be designed and installed following NEC and IEEE codes.

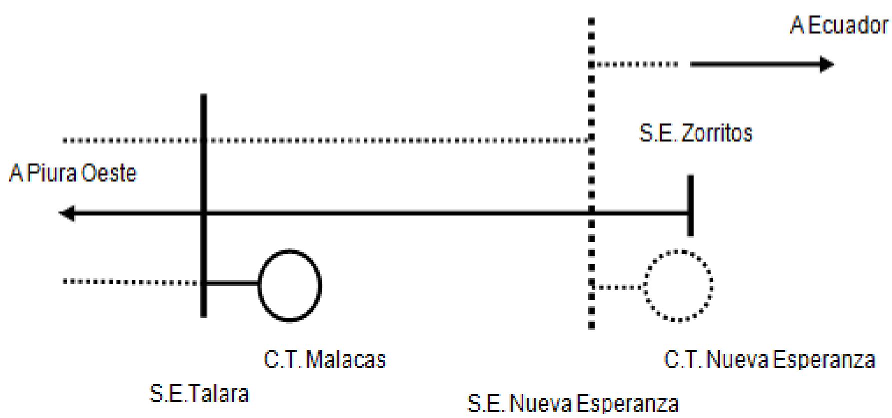
- Telephones and surveillance camera systems.

- 220V AC outlets installed in work areas, rooms and cabinets so all equipment will be within comfortable reach using 15 meter long extension cords at most.

15 Transmission System

To connect to SEIN, the project proposes to intersect the new Nueva Esperanza substation (SENE) and the 2nd 220 kV Zorritos (Nueva Esperanza)-Talara transmission line, 100 meters from REP's Zorritos substation, and connect to SENE the transmission line presently running toward the Ecuadorian border. This appears as the most appropriate interconnection solution. The corresponding links (transmission lines and the substation) will fall under REP's responsibility, after obtaining MINEM's (Ministry of Energy and Mines) authorization. Likewise, to meet the unrestricted stationary state operation criteria in case of N-1 type contingencies, the third-party Nueva Esperanza-Talara, Talara-Piura and Piura West-Chiclayo West lines must be added, most likely through a bidding process. Thus, the Nueva Esperanza-Talara line will fall under the responsibility of the tender winner.

Proposed Transmission Line Interconnection



15.1 Nueva Esperanza Substation

This substation will be comprised of a double bar 220 kV system with a 650 mm^2, AAAC cable for each phase. It will be comprised of five (05) 245 kV uni-tripolar actioning switches and a live tank for the various transmission lines connecting to the substations, and six (06) cells with a 245 kV equipment provided with tripolar actioning switches and live tank for the triphase 220/13.8 kV, 40/52/64 MVA transformers.

15.1.1 High Voltage Equipment

- Tripolar 245 kV, 1050 kVP (BIL), 2000 A 40 kA, live tank switch; power transformer for the (04) 600-1200/5/5/5/5 spring activated lid-through insulators provided with their corresponding supporting structure.

- Tripolar 245 kV, 1050kVp (BIL) 2000 A, 31.5kA line switch, with electric command, provided with a grounding knife, manual command and supporting structure.

- Tripolar 245kV, 1050kVp (BIL) 2000 A, 31.5kA bar switch, with electric command and supporting structure.

- Capacitative-type voltage transformer, at 245 kV 1050 kVp (BIL), 220:V3/0.1:V3/0.1: V3 kV 20 VA, cl 0.2; 20 VA, cl 3P; and AF coupling including grouping box and supporting structure.

- 198 KV, ZnO, 10 kA lighting road, with discharge counter and supporting structure.

15.1.2 220 kV Bars and Connections

- Flexible, 650 mm^2 AAAC cable
- Anchoring insulator chains and hot-dip galvanized connection accessories
- Anti-crown aluminum connectors

15.1.3 Galvanized steel reticulate gantries

- 17-meter-high columns
- 19-meter-long beams

15.1.4 Control, protection and metering equipment

- Control, protection and metering panel, cl. 0.2 for the 220 kV line cell.

