CHAPTER 1

PROJECT DESCRIPTION AND PLAN

1.1 Historical Background

In the 1950s the potential for oil exploration in Belize began which over time became an after thought with several dry wells. It was not until 2005 that the only success in exploratory drilling proved viable. From hence, other concession blocks have been issued to other companies. The Spanish Lookout Field (estimated at 40 million Barrels of which an estimated 11 million Barrels are recoverable) was discovered by Belize Natural Energy Ltd (BNE) in 2005.

BNE in conjunction with the Government of Belize (GoB) are in the process of developing the infrastructure necessary to facilitate the commercialization of the valuable asset. To date, Belize Natural Energy Limited's operation in Belize is vastly developing its resources to extract and deliver crude oil to the market, a process which consists of:

- Developmental Drilling
- Development and Exploitation (Production Well)
- Bulk Storage Facilities
- Transportation (Road/Pipeline/Sea Transport)
- Processing/Refining (in Country or Abroad)

Presently BNE has several production wells in the Spanish Lookout, Cayo District area namely Mike Usher Well # 1 - # 5. These wells are all within the Spanish Lookout area. One dry well has been encountered so far, Mike Usher # 6. The production wells are all in operation and consist of similar infrastructures. BNE from its 3D seismic survey conducted within the Spanish Lookout area has determined that there is an extension of the field, referred to as the Spanish Lookout field, within the San Marcos area and as such is considering two sites in San Marcos Village for the drilling of two field development wells. In addition to this, base on studies conducted for the Spanish Lookout Field and related development work program, it is expected that up to four development wells will be drilled in the Spanish Lookout community. The locations of two of these have already been identified.

1.2 Project Description and Location

The proposed project is a series of wells that will be undertaken in the Spanish Lookout Community and San Marcos Village.

