Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**

Elverdton Project

Abandoned Mines Program

April 2021

Elverdton – located within the Fitzgerald Biosphere.

Background

Location

The historic Elverdton mine site is located approximately 540km south-east of Perth and 11km south-east of Ravensthorpe along the Hopetoun - Ravensthorpe Road. The historic site is loosely defined by a cluster of abandoned mine features comprising tailings storage areas, underground mine shafts and mine infrastructure.

The abandoned mine features are situated largely within live mining/prospecting tenure upon Class C Crown Reserve (R16119) adjacent to the historic Desmond town site. The site sits at the headwaters of the Steere River upstream from the Culham Inlet and Fitzgerald River National Park.

The Elverdton area lies within the Threatened Ecological Community (TEC): Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia; listed as endangered under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) [1]. It also falls within the Fitzgerald Biosphere[2].

History

Gold and copper mining began in the area during 1899 with major periods of copper ore production between 1901 - 1918 and 1957 - 1971. During the second mining period (1957 - 1971) a treatment plant was set up at Elverdton to produce copper concentrates and recover coarse gold. Tailings produced from these activities form the bulk of the tailings materials deposited on site. Tailings discharge events during this period resulted in the deposition of significant amounts of material into the Steere River immediately south of the tailings storage area.

Norseman Gold Mines held a mining lease (M74/34) over the project area from 1988 - 1992 and established a gold treatment plant to process ore from nearby Kundip.

1. http://www.environment.gov.au/system/files/resources/4b2a6210-af44-4672-871c-75a8cdc58f56/files/kwongkan-ec-info-guide-faweb.pdf

2. http://www.environment.gov.au/system/files/resources/5f1360ed-4670-49d7-8660-ea3e8636a888/files/fitzgerald-biosphere-recovery-plan.pdf

Tailings from this plant were stored separately from the older tailings. Upon tenement forfeiture in 1992, the former Department of Mineral and Petroleum Resources called in the Unconditional Performance Bond.

It is estimated there are approximately 700,000 tonnes of tailings material remaining on site.

The site is characterised by two (south and north) uncontained Tailings Storage Facilities (TSF), a large deposition fan of uncontrolled tailings and various abandoned mine features including open shafts. In addition, eroded tailings and associated mining slurry have been deposited beyond the site and into the upper reaches of the Steere River valley.

Community concern prompted preliminary studies of the site being undertaken in 1999 including the installation of temporary control measures; related efforts in 2002 consisted of:

- The use of timber pegging on the sides of the TSF
- Construction of bunds and two sediment ponds
- Construction of a sediment trap at the head water of the Steere River (located at the southern end of the Tailing Deposition Fan).

In 2007 and 2013 the Ravensthorpe Agricultural Initiative Network with the Culham Inlet Management Committee raised issues regarding dust generation from the site and potential downstream impacts to the Steere River and Culham Inlet.

Abandoned Mines Program

The Abandoned Mines Program (AMP) undertook opportunistic soil and surface water sampling at the Elverdton pilot site in October 2018. The AMP aimed to characterise sources of potential contamination and more specifically, to investigate issues raised the 2002 studies relating to potential acid and metalliferous drainage and heavy metal contamination.

Several of the tailings samples reported net acidity above the Department of Water and Environmental Regulation's (DWER) texture/volume based action criteria. All tailings samples reported copper concentrations above the Ecological Investigation Level (EIL) for 'ecologically sensitive areas' but were below all human Health Investigation Level (HIL). Samples associated with the tails storage area exhibited chloride to sulfate ratios indicating sulfidic material in the vicinity is being, or has been, oxidised.

Elverdton headframe and winder room.

The site was referred to DWER as a possible contaminated site and on 20 December 2018, DWER issued a Notice of Classification of a Known or Suspected Contaminated Site Given Under Section 15 of the *Contaminated Sites Act 2003* (CS Act) for the Elverdton mine site with a classification of Possibly Contaminated – Investigation Required. The reasons for the classification are focussed on the presence of uncontrolled mine tailings.

