Tasmania

MINERAL RESOURCES TASMANIA

Archaeological Survey Report
1995/02

Archaeological reconnaissance of Storeys Creek and Aberfoyle mines Rossarden, Tasmania

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1.0 Executive Summary

Since the closure of the Storeys Creek and Aberfoyle mines in the early 1980s concerns have arisen relating to the effect that years of mining and indifferent tailings disposal practices have had on the health of the local environment. A rehabilitation plan for the mine sites at Storeys Creek and Aberfoyle, Rossarden, drawn up by Thompson & Brett Pty. Ltd. consulting engineers, outlines a number of measures to be taken over the next six years to inhibit the current rate of heavy metal contamination of Storeys and Aberfoyle creeks and nearby areas (Thompson and Brett 1994). The six year rehabilitation works schedule has recently been revised in order to bring the program to completion during 1995/1996.

This report details the findings of an archaeological site inspection of Storeys Creek and Aberfoyle mines undertaken by Back-Tracks Heritage Consultants. The purpose of this reconnaissance was to survey and report upon those areas of the Storeys Creek and Aberfoyle mines likely to be modified by site rehabilitation programs in order to ascertain the effect of the proposed works on the heritage values of the mine sites. The archaeological survey of effected areas was commissioned by Industry Safety and Mines Division of Tasmania Development and Resources.

1.1 Results

1.1.1 Aberfoyle mine, Rossarden

The Aberfoyle mine provided the economic basis and social focus for the small Rossarden community for over 50 years. For many of those years Aberfoyle was the largest annual tin producer in the State and one of the nation's foremost mines. The site has social significance at the local to regional level and historical significance at the state to national level. Given the visual prominence of industrial and domestic waste and high levels of heavy metal pollution the site is deemed to have little aesthetic significance. The archaeological significance of the Aberfoyle mine has been greatly effected through the dismantling or destruction of structures following mine closure, and previous attempts at site rehabilitation.

In nearly all cases the features recorded during the archaeological survey of the Aberfoyle mine are associated with the past transportation, storage and drainage of mill waste on the site and comprise the remains of timber framed silt traps, access walk-ways, launder trestles and overflow pipes. The features are typically insubstantial and expedient constructions and are likely to have been modified, moved or replaced periodically during the life of the mine. While they illustrate aspects of the waste management process, the structures themselves are considered to have little intrinsic historical or archaeological significance or interpretive potential.

The head-frame site at the far north end of mine area would appear to be suitable for public visitation and interpretation. The head frame and its associated concrete machinery footings date from the latest and final period of operations at the mine and illustrate the first point in the mining process, that of ground opening and ore extraction. The site, although not particularly historically significant, has strong aesthetic qualities and represents a heritage asset for the future.

1.1.2 Storeys Creek mine

The closure of Storeys Creek mine in late 1979 brought to an end a century of episodic mining activity, which saw the mine develop into the State's largest producer of wolfram and a significant producer of tin. The population of the small township has dwindled substantially since mine closure but the site continues to be an educational focus for school groups in the area. The mine has historical significance at the regional to state level and social significance at the local to regional level.

The features recorded at the site illustrate various important facets of the mining process. Ore extraction is represented by the compressor and adit portal, the processes of ore handling and transportation by the hopper frame and tramways, and the separation of the wolfram and tin from the gangue by the mill site. The structural integrity of many of these features is surprisingly high and consequently the site is considered to be of regional archaeological significance.

The northern workings and the mill area at Storeys Creek have considerable potential for public interpretation.

1.2 Recommendations

1