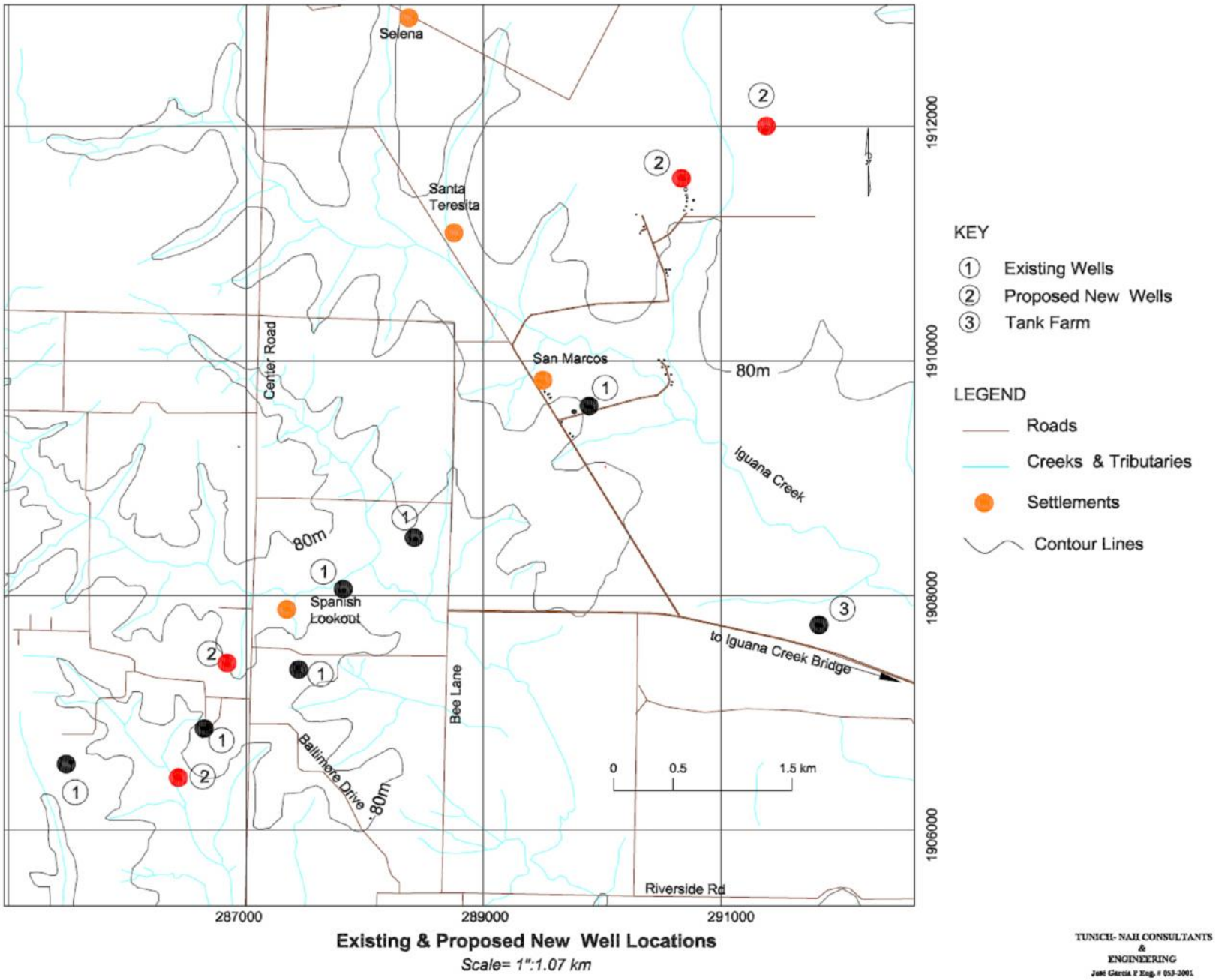

Fig. 1.1 Existing and Proposed New Well Locations for BNE

These two communities are bordered by other villages collectively known as the Spanish Lookout area as can be seen in figure 1.1. These communities are serviced by the Spanish Lookout Community and are the center of most of BNE's production wells.

The proposed project is basically a petroleum development operation under the Production Sharing Agreement (PSA) signed with the Government of Belize (GoB). The projects proposed by BNE is for the drilling of up to four development wells in the Spanish Lookout Community and two in San Marcos Village. These wells will be linked to the Iguana Creek facility via an underground pipeline. For further information, consult the Iguana Creek Pipeline EIA. The locations of these wells are listed in table 1.1 below with the coordinates being in UTM, NAD 1927 zone 16.

Table 1.1 Coordinates of the proposed wells

San Marcos Wells Well No.	**Easting**	**Northing**
1 (San Marcos # 1)	290680	1911556
2 (San Marcos # 2)	291363	1911966

Spanish Lookout Wells Well No.	**Easting**	**Northing**
1 (Mike Usher # 7)	286841	1907422
2 (Mike Usher # 8)	286427	1906459
3 (Mike Usher # 9)	SLO Area	SLO Area
4 (Mike Usher # 10)	SLO Area	SLO Area

The location Mike Usher # 9 and # 10 will be within the SLO Community. These proposed wells will be sited according to BNE's development guidelines.

1.3 Existing Facilities

As described previously, BNE has five production wells in operation, each operating harmoniously in the same way. Each site has a production well with the required ancillary services. It is anticipated that the proposed BNE wells will be of similar nature with the exception of the proposed oil and gas operations as briefly summarized in the following sections.

1.3.1 Existing BNE Oil and Gas Operations

Drilling Operations

Initially, heavy earth moving equipment is used to build the access road and well pad. Topsoil is stockpiled for use in reclaiming areas not needed during the production phase. A large "reserve" pit is dug on the well pad. Material excavated from the pit during construction is stockpiled on-site to backfill the pit when drilling is finished. The majority of wells will be drilled by a rotary rig.

