
CHAPTER 6

AIR AND NOISE POLLUTION

6.1 Ambient Air Quality

The air quality at the proposed sites appears to be favorable and consistent with a rural or an undeveloped area. The project sites are nestled in open agricultural lands populated by agriculture products and livestock. Significant industries within or near the project sites are mainly agricultural (poultry and cattle) and of industrial service provision as well as the oil wells currently in production which are the property of the proponent. BNE is presently flaring the gas associated with the five producing wells.

However, BNE is also cognizant of the concerns this has raised as well as the inadequate use of resources and is in the process of piping the oil along with the associated gas to a central facility whereby it will be used by a gas turbine engine to produce electricity. It is therefore anticipated that the San Marcos wells and the new Spanish Lookout wells which will be located in Spanish Lookout Community will have associated gas that will be piped along with oil to the central facility.

Other possible sources of existing impacts to ambient air quality include vehicular emissions from the Iguana Creek road entrance to Spanish Lookout, the dirt roads leading to San Marcos Village and Spanish Lookout sites. Other possible sources also include soot/particulate emissions from the existing generating station within the community; periodic fires; and fugitive dust emissions from farming and travel on local gravel/clay roads both within the project site and the surrounding area. BNE also has some equipment that produces air emissions, and these will be addressed further in this chapter. Site specific measurements were conducted in January 29, 2007 to assess the current ambient air quality conditions.

Figure 6.1 shows the four monitoring stations that were used to measure the air quality. Measurements were conducted using reactive chemical gas detector tubes manufactured by Sensidyne. Ambient air at each monitoring location was measured for carbon monoxide (1 to 50 ppm), Carbon Dioxide (1-20 %), sulfur dioxide (0.5 to 20 ppm), nitrous fumes (0.5 to 30 ppm), nitrogen dioxide (0.5 to 30 ppm).

A metered bellows style pump was used to draw a precise amount of air through each tube. The tube was then observed for any changes of coloration indicating the presence of the target gases. As can be seen in figure 6.1, none of the target constituents were detected in the field survey. Nevertheless, BNE has conducted extensive air sampling around the wells which can be found in the Air Sampling Report. Wind directions around the proposed sites are predominantly in the east to west direction with seasonal differences.

