Bossong Engineering PTY LTD

Works Approval and Registration Application Attachment 3B - Supporting Information Document

8 March 2024

Table of Contents

Figures

Tables

[redacted]

1. Proposed Activities

Bossong Engineering will establish an engineering facility at Lot 618 Exploration Drive, located withing the Gap Ridge Industrial precinct nearby the City of Karratha.

The site has no notable topographic features and is part of an upper coastal plain and sits adjacent (approx. 700 m west) to Seven Mile Creek, which is usually dry year around except during heavy rainfall events. No native vegetation is present on the suite which has been previously cleared with the development of the Gap Ridge Industrial Estate, but pockets of sparsely vegetated low lying shrubs are present outside the site boundary towards Seven Mile Creek. The soils within the site are a stony red sandy loam with little organic matter.

Bossong Engineering intend to develop the site to provide specialised machining processes to the oil and gas industry operating out of the Karratha and Dampier area. Three primary covered factory workshops (1,494 m^2) and two secondary Dome Shelters (432 m^2) will be constructed on the site (refer to Site Plan in **Attachment 2**).

Machining operations will take place in Workshop 1 and support processes (i.e., metal treatment with manganese phosphate coating) and drill rod storage will be undertaken in the yard.

Proposed activities for Workshops 2 and 3 are:

- Under cover storage of drill rods, casing, and similar equipment
- Fabrication of equipment for surrounding mining and mineral processing industries.
- Fabrication of equipment for the oil and gas industry.
- Fabrication and Maintenance of rolling stock.
- Assembly and commissioning of subsea machines and systems.

A key activity of the proposed business operations on the site will be metal coating treatment with manganese phosphate, commonly called phosphate conversion coating, or phosphating. Phosphating is a common treatment practice whereby a chemical coating applied to steel parts that creates a thin adhering layer of manganese phosphates, to achieve corrosion resistance, lubrication, or as a foundation for subsequent coatings or painting, and is one of the most common types of conversion coating.

This activity will be classified as a prescribed activity (Category 88) under Part 2, Schedule 1 of Part V of the EP Act, which states:

Metal finishing: premises on which —

a. metals are chemically cleaned or metals, plastics or metal or plastic products are plated, electroplated, anodised, coloured or otherwise coated or finished; and

b. from which liquid waste is discharged into a sewer.

The proposed operation intends to manganese phosphate treat both newly manufactured tools (max. 500/year) and re-conditioned tools (max. 5,000/year) for the Oil & Gas and mining industries. General process diagrams for these activities are presented in **Figure 1-1** below.