On 20 June 2019, the notice was revised following the submission of the DMIRS sampling results.

Actions required under the notice are:

- Further investigation of soil, surface water, sediment and potentially groundwater to delineate and characterise the nature and extent of contamination at the site and potentially off site;
- Environmental risk assessment to determine the risk to the environment and/or environmental value from the contaminants at the site; and
- In conjunction with the above works, development, and implementation of a strategy for the containment and management of tailings materials to minimise the further distribution (by wind and water processes) of potential contaminants into the environment.

A preliminary site investigation was undertaken in July 2019, concluding:

- Potential soil, groundwater, surface water contamination and AMD associated with the tailings remains to be investigated and characterised and the human health and environmental risks to be assessed.
- There is active and ongoing erosion of tailings at all locations where tailings are present, including erosion by wind at the top of the South TSF.
- The south and north TSF tailing sediment pond traps are inadequate to control the erosion and transport of the tailings
- The sediment trap at the southern end of the Tailing Deposition Fan is full of sediment and in disrepair
- There is previously unidentified localised (tailings/ concentrate) material present in the Steere River valley (within 1.5km of the mine site) that is visually distinct from the grey tailings, and this material appears to be actively oxidising to a greater extent than the adjacent typical Elverdton tailings. The nature and extent of this different material has yet to be characterised.
- With removal of most of the mine infrastructure in 1991, there do not appear to be sources of ongoing contamination at the former operations area, with the exception of the unidentified source of the acidic water that has been identified in the Remnant Powerhouse Cooling Water Pond.

An Accredited Contaminated Sites Auditor (CSA) was engaged in a voluntary capacity to oversee and report on the assessment and management of contamination associated with the site on the 26 February 2020 to review the preliminary site investigation and endorse the sampling plan due to significant level of community interest in the site, the site likely meeting the definition of a 'source site' as a result of the tailings material having entered the Steere River and migrating away from the Elverdton mining area, and due to the complexities in managing contentious issues including acid and metalliferous drainage (AMD) in environmentally sensitive areas.

Elverdton tailings storage facilities (north and south).

Elverdton tailings stockpile overlooking the downstream plume.

Overlooking the historic Elverdton mine site from the tailings stockpile.

Movement of tailings from the uncontained stockpile into the downstream plume.

Current Classification

The Elverdton site was classified as possibly contaminated – investigation required under the CS Act on 20 December 2018. The 'reasons for classification' were updated on 19 June 2019 but the classification category remained unchanged. The currently classified land parcel comprises a portion of Crown Reserve 19119. The site is likely to meet the definition of a 'source site' due to the migration of tailings. Given the large size of Crown Reserve 16119, it is possible that the tailings may not have migrated beyond the cadastral boundary. It has been noted that tailings material is known to extend beyond the boundary of the currently classified land.

Given the above and noting considerable community interest in the site, DWER considers a mandatory auditor report (MAR) is required to enable the site to be properly dealt with for the purposes of the CS Act. DWER stated that their decision was based on the fact that the assessment and management of contamination at the site presents particularly complex technical issues such as ecological risk assessment; fate and transport modelling; and AMD. On 15 June 2020, pursuant to regulation 21(1)(d)(i) and (iii) of the *Contaminated Sites Regulations 2006*, DWER formally requested a MAR be provided for the Elverdton tailings site.

Approach

The AMP has been working closely with all project stakeholders, engaging directly with tenement holders, neighbouring land holders, and the local community through the Ravensthorpe Agricultural Initiative Network and the Shire of Ravensthorpe.

An endorsed sample plan has been developed to enable human health and ecological risk assessment to be undertaken which will form the basis for management of the impacted area.

How to find out more

For further information on the Abandoned Mines Program, please contact the Abandoned Mines Branch:

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