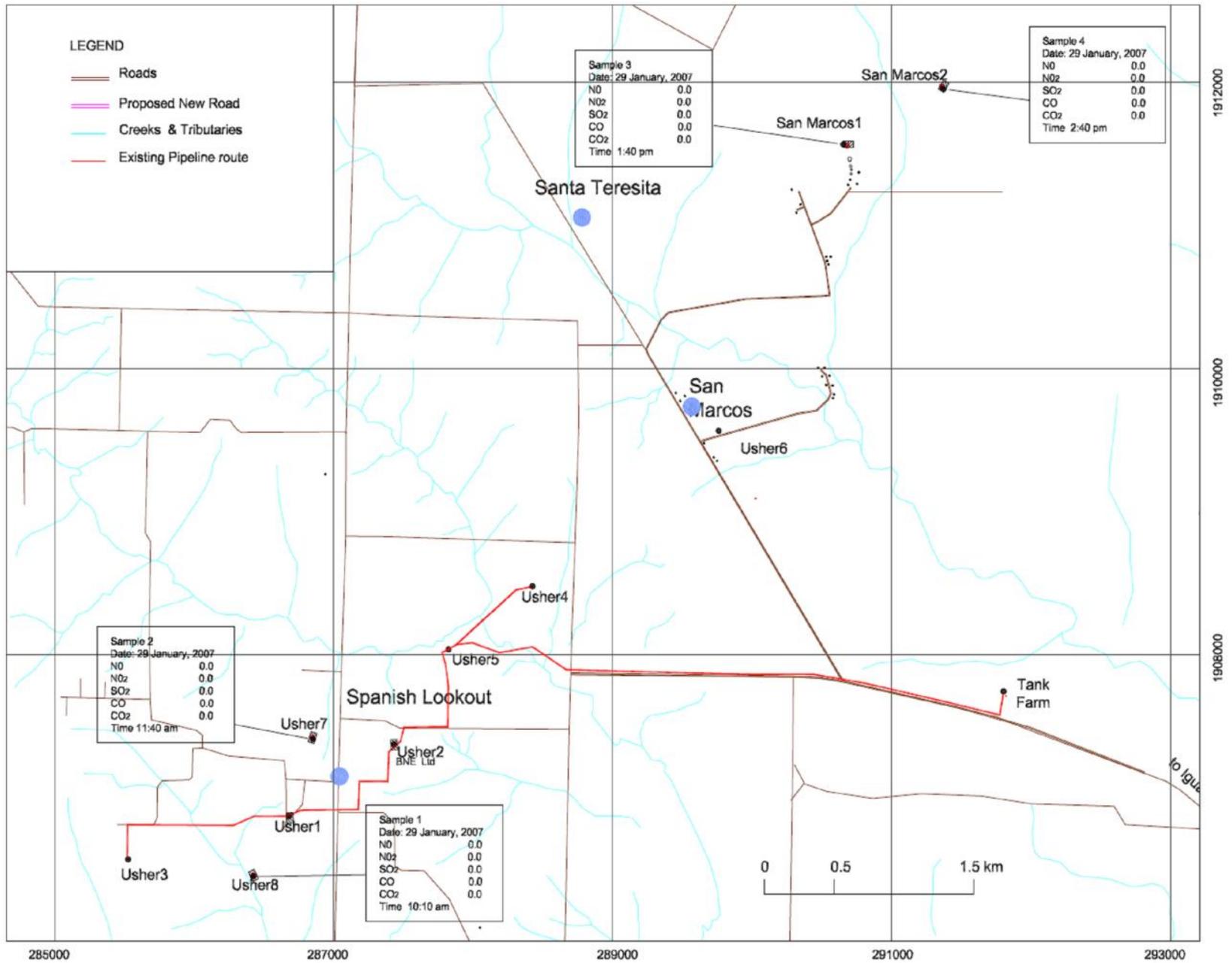


Fig. 6.1 Air Monitoring Samples at the Proposed Sites

Around the hills, air streams generally vary in directions but are in concert mostly with the predominant winds.

6.2 Ambient Air Quality during Drilling

An evaluation of the existing air quality is summarized in figure 6.1. Possible impacts to the ambient air quality that may result because of the drilling phase of the BNE wells, as well as the proposed mitigation measures are discussed in the following sections.

6.2.1 Potential Impacts to Air Quality

Potential impact sources to the existing air quality during the drilling and construction phase include fugitive dust emissions, vehicular/ heavy equipment exhaust and emissions from the diesel generator and drilling rig engine used to generate energy. As indicated previously, considerable heavy equipment will be used to clear the land thereby increasing the vehicular traffic in and around the project site. Furthermore, fugitive dust emissions from access roads, disturbed areas and non point sources could also impact the air quality in the area.

The air quality at the project site could also be impacted by the vehicular traffic on the existing dirt road around the wells (San Marcos and Spanish Lookout), especially during the dry season. Apart from this, impacts to air quality from these sources should not appreciably degrade the ambient air quality at the sites. Moreover, the anticipated duration of the drilling phase for each of the sites is relatively short (approximately 6 -7 weeks).

6.2.2 Proposed Mitigation Measure

The anticipated mitigation measures for the potential air quality impacts during the drilling phase involve both operational and engineered interventions. In order to limit the possible emissions, all vehicles and equipment will be turned off when not in use as well as prohibit vehicular and equipment idling. In addition the vehicles and equipment (generators) will be serviced and maintained in order to reduce any possible emissions.

Fugitive dust emissions could also affect ambient air during road construction. Water trucks will be used to spray water on the unpaved roads and cleared areas to reduce dust emissions. This will be further enhanced by the eventual upgrading of the wells road system. Trucks transporting materials will be covered to prevent any loose material from blowing away. Vehicular speeds shall be limited to further reduce any possible fugitive dust emissions. Disturbed areas will be re-vegetated as soon as practicable to limit exposed areas of soil.

6.3 Ambient Air Quality during Production

As stated earlier, the current air quality is favorable at the project sites. This is further supported by the evaluation data of the ambient air quality discussed earlier. A report

produced by BNE was submitted to the Department of the Environment in October 2006. The report outlines the results of the monitoring as well as sets out a basis for the development of any Air Quality Monitoring or assessment protocols that may be required in the future. Possible air quality impacts and proposed mitigation measures associated with the proposed production phase is summarized below.

6.3.1 Potential Impacts to Air Quality

Possible sources of impacts at the new sites include the flaring of the gases, exhausts emitted from road tankers and other vehicles, and fugitive releases from the venting of the storage tanks gases. There are also indirect sources that contribute and include vehicular traffic in the area, range and periodic fires and farming of adjacent lands.