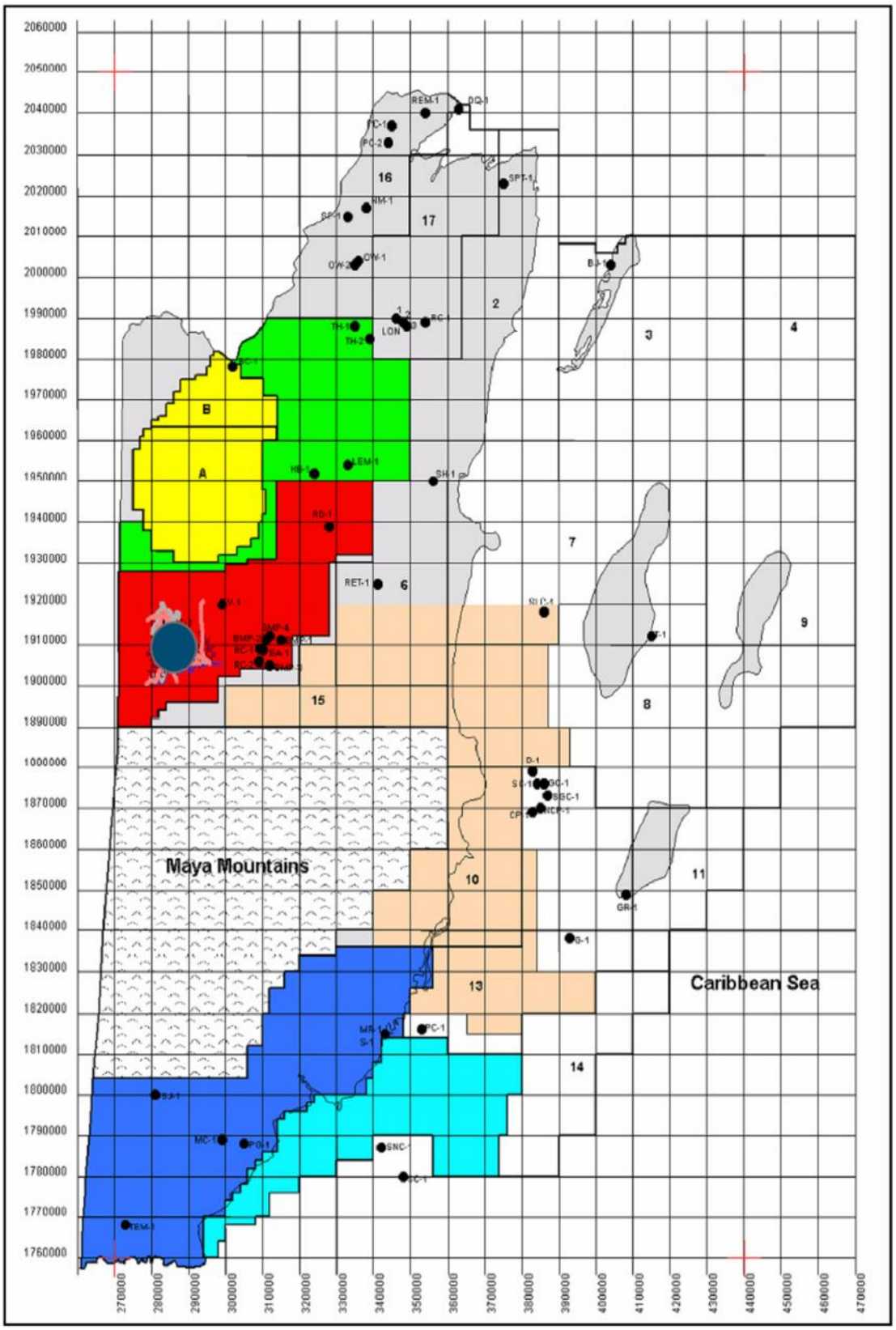

Fig. 1.2 BNE Concession Block illustrating the proposed project site location

Less commonly, wells will be drilled by a cable tool rig. Both types of rigs are powered by diesel engines. During drilling, the mast of a rotary rig extends from 80 to 100 feet in height. Since drilling is a continuous operation until the total depth of the well is reached, the lights and engine noise from the rig are evident throughout the day and night. It will take the rotary rig about 6-7 weeks to drill a typical BNE Well, within the Spanish Lookout / San Marcos area.

Rotary rigs use a toothed, tricone cutting bit mounted on successive lengths of rotating drill pipe to drill the hole. Either a water-based mud (with additional conditioning agents as needed) or compressed air is used as the circulating agent. In a mud based system, pumps direct mud down the drill pipe, back up the hole, and out to the reserve pit where the rock fragments will settle. Even with air drilling systems, the operator will keep drilling clay (i.e. bentonite) and a tank of water at the drill site in case conditions require converting to a mud-based system.

As the well is deepened, using one of the above methods, steel pipe called casing will be periodically cemented into the hole along its length to seal the rock formations and their native fluids from the drilling (and later producing) environment. DOE regulations require casing to be installed in a manner that will protect fresh water zones and isolate other zones which contain oil, gas, and water. Casing is also used to seal off potentially valuable minerals, such as coal seams, and other underground features, such as caves, vugs, or large fractures.

DOE regulations require that the rig be equipped with blow-out preventers which are capable of preventing the hole from an uncontrolled flow in case a high pressure zone is encountered. Drilling in the SLO field has not encountered any high pressure zones. Anticipated pressures are 0.4 to 0.5 psi per foot of drilling depth or less. No other unusual or difficult geologic conditions are anticipated while drilling.