15.1.5 Miscellaneous systems

- Multiple pair control cable

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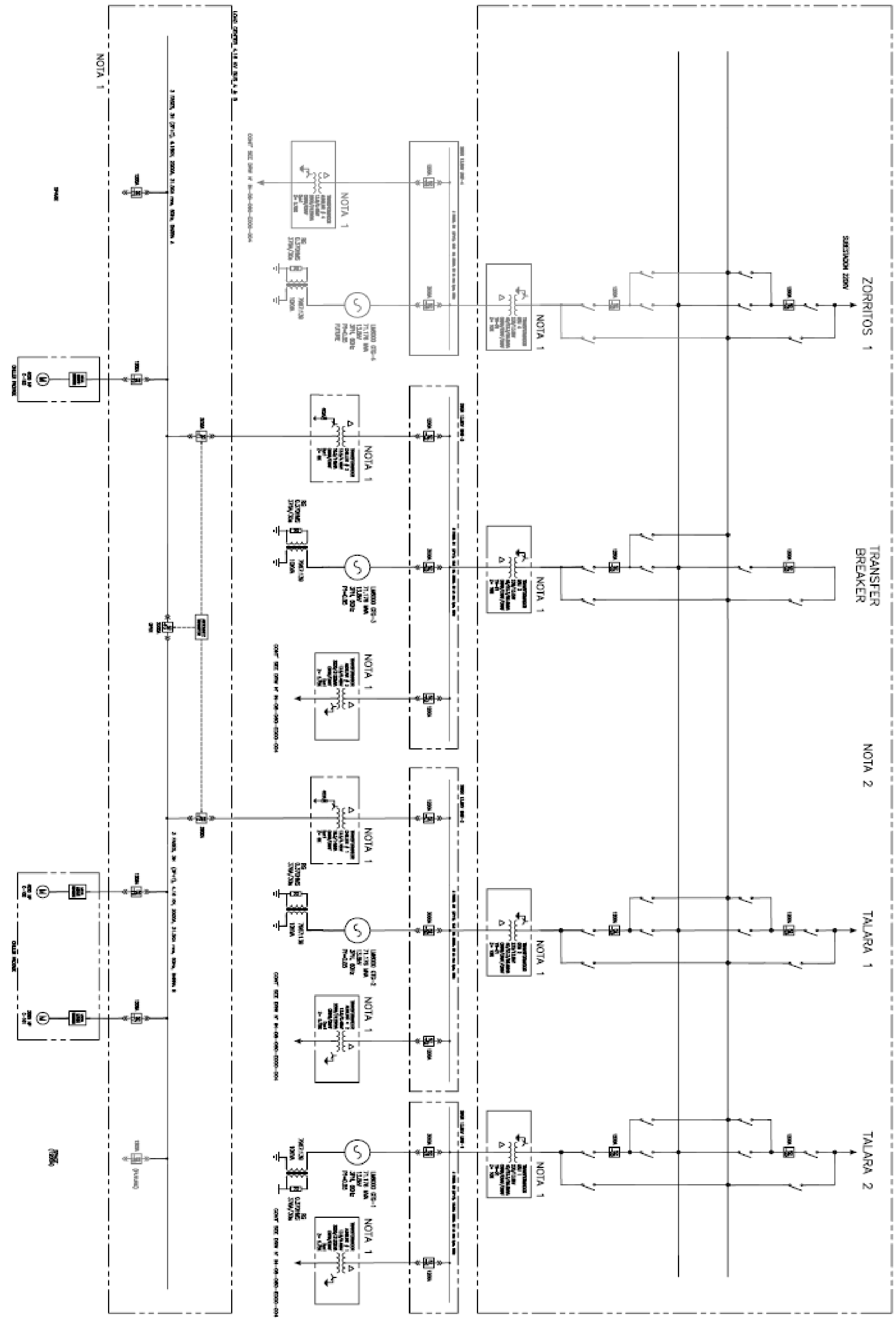
15.1.6 Grounding System

- Extra flexible 70 mm^2 bare cooper wire.
- Various bronze connectors.