The main source of emissions to the air from BNE originate from the flaring of natural gas at the production wells MU#1 to MU#5 and the exhaust gases emitted from road tankers transporting the crude and other vehicles and plant used in the servicing of the field operations. There are some fugitive releases of volatile gases emitted during the loading and unloading operations of road tankers at the well sites.

6.3.2 Proposed Air Mitigation Measures

The flaring of gases is considered to be a temporary impact as the plan is to link all the wells by a pipeline to a central gathering station where the gas will be separated and used to generate power, which will then be used by Belize Natural Energy Limited and/or sold to the local community. The equipment used on site is modern and properly maintained such that exhaust gases have a minimal impact on the environment. It is recommended that periodic monitoring take place at each site in order to support the base line study. As part of their Strategic Environmental Assessment, BNE has undertaken a high level review of the areas within their concession area that may be particularly affected by emissions from flares. The installation of gathering pipelines however will mitigate this risk.

Fugitive losses from storage tanks are controlled using valves which are mandatory safety features to prevent excessive build up of pressure within the tanks. These fugitive losses are very small, have an odor, and are strictly controlled using valves specified by the American Petroleum Institute (API) for the bulk storage tanks and the US Department of Transport (DOT) for road vehicles.

6.4 Ambient Noise levels

The present noise levels at the project site are minimal and its only existing sources of noise in the vicinity includes existing traffic activities, localized farming operations and some construction activities. These sources may also represent and result in short term notable noise. With this in mind, noise level measurements were performed in order to assess the current ambient conditions.

In order to verify the present noise levels within the impacted areas, four monitoring stations were analyzed. Measurements were taken to evaluate the ambient noise conditions at each well site. Several readings were taken along the four cardinal points (north, south, east and west) with the maximum and minimum A Weighted for each site recorded. The results of the noise level monitoring are summarized in figure 6.2.

As can be seen in figure 6.2, the ambient noise levels recorded at the well sites are minimal. The ambient noise levels at the San Marcos sites are minimal and typical of undeveloped areas. The Spanish Lookout wells were a bit higher than the San Marcos sites, this can be attributed to the transiting of vehicles and related agricultural activity.

6.5 Noise Levels during the Drilling Phase

The ambient noise levels can increase during the drilling phase. An evaluation of the noise levels during the field survey is summarized in figure 6.2. The following sections summarize the potential noise impacts during construction.

6.5.1 Potential Noise Impacts during the Drilling Phase

Potential sources of noise impacts during the drilling phase include drilling operations, vehicular transportation and equipment operations. The drilling operations are undertaken continuously 24 hours a day producing noise in the process. However all drilling equipment and power generators are modern and baffled. The transportation of large equipment such as drilling rigs may cause temporary noise (and occasional vibration) but this is of a limited duration. There are some construction noise (i.e. hammering, sawing, etc.) and crew noise (yelling, shouting, and talking) produced at the sites also. Noise levels at night may increase slightly but not expected to be a major impact due to the duration of the phase.

6.5.2 Proposed Noise Mitigation Measures

Mitigation measures shall be put in place to reduce the potential noise impacts during the drilling phase. Drilling equipment and power generators are modern and therefore baffled. Construction noise and crew noise will be mitigated by maintaining these noises to a minimum. Crew noise shall be kept to the minimum necessary for effective job-site communication. Vehicular transportation and equipment operation shall be maintained and fitted with mufflers during operation, as applicable. Equipment and vehicles shall also be turned off when not in use.