During drilling and immediately after total depth is reached, a variety of testing devices are placed down the hole on a wire cable. These are used to determine rock characteristics and to ascertain the presence of hydrocarbons. In the event of a commercial discovery, the drill rig is moved off the site and a smaller truck mounted (workover) rig and two to three 400-barrel tanks are moved onto the site to begin the completion phase. Specialized trucks pump water or nitrogen mixed with sand or a mild acid into the well to fracture the producing formation to increase its flow rate. A large amount of the fluid volume that is pumped into the well is “flowed back” into the tanks that were brought on site. Completing the well usually begins shortly after the hole is drilled, but may be delayed for several weeks pending availability of equipment. The truck mounted completion equipment is typically removed from the site in one to three days. The tanks may remain for a longer period until the well is “cleaned up”, that is, most of the injected fluid is recovered. Either during or shortly after the completion process, the production facility is constructed. At this time, the reserve pit is backfilled and the portion of drill pad not necessary for the production phase is revegetated. Then the access road is often upgraded at this time to provide all-weather, year-round access to

the wellhead and production facility. This includes revegetating the portion of the roadway beyond the running width.

Present Production Operations

Presently BNE's producing oil wells and its associated production facility consists of one 100-barrel steel oil/water storage tanks, four vertical storage tanks all enclosed in a containment wall, a pump-jack and motor to bring the oil to the surface, an electric line to run the motor, a separator (a vessel that separates the raw well stream into oil, gas, and water). A typical producing gas well consist of an assortment of valves on the wellhead. At the production facility, there are storage tanks for the crude, storage tanks for the, produced water and a separator.

Hydrocarbons are transported from the well bore to the production equipment via pipelines. Where feasible the internal pipelines are buried at least 24 inches below the ground surface. There are flares to dispose of small quantities of natural gas that are not economic to sell or use.

Water produced along with the oil and gas is generally salty. DOE regulations require that this saltwater, or brine, be properly disposed of. The most common method of disposal is for the brine to be injected into underground formations already containing brine. Producing wells at BNE typically produce only small amounts of brine.

Access to the site is through a gated entrance located at the start of the lease access road. The company employee, called a "pumper", regularly inspects and maintains the well and facility. Tanker trucks will pick up oil from the production tanks on a schedule determined by the volumes produced. This oil is then transported to the Storage Tanks In Blue Creek.

Occasionally, producing oil and gas wells experience mechanical problems in the wellbore that require a process called a "workover". A workover involves bringing a smaller service rig to the location to perform any needed service on the well. Workovers take place on the existing well pad and sometimes may require a small pit or mobile storage tanks to contain any fluids circulated from the wellbore. After the workover is complete, any fluids remaining in the pit are vacuumed out and disposed of in accordance with local requirements. The pit is then backfilled and revegetated as appropriate.

1.3.2 Proposed BNE Oil and Gas Operation

Pipeline Installation

BNE has installed a Polypipe gathering pipeline system in SLO to transport the crude oil mixture from the producing wells to the Iguana Creek Storage Facility. A series of 4", 10" and 12" Polypipe pipelines are being used of which a series of 4" Polypipe® lines will connect the individual producing wells to 10" steel manifolds at each of the Mike Usher #1, #2 & #5 wellsites. If additional wells are needed they will connect by 4" lines

to either manifold at MU #1, 2 or 5, as such is the case of the four SLO development wells. The San Marcos wells will have one manifold at SM #1 and its direct pipeline to the Iguana Creek Storage Facility.

The pipelines are butt fused together in the field then air pressure tested and finally laid in a 5.5 foot deep trench. A minimum of 12 in of backfill is placed over the pipeline before laying a 1/0 3/C+G 25 KV 100% shielded (UL) Marine Shipboard Cable in the same trench. The trench is then backfilled to within 2 ft from surface and marking tapes for both the pipeline and power cable laid in the trench. The trench will then be backfilled to surface and the surface re-instated to original condition. The pipeline/power cable route will be marked using Triview markers with warnings in Spanish and English to provide line of sight coverage with markings at every fence and road crossing.