15.2 Interconnection line

The connection line will be comprised of AAAC, 636 mm^2 cross-section aluminum alloy wire to be decided in the project's next stage. Wires will be supported by appropriate 245 kV insulators, polymer type, supported by 27-meter-long wooden post structures. The line will run approximately 100 meters.

Preliminary CTNE One-Line Schematic



16 Plant Controls

The power plant will be operated from the control room located on the 2nd floor of the administration building. Remote control stations will provide absolute and total control of the generation units, auxiliary equipment and balance of plant equipment.

Control systems and instruments for the entire plant will be designed to operate from the control room or from a remote control room located within the plant's facilities. A PLC Allen Bradley-based system will be used for total plant control and, mainly, for interconnecting the gas turbines and BOP (Balance of Plant). The system is comprised of a server and a PC work station that will provide an interface between the operator, control and surveillance of each turbogenerator and the auxiliary equipment. Critical control signals between the plant and the turbines' local control systems will be cabled. General monitoring, alarms and data capture will be possible through high speed/Ethernet communication links.

Wanderware is the software for the remote control. Instruments and controls will ensure reliable, safe and efficient operation over the entire range of operating conditions. Integration of the various plant systems will be accomplished through control panels that provide a man-machine interface and which are part of the plant's control system.   The system will be used to supervise and monitor the plant's major components and packaged system, including the turbogenerators, and will be used to directly control the balance of plant equipment and processes.

17 Facility Closure

Facility closure means the stopping of all plant operations, whether on a temporary or permanent basis. Temporary closure means the plant's temporary stoppage for extended periods. This type of closure does not include regular stoppages for maintenance. Temporary closure may also be required for major equipment repairs or replacements, interruption in natural gas, water or electricity supplies, or significant plant damage resulting from earthquakes, fires, floods, etc. Permanent closure is a permanent stoppage of operations when no previous plans exist for plant decommissioning. A permanent plant closure may result from sufficient significant damage that warrants, from a financial or physical viewpoint, the decision not to repair such damage. These damages may be caused by plant age, unfavorable market conditions, the depletion of natural gas reserves, etc.

In case of temporary closure due to spills/leaks of hazardous materials or the threat thereof, the hazardous materials handling plan for the project site will be enforced. The procedures described in that plan shall include methods to control and contain spills/leaks, the expected response from the plant's trained personnel, notification to the corresponding authorities and the public at large, and the procedures to clean up/mitigate the spills/leaks. Once these steps have been taken, the plant's temporary closure will proceed as with temporary closures NOT resulting from hazardous materials, spills/leaks.

For temporary closures NOT caused by hazardous materials' spills/leaks (replacement of major equipments, interruption of utilities' supplies, plant damage caused by natural phenomena or equipment failure, etc.), additional plant safety measures will be taken, as required. A plan will be implemented for appropriate suspension. This plan will ensure that all applicable laws, provisions, regulations and standards applicable will be put into practice, and that public health and safety, as well as the environment, will be conveniently protected. Depending on the duration of the temporary closure and the expected ambient temperatures, the plant may consider emptying one or more water systems, chemical storage containers, nitrogen purging and stopping operation of all equipment. All drained chemicals and water will be disposed of pursuant to applicable norms and regulations.