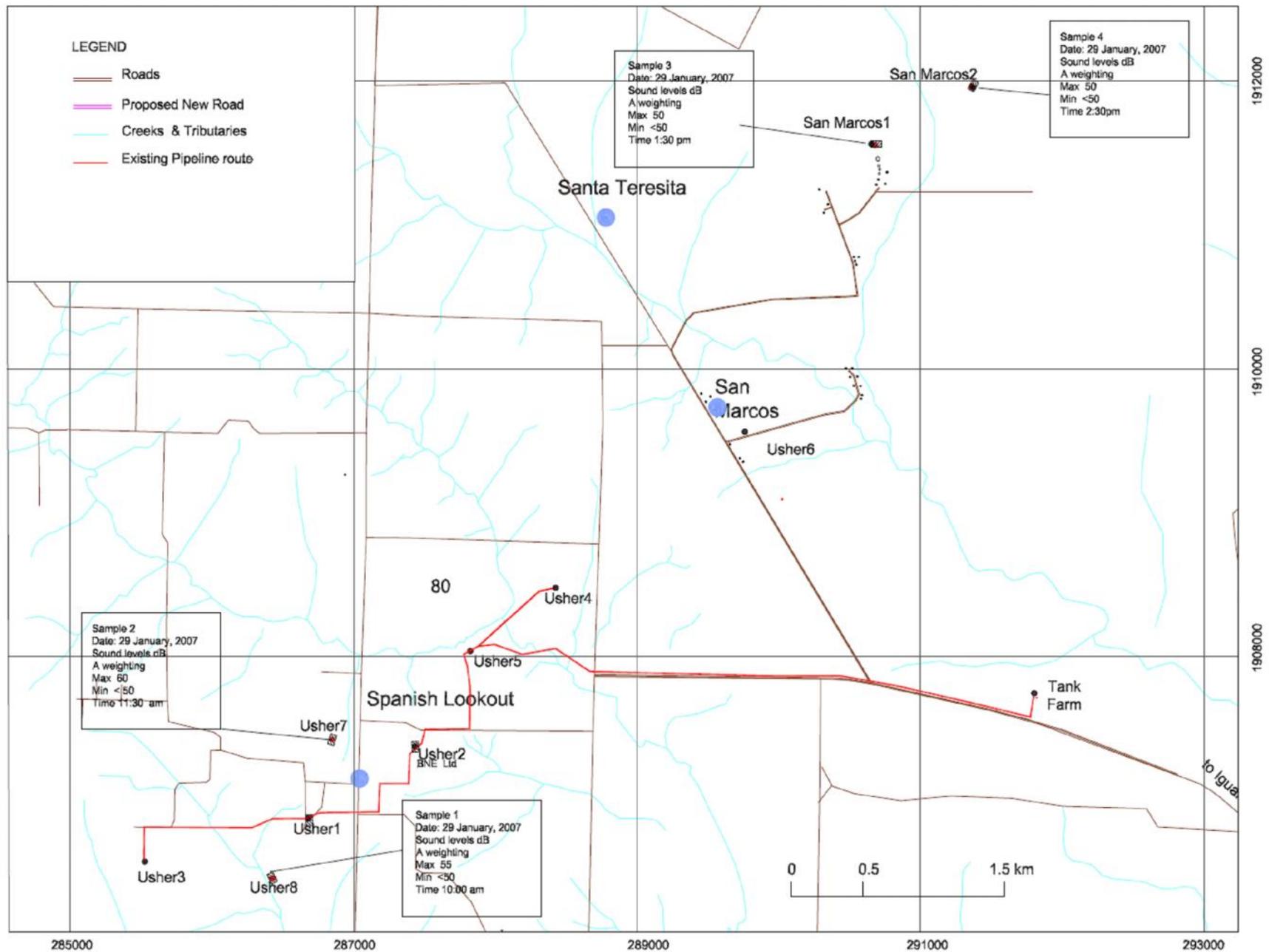


Fig. 6.2 Noise Sampling Results conducted at the proposed sites

6.6 Noise Levels during the Operation Phase

The existing noise levels recorded at the well sites are illustrated in figure 6.2 and generally indicate the existence of low level noise. Potential noise impacts associated with Belize Natural Energy's operation phase along with mitigation measures are presented in the following sections.

6.6.1 Potential Noise Impacts

Unlike the other production wells currently in operation, the San Marcos wells and the new Spanish Lookout wells will be limited in their noise generation. Presently at the production sites, the flaring of the gas, the operation of the pumping jack along with transiting of vehicles accounts for noise sources. Potential noise sources at the new sites will be from the operation of the pumping jack and non point sources such as vehicular traffic around the area. These are pumps that will be used by BNE to pump the oil from the wells and pressurize the pipeline. The noise generated by each site will be negligible and will be below the Belize Pollution Regulations, 1996.

6.6.2 Proposed Mitigation Measures for Noise Impacts

The noise emission generated by well sites during operation will be negligible to the surrounding environment. However, BNE continue to will employ Best Practices in all their activities related noise emissions. These include the proper maintenance of the pumping equipment and the proper muffling of operating equipment. The creation of a buffer zone within the respective sites can also help. Trees and other vegetation may be planted to further attenuate possible emissions and reduce noise impacts to the surrounding area.