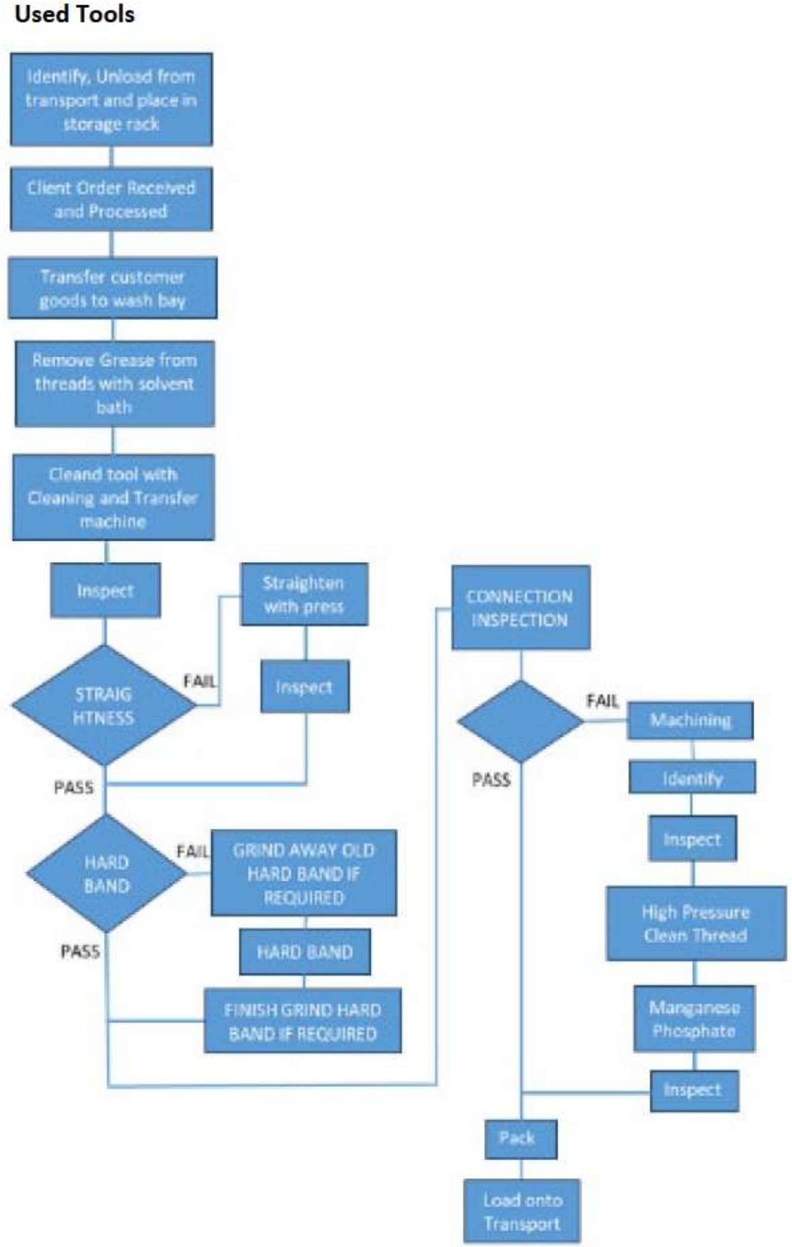

Figure 1-1: Processing diagrams outlining steps to manufacture new tools and recondition used pipe, tools, and casing

1.1 Phosphating Treatment Process

The proposed operation will consist of installing a phosphating tank (solution storage volume is 1,033 litres) to coat drill pipe connections (tools) with manganese phosphate. The process involves heating (90 – 98 Degrees C) a phosphoric acid (H_3PO_4) and manganese ion solution in the phosphating tank (Figure 1-2) whereby newly machined connections are immersed in the solution for specified period (5-20 mins) of time. It should be noted that the treatment solution in the phosphating tank is continually re-used and not discharged after use.

Examples of a phosphating tank and manganese phosphate treated drill pipe connections are presented in **Figure 1-2** and **Figure 1-3**.

Figure 1-2: An example of a phosphating tank used to chemically coat a metal component

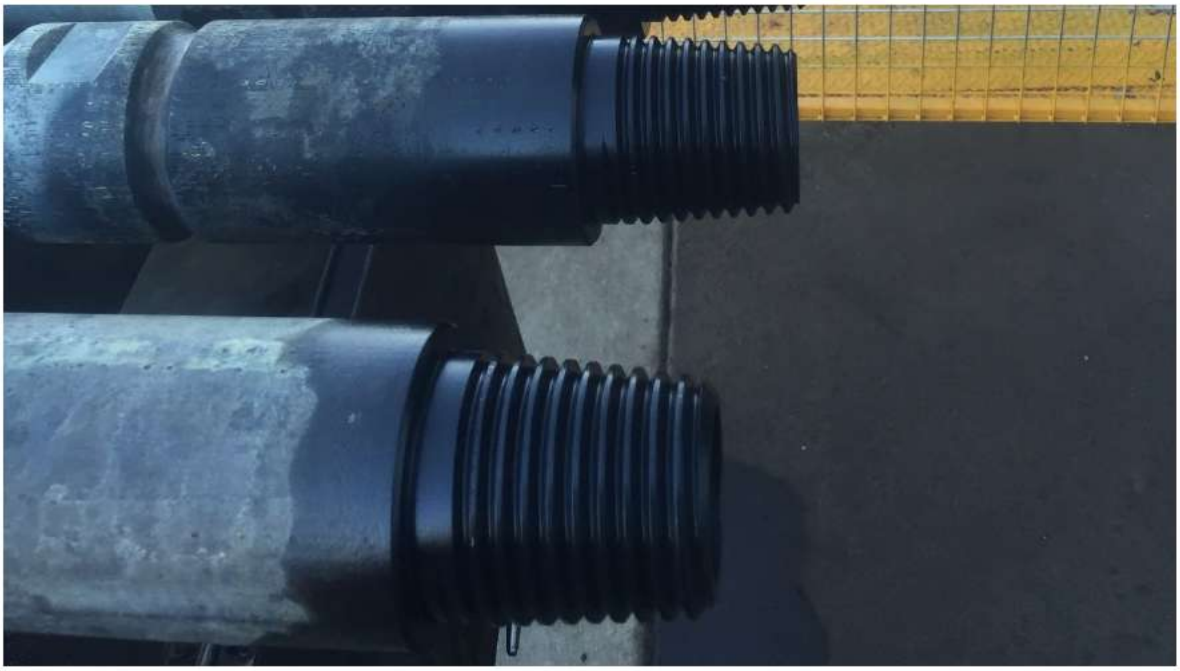

Figure 1-3: Manganese phosphate coated drill pipe connections

1.2 Materials Used

Materials used, their use and weekly consumption on the site are presented in **Table 1-1** below.