Permanent plant closure may include from abandoning the site to total removal of the project's equipment and systems on site. The decision will depend on existing conditions and the site's plant use in the more distant future. A service-stoppage or decommissioning plan will be prepared and submitted to the corresponding authorities and/or regulatory agency. As a minimum, this plan will address the following:

- Activities proposed for plant, equipment and plant-related systems' decommissioning.
- Approval of the plant's decommissioning plan, pursuant to existing/applicable regulations/norms.
- Activities needed for site reclamation and restoring it to its original condition (should the plan require removing all the equipment and systems).
- Estimated plant decommissioning cost, including sources of financing for same.

The plant's decommissioning plan will encourage plant equipment and material recycling. If possible, unspent chemicals and oils will be sold/returned to suppliers or other users. If no recycling is possible, spent chemicals and oils, as well as all hazardous and non-hazardous waste will be gathered and disposed of pursuant to existing/applicable regulations/provisions, at appropriate landfills or waste collection facilities. Equipment containing chemicals and oils will be drained and removed from service to ensure appropriate protection to public health and safety, and for environmental protection.

18 Project Construction

Construction activities in the CTNE project will basically take place in two stages, as follows:

- Civil Works Construction
- Assembly of Electromechanical Equipment

18.1 *Civil Works Construction*

Civil works will include earth movement in a way that will reduce area cutting and changes to a minimum. Materials from the cutting work will be used as filling material within the site. Filling and replacement will use only local material originating in the cutting work. No surplus material is expected that will require disposal in areas outside the plant's site. Consequently, cutting material will be used for filling and replacement in the cut and excavation work.

Civil work will also include excavation for and laying of concrete foundations for equipment and complementary buildings, ground leveling (finish floor/ground level = 48m), building and placement of concrete planks and shields, and the necessary filling and leveling of mortar to lay down the foundation for, and subsequent assembly of, equipment and facilities, as well as the supply and assembly of all the buildings' metal structures, equipment support, cabling, trays, ponds, pipelines and other components. In addition, it will include supply of anchoring for the civil works, building the platforms for the turbogenerators, the control building and other required structures, and the supplies for and execution of all architectural finishing for buildings and structures such as floors, wall lightings and coating, painting, offices, railing, exposed concrete surface treatment, partition walls, panels, doors, windows, potable water and sewage system, fixtures and final clean up of all rooms.

An erosion control, water discharge and drainage control plan will be enforced throughout the construction work stage. Prior to mobilization and start of construction activities, the area will be stabilized. Special care will be put to stabilize slopes and address runoffs as a precaution against future intense rainfall and floods resulting from an El Niño event. Rainwater will be collected and discharged at a single point as necessary, and then fed into the process and rain water treatment system.

The existing road to the area near the plant will be used. Roads within the plant will have a concrete or asphalt surface. The area surrounding the turbogenerators will be treated to approximately 10 centimeters of compacted gravel and 10 centimeters of concrete surfacing.

The power plant equipment, including turbines and generators, will be unloaded at the La Cruz dock. If necessary, unloading may also take place at the port of Paita from where the equipment will be carried by land using trailer trucks to the project site.

Access during the construction and operation stages will be possible using the existing asphalt road that runs from Electroperú's power plant and a packed dirt road that for the most part runs along the gas pipeline path (southern bank of the Charán creek).

Major pieces of equipment, including turbogenerators, smokestacks, transformers, etc. will be placed on concrete foundations or platforms. An independent laboratory will test concrete for quality every 38 m^3 pouring, at least once a day, and every 464 m^2 of platform or wall surface area. Field slump tests will proceed following ASTM specifications.

Temporary fencing will be provided during the construction stage, while a permanent fence will be built for the power plant's operational stage.

Supports will be designed following the most recent specifications issued by the American Institute of Steel Construction (AISC) and Peruvian earthquake technical specifications. Equipment and systems requiring this type of structures are those for which overhead pipeline supports and duct supports are needed.

18.2 Assembly of Electromechanical Equipment

Generally speaking, electromechanical assembly includes building metal equipment and structures, and mounting turbo generators.

