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11. Construction processes and materials

This section provides a description of the various construction processes that will be used in constructing the power plant. Descriptions of the facilities that make up the footprint of the power plant are described below.

11.1 Power House

The power house building will be a pre-engineered building designed and constructed to the site design requirements. The power house will contain the seven generators-engines that make up the power plant. The building will be made out of tapered columns having a pin base design. The power house building will be insulated for noise abatement to attain the maximum allowable noise levels at the property fence line. The power house will include the following features.

- Engine hall with 2-ton maintenance crane;
- Open bay for maintenance;
- Reinforced concrete floor independent of engine-generator foundations;
- Control room;
- Water closet (in control room);
- Electrical room;
- Equipment annex with raised steel grate floor for equipment access;
- One (1) overhead electric coiling door shall be provided in the loading/staging bay;
- Forced ventilation; and
- Lighting and convenience outlets.

11.2 Maintenance Building

The maintenance building will be designed and constructed to the site design requirements. It will house the workshop and associated infrastructure. The building will be made out of tapered columns with a pin base design. The Maintenance Building will be sized for routine maintenance, and will include the following features:

- Ventilation and air conditioning;
- Linoleum floor in office area;
- Workshop area; and
- Spare parts area.

11.3 Fuel Treatment Building

The fuel treatment building shall be a pre-engineered building designed and constructed to the site design requirements. The building will be made out of tapered columns and have a pin base design. The fuel treatment building will include the following features:

- Concrete floor sloped towards the floor drains;
- Ventilation; and
- Lighting and convenience outlets.

11.4 Roads & Paths

The roads within the power plant will be designed and constructed to withstand the expected traffic, frequency and weight of heavy trucks. Materials used for construction of the access roads within the power plant will be concrete or asphalt. Special precaution shall be paid to roads constructed from asphalt in areas where fully loaded trucks turn to prevent undue accelerated degradation of the road.

Secondary roads as defined to carry light truck traffic (fork lift trucks, work trucks, cars and other like vehicles) shall be designed and constructed to withstand the expected traffic frequency and weight. These types of roads shall be made out of compacted gravel with a geo-textile fabric laid beneath the surface. All other parking areas shall be gravel. The roads will be designed to allow proper drainage of storm water and prevent water puddling.

11.5 Fencing

For security purposes, a chain link fence with galvanized mesh and galvanized posts will be installed around the site perimeter. A manually operated vehicular entrance gate will also be provided. The chain link fence will be erected to a height of 2.7m and will contain razor wire fencing at the top.

11.6 Miscellaneous

11.6.1 Piping

Piping for mechanical works will be sized using flow velocity considerations in keeping with good engineering practice. Low point drains and high point vents will be provided. Vents and drains will have valves and caps. Threaded piping connections will not be used for DFO, HFO or lube oil piping. Standard pipe sizes will be used. All pipework will be supported, anchored and guided to prevent undue vibration, deflection or stress on piping or equipment.

Installation and orientation of all gauge glasses, level controllers, thermometers, pressure gauges, etc. on the piping will maximize readability, ease of operation, and ease of maintenance.

Piping systems will be chemically cleaned, blown out, flushed, and/or boiled out as appropriate. Installed piping will be free and clear of all dirt, welding slag, rags and debris.

11.7 Insulation

Insulation will be provided as required on piping, ducts, and equipment to:

- Reduce heat losses;
- Reduce noise; and
- Reduce heat loading of surrounding spaces.

In addition, any accessible hot surface that presents a burn hazard to personnel during normal operations will be insulated. Any hot surfaces within one meter of ladders, platforms, walkways or accessible floor areas will be insulated.

11.8 Paint and Coatings

Vendor-supplied equipment will be finish painted in accordance with vendor standard specifications. Touch-up painting will be completed after installation. All equipment will be painted with the manufacturer's standard paint.

Piping will be cleaned, primed and finish painted in accordance with good industry practice.

Structural steel will be cleaned, primed and painted in accordance with good industry practice.

Miscellaneous structural steel supports, handrails, ladders, and walkways will be painted or galvanized. The exhaust stacks will be painted with high-temperature paint.

Steel tanks will be cleaned, primed and painted on the outside. Steel water tanks will be coated inside.

Underground carbon steel pipe will be coated and wrapped per good industry practice.

The concrete floor of the Power House and Maintenance Shop will be painted.

11.9 Construction process

Materials needed for the civil and structural works include stone, cement, steel, pipelines, sand, gravel and wood. The required supplies will be transported to site by truck. Sand and cement will be sourced from existing local and/or national commercial suppliers.

Necessary equipment includes cranes, bulldozers, excavators, front-end loaders and electric welding machines. Low-bed trucks will be used for transporting equipment.

Nearly all pipes, pumps and control systems will be imported. The aboveground storage tanks will be made of flat sheets of steel that will be rolled offsite and welded together onsite. Cranes will be used for tank construction, as well as to put the transport gantries in place. Tanks will be tested using x-ray equipment.

Construction activities will generate noise levels to a limit of 85 decibels (dB(A))

Exact daytime and night-time period continuous equivalent sound pressure levels are not possible to calculate with certainty at this stage as the final construction site layout, work program, work *modus operandi* and type of equipment have not been finalized. Typical noise levels to be generated by the construction plant and equipment are provided in section 9.7.7 of this ESIA Study.

11.10 Water requirements during construction

During construction, water will be required for mixing of concrete and other uses. This water will be sourced from the Mavoko Municipal Council or using contracted water bowsers.

Hydrostatic testing will be used on the pipes. Water used for this purpose will need to be tested and approved as per relevant standards before discharge takes place.

11.11 Sewage, waste and stormwater runoff

During construction, storm water will be controlled to minimize the risk of erosion and sedimentation and prevent water contamination. Contaminated storm water will be treated before being released.

The EPC Contractor will put up site offices which will include ablution facilities. There will be a septic tank that will be constructed to direct the sanitary sewage for collection and disposal by a contracted exhauster company. The sanitary sewage will be discharged at locations approved by the Mavoko Municipal Council.

11.12 Site management

Construction will only take place during daylight hours. During construction there will be 24-hour security onsite and no workers will be allowed to stay overnight at the site.

11.13 Staffing requirements

Job opportunities will be generated through the construction of the power plant. Both skilled and unskilled labor will be required in technical fields as well as in the power plant operation and management. It is anticipated that a minimum of 100 to 150 jobs will be created during the construction phase. The overall organization chart for the power plant project is given in Figure 11-1.

Figure 11-1: Organization chart for the power plant project