Iguana Creek Storage Facility

It is proposed that crude oil and the associated gas will be transferred under pressure to the Iguana Creek facility principally via 10" (25cm) and 12" (30cm) Polypipe. The pressure will be generated by pumping jacks (nodding donkeys) at the top of each well head powered by electricity generated at Iguana Creek. The pipeline will be operated so that the crude oil (and gas still in solution) will arrive at the three phase separators (oil / water / gas) at Iguana Creek at 20 psi.

The oil from the separator will discharge to two 10,000 barrel storage tanks which have been fitted with facilities to load the crude into road tankers. Crude oil will be transferred 240 kilometers by road tanker to the 42,000 barrel storage facilities at Big Creek Port before being transferred to barge and exported for processing. Any produced water (water content of the oil is currently negligible) will be discharged from the separator to the water holding tanks prior to re-injection into the non productive well MU No. 6.

The gas from the separator will pass through a 24" x 8ft horizontal coalescer which will remove all particulate, mist and condensing vapours down to 10 microns. The liquid leg of the gas coalescer will discharge to a low level from where the liquids will be pumped to the oil storage tanks and combined with the crude oil. The gas stream from the coalescer will be fed to an 800kW Solar Saturn Enclosed (1800 rpm, 480V, 60Hz) Continuous Duty Propane Gas Turbine Generator Set with PLC controls to allow the gas turbine to be fuelled by the circa 2000 btu/cuft associated gas. The generated power will be used at the Iguana Creek Processing Facility and distributed (via power cables running back along the pipeline trench) to the individual well sites to power the Pumping jacks (nodding donkeys), auxiliary lighting etc. It is proposed that excess electricity may be sold to Farmers Light, a small power company in Spanish Lookout.

The 800-kW Solar Saturn Gas-fired Turbine Generating System designed by Jaguar Energy Belize for BNEL's Iguana Creek facility is comprised of a gas turbine engine coupled to a wound field synchronous generator with a reduction gearbox mounted on a skid containing lubrication and systems control. The unit is capable of running on gas or liquid fuel and is fitted as standard with a Hospital-grade Exhaust Silencer, a fire

Detection System and a Fire Suppression System. The unit will be housed within a sound-attenuated, weather-proof enclosure rated 70 dB(A) at 10 ft (3m) to ensure compliance with international noise workplace standards.

1.4 Project Rationale

BNEL signed a Production Sharing Agreement (PSA) with the Government of Belize (GoB) on January 3rd 2003 to conduct petroleum operations within a concession area in the central, western portion of the country. This PSA gives BNEL the authority to conduct petroleum exploration operations over an eight year exploration period, within an assigned contract area. These petroleum operations include the exploration for, development, extraction, and production as well as transportation, storage and sales of petroleum within the concession area. As such, BNEL is tasked to explore for, locate and develop petroleum resources within its concession area.

Its exploration efforts found the Spanish Lookout field and its developmental efforts have identified both the San Marcos sites and two of the proposed Mike Usher # 7 to # 10 sites as locations to effectively deplete the field. The San Marcos wells will be located on the northeastern boundary of the Spanish Lookout Community, while the Spanish Lookout wells (Mike Usher # 7 and # 8) will be located between Mike Usher # 2 and Mike Usher # 1 and MU#1 & MU#3, respectively.

It is anticipated that hydrocarbons found in these wells be of similar nature (high gravity oil and minor associated gas) as they are of the Spanish Lookout Oil Field. Putting these wells into production, and drilling and producing from the four development wells proposed for the Spanish Lookout area will effectively deplete the field.

1.5 Facility Specifications and Forecast of Activities

The proposed developments will be carried out in phases and will consist of the construction and drilling phase, production or operation phase and decommissioning phase. These phases will run concurrently to maximize time and investment. The construction and drilling phase involves several other subphases including site access which may involve road infrastructure, construction of the drill pad and the drilling activity. The production phase involves the actual exploitation of the crude oil and bulk storage. This phase also includes subphases such as pipeline installation, site enhancement and site management. The last phase is limited to the termination of the project and simple refers to the removal of the entire infrastructure from the site in hopes of returning it to its original state.

a. **Road Access** -BNE will make provisions for the construction of a road access that will facilitate the company to install the drilling rig and its associated ancillary and site personnel. For the San Marcos wells, accessing the site will require the upgrading of the village main entrance road and construction of an access road to transport the drilling equipment. More on this road is summarized in Chapter 8.

Presently the San Marcos road has been upgraded by BNE in conjunction with the Ministry of Works. New culverts were installed to replace the old and dilapidated ones.