Likewise, it includes platforms, access stairways, banisters, steel floors, etc., which will be supplied and installed following Occupational Safety and Health Administration (OSHA) standards. Access will be sized to allow for regular operation and maintenance work. Exposed structures, ducts and steel sheeting will be cleaned following industry standards to remove rust, corrosion and foreign materials, and will be applied a 3-mm total thickness dry-finish layer of paint. Equipment will be supplied painted by the respective manufacturers. Any imperfections resulting from transportation and mounting will be corrected on site. Supporting foundations and equipment and structure anchoring will be built so as to provide properly in-field alignment.

Start up and operation tests for the turbo generation unit, its auxiliary equipment and all other equipment (balance of plant) will be performed until normal operating conditions are accomplished. During this period, the appropriate functioning of all equipment, calibration of equipment and instruments, controls, start up and efficiency assessments, pursuant to contract terms with technology suppliers, will be certified and accredited. Once the testing period ends, the installation and mounting stage will be deemed as finished. Waste from the construction stage will include material from excavations, demolition debris and waste moldings, packaging, cabling, rebar, and similar materials, all of which will be temporarily kept on existing concrete platforms to subsequently be removed from the plant's site using specially hired trucks.

18.3 Equipment

At least, the following equipment and machinery will be used during the project's execution:

- 01 140 – 160 HP Caterpillar truck
- 01 Front loader, tire-mounted 125 – 155 HP
- 02 Air compressors, 240 HP; 700 – 800 CPM
- 01 Power graders 145 – 150 HP
- 01 Self-powered vibration roll 101 – 135 HP; 10
- 02 15-m^3 Hop trucks
- 02 2000-gallon Cistern trucks
- 02 4-inch 12 HP Power pumps
- 02 Concrete mixers, 9 – 11 cf
- 02 Plank type, 8 HP vibrating compactors
- 08 Air hammers 21 – 24 Kg
- 02 Concrete vibrators 3/4" – 2"
- 01 Crane 150 ton
- 01 Crane 20 ton

18.4 Labor

Labor requirements will differ during the construction and plant operation stages. A distinction is made between skilled labor and unskilled labor.

During the constructor stage, unskilled labor will fluctuate between 30 and 60 persons per month. Skilled labor requirements will fluctuate between 45 and 60 persons. Work supervision staff will fluctuate between 15 and 30 persons. On average, personnel are estimated to fluctuate between 80 and 100 persons per month.

19 Operation and Maintenance

The power plant's operation will be coordinated with COES's dispatch schedule. Units are fully capable of dispatching energy to meet all types of operating conditions, peak loads, both intermediate and continuous within the units' allowable ranges.

Operation and maintenance tasks include routine, preventive, predictive, scheduled and non-scheduled activities aimed at addressing the needs of electricity customers and preventing equipment failure. These tasks will be performed by highly skilled personnel who will be trained on site by experts sent by the equipment installers.

Scheduled preventive maintenance will follow GE's recommendations on the basis of 8,000 operating hours per year and starts every 100 hours of operation.

Approximately 12 persons will be needed once operation starts, of which 90% will be skilled personnel. Because the plant will run around the clock, 2 to 3 operators have been planned working in 8 or 12 hour shifts.

During the plant's operation and/or maintenance, various consumables will be needed for cleaning and operation, including oils, additives, clean materials, anti-corrosion paint, etc.

Eventually, liquid effluents resulting from cleaning of equipment and machines may contain trace oils and grease. If so, dielectric oils and lubricants will be replaced or treated by suppliers authorized to handle these systems. In addition, they will be certified to handle and dispose such materials by local regulatory authorities, pursuant to applicable norms and regulations.

Eventual waste materials include used cables, oils, lubricants and paint tins, cans and drums, as well as rags and other items used during operation and maintenance. These materials will be classified by type and placed in properly labeled drums. Hazardous waste will be handed over to authorized companies for final disposal. Non-hazardous wastes will be temporarily stored on concrete platforms to then be taken off-site in specially hired trucks.