Table 1-1: Site materials consumption

Material	Use	Weekly Consumption
Gardobond G4098	Compound used in the manganese phosphating process	8 L
Gardobond Additive H7023	Catalyst used in the manganese phosphating process	130 g
Sodium Hydroxide – 20mls / week	Testing of acid content in phosphating solution	20 mL
Urea	Testing of iron points in phosphating solution	2 g
0.1N Potassium Permanganate	Testing of iron points in phosphating solution	10 mL
Phenolphthalein	pH testing solution	10 mL
Bromophenol Blue	pH testing solution	10 mL
Sulphuric Acid 50%	Testing of iron points in phosphating solution	20 mL
Rust Paint Aerosol	Metal finishing	1 L
Envirogreen	Degreasing solvent	20 L
CF50, Robowash Cleaning Agent	Chemical detergent used for cleaning	1 L
CO Contact Cleaner	Plastic cleaning agent	1 L
Diesel	Vehicles	25 L
QCUT 2229B	Grinding and cutting fluid	10 L
Hydraulic Oil	Machinery maintenance	2 L
Kendex GO43 OCTG	Metal anti-corrosion treatment	1 KG
KOPR-KOTE	Metal lubricant	1 KG

2. Infrastructure and Equipment on Prescribed Premises

Table 2-1 below lists the key infrastructure and equipment on the site. Refer to the Site Layout Plan in **Attachment 2** for locations of listed items.

Table 2-1: List of key infrastructure and equipment on the site

SHED 1
• Facility for 10T Overhead Crane • Facility for Davit Cranes • Band Saw – future • Straightening Press (future planning) • Swaging Machine (future planning) • Protec 11NFx3000 CNC Lathe • Protec 13ND x 5000 CNC Lathe • Drill Rod infeed transfer systems (Apron) • Toilets and Lunchroom
SHED 2
• Facility for 10T Overhead Crane • Future Fabrication and/or storage
SHED 3
• Facility for 10T Overhead Crane • Future Fabrication and/or storage
OFFICE
• Toilets • Change Room • Showers • Lunchroom • Gauge Room • General Office • Conference Room
OUTSIDE YARD AREA
• 15 Bay Car Park • Transformer Compound • Crossover • Truck Loading Bay • Storage Racks
DOME SHELTER 1

• Inspection Area • Drill Rod Cleaning and Transfer Machine
DOME SHELTER 2
• Wash Down Bay • Solids Separation Pit • Wastewater Treatment System
MANGANESE PHOSPHATE ENCLOSURE
• Manganese Phosphate Tank • Loading Hoist • Tipping Rack • Hard Cover Drum Bund
MISC. EQUIPMENT
• Hard Banding Welding System • Coffey Grinder • Heavy Duty Forklift • Light Duty Forklift • Light Truck

3. Emissions, Discharges, and Waste

Table 3-1: Projected emissions, discharges and wastes that will be generated from the prescribed premises

	Emission, Discharge, Waste	Source	Weekly Volume	Disposal/Management
1	Air emissions (water vapour, hydrogen gas, odour)	Phosphating tank	Water vapour – 62 L Hydrogen gas and odour – unknown but minor	Refer to **Section 3.1** below
2	Noise	General operations on site	-	No management controls are considered necessary given that noise will generally occur be during day-time business hours only, and the site is located within an industrial precinct with the nearest residential receptors being located > 1,200 m from the site (refer to **Figure 2E, Attachment 2**).
3	Wastewater	Processing wastewater (Washdown Bay 1) and sewage from staff amenities	16 to 32 m^3	Discharged to the sewer servicing the site. See **Section 3.2** below.
4	Sand and Dirt	Washdown Bay 1 – Solids Separation Pit	2 m^3	Placed in the general waste skip for disposal to landfill
5	Oil	Washdown Bay 1 - Oil plate separator	40 L	Stored on site and removed from a certified waste contractor for disposal
6	Machine coolant	Machinery Use	20 L	
7	Grease	Machinery Use	15 L	
8	Used lubricating oil	Machinery Use	30 L	
9	Degreasing solvent	Processing	20 L	Discharged to the sewer servicing the site
10	Steel scrap/offcuts	Processing	500 KG	Recycled - placed in the scrap metal skip for removal by a scrap metal dealer
11	Swarf (metal shavings)	Processing	500 KG	
12	Stormwater runoff	Roof and hardstand areas	-	Discharged to the stormwater drainage easement located at rear of the site. See **Section 3.3** below.