Once upgraded, BNE will construct a 1.36 km access road to the well sites. This will require permission or consent from the respective land owners whose property the road access will pass through. Once completed, it is expected that the land clearing process will take place in order to install the drilling rig. The same will be done for the Spanish Lookout wells where consent from the land owners will be obtained prior to any road construction. Once approved, land clearing will take place for the access road and site installation.

b. Well Pads - The construction of the well pad or drilling pad requires the clearing of land to facilitate the process. Typically the new BNE wells drilled will require, on average, a 0.83 acre well-pad area (150 by 240 ft.) to be cleared and leveled. Wells drilled to formations over 5,000 feet deep use a larger drill rig and would need a 1.1 acre (250 by 200 ft.) well pad area cleared. Construction of the drilling pad involves the spreading or compacting of 10 -12 inches of stone covered by two layers of compacted gravel. The drilling rig is then placed on the drill pad which is the same used in previous Spanish Lookout drilling program as shown in Plate A. The drill rig will be placed on the drilling pad throughout the drilling and testing process.

If commercial quantities of oil and/or gas are discovered, roughly a 50-by-50 foot portion of the disturbed well pad is used to set up the piping, tanks, and production equipment necessary to produce the well. Additional area of the pad will also be used as a turnaround area used for inspection and maintenance equipment. This report assumes that about 25 percent of the disturbed pad area (0.21 acres) will remain in use for the producing life of the well. The balance of the pad area not needed for production is then re-vegetated.

c. Energy – A mobile diesel generator will provide energy to the site in the form of a 100 kVA three phase engine. The drilling rig will supply energy via its own engine. The diesel generator will be working throughout the drilling phase and part of the production process. BNE plans to supply energy to the sites from the Iguana Creek facility via the gas turbine engines. More on this issue is discussed in Chapter 9. Fuel trucks will transport fuel to the site and will remain there until the duration of the drilling phase.

d. Water – Water to be utilized at the drill sites will be taken by water trucks. Production of these wells will be centralized at the Iguana Creek facility, via pipeline, where a potable water well will be located.

e. Waste –Waste will be produced on site via the different waste streams. Both phases will produce waste and will range from domestic solid waste to effluent waste (drilling fluid). Unused drilling fluid will be carted away from the site in

tanker trucks to the Iguana Creek Facility, where it will be recycled through a dewatering unit

f. Pipeline Installation –All the proposed wells will be linked up to the pipeline network. In the case of San Marcos, a trench will be excavated directly from San Marcos well # 1 to the Iguana Creek facility. This 5.5 foot trench will accommodate the oil pipeline and electrical cable (See Chapter 10).

g. Pumps – As production pressure drops, the BNE wells will be in need of a pump to pressurize both the well and the pipeline. With this in mind, BNE will make provisions, at each site, for the eventual installation of pumping jack or nodding donkey as they are sometimes referred.

h. Ancillaries – BNE will have in place notices and warning signs at the well sites. During production, galvanized perimeter fence will encircle the proposed well sites.

Plate A: P.R. Marriot Drilling Rig

1.6 Project Implementation

Although there are several phases for the proposed project, once the implementation phase starts, works will continue along a steady continuum aspect, blending

seeminglessly into the succeeding operations. The term phases is therefore used loosely in this context as a management tool to discern the work discrete activities which are to be accomplished within a given time period.

There will be 5 activity clusters that will be discernible as the projects move forward. These are the same clusters previously describe in Section 1.1 of this Chapter and will basically involve:

- Developmental Drilling
- Development and Exploitation (Production Well)
- Bulk Storage Facilities
- Transportation (Road/Pipeline/Sea Transport)
- Processing/Refining (in Country or Abroad)

The developmental phase is expected to be completed within 6 – 7 weeks per well baring any unforeseen or calamitous event such as natural disasters or other occurrences beyond the contractor's control.

1.7 Overall Management Structure

The overall management structure for the activities for the proposed developmental wells is outlined below:

- BNE's President & CEO: Dr. Gilbert Canton, with overall responsibility for the proposed project
- drilling contractor: PR Marriott
- mud contractor: Sinclair Drilling Fluids
- mud logging Contractor: Horizon Well Logging
- cementing / grouting contractor: PR Marriott/ Dennis Shaver
- electric logging Contractor: Schlumberger
- company man: Virgil Welch, Welch Energy Services
- engineering: Derek Howard Orchard