3.1 Air Emissions

The primary air emissions from the site will be gaseous emissions from the manganese phosphating process (**Section 1.1**) related to the chemical reactions occurring in the solution between phosphoric acid (H_2PO_4) and manganese ions (Mn^{2+}), with the main by-products being water vapour and hydrogen gas (H_2).

The amount of hydrogen gas produced in the manganese phosphating process can vary depending on the specific conditions of the process, such as the concentration of the phosphating solution, the temperature, and the duration of the process. However, it is important to note that the hydrogen gas produced is typically consumed within the process itself. The bath often includes an oxidizer to consume the hydrogen gas - which otherwise would form a layer of tiny bubbles over the surface, slowing down the reaction. While the exact quantity of hydrogen gas produced is not typically disclosed in the available literature, it is understood within the industry that the amounts are not significant enough to pose a major environmental concern [1,2].

To keep vapour/gas emissions to a minimum, tanks will be turned off when not in use. In addition, Bossong will implement the following engineering design controls:

i. Polymer balls are added to the tank and float on top of the solution. The balls insulate the surface of the tank and significantly reduce vapour discharge.

ii. A Silicon Rubber impregnated fibreglass cover is drawn over the top of the tank by a timing belt mechanism and can be retracted to the space behind the tank when tools are to be dipped into the manganese phosphate solution. This is an innovation that will be implemented over the current system (operated at the Perth facility) which is operated manually while the reliability of the mechanism is improved.

These two engineering controls have implemented in Bossong Engineering's phosphating system located in their Perth facility and have resulted in significant vapour emissions reductions by approx. 80%.

Measurements undertaken showed that amount of vapour emitted and evaporated measured at 37 L/day (185 L/week), when the tank is left on over a 24-hour period. Thus, if the tank is only used and left on over an 8-hour workday as planned, then vapour emissions are projected to be only around 12 L/day (62 L/week).

To reduce emissions even further, it is planned to install an electric motor to open and close the cover controlled by an open and close switch controlled by the operator. Once the reliability of the motorised system is proven the control switch will be integrated into the phosphate system automated dipping system. It is anticipated that automation of the cover operation is likely to reduce vapour emissions by a 25% from the current manual system.

In conclusion, given the small vapour/gas emissions that will be given off the manganese phosphating process, the distance (>1,200 m) of nearest sensitive receptors (refer to **Figure 2E**, **Attachment 2**), in addition to the engineering controls that will be implemented to minimize gaseous emissions, it is considered that the likely impacts of these air emissions will be *de minimus*.

3.2 Wastewater

Pending approval of a trade waste permit from the Water Corporation, wastewater generated from the site will be disposed to the reticulated sewer servicing the site whereby it will be conveyed to the Water Corporation wastewater treatment facility for treatment.

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1 https://www.scielo.org.mx/pdf/jmcs/v57n4/v57n4a10.pdf
2 https://en.wikipedia.org/wiki/Manganese%28II%29_phosphate

3.3 Stormwater

The Gap Ridge site is located within the catchment of the Seven Mile Creek and flood studies of the creek catchment during extreme (1:100 year events) have been indicated that some filling of the site will be necessary to preclude flooding. The high intensity rainfall associated with being in a cyclonic region requires the provision of a high-capacity drainage network comprised of large open drains to cater for high stormwater flows. These open drains will be located within road reserves or in some cases drainage easements within lots [3]. In the case of the proposed Prescribed Premises, there is an approx. 1,300 m^2 (15 m x 85 m) stormwater drainage easement located at the rear of the site (refer to Site Layout Plan, **Attachment 2**) that will provide detention and treatment (filtering out of any entrained contaminants) of stormwater runoff from the site during heavy rainfall events.

3.4 Solid Waste

Solid waste generated from site operations will be stored on site and either be disposed of to landfill (sand and dirt) or removed by a scarp metal dealer for recycling (steel scrap/offcuts/shavings) (**Table 3-1**).

3.5 Hazardous waste

Hazardous waste material such as used oil, machine coolant and grease will be stored on site and periodically collected by a certified waste contractor for appropriate disposal (**Table 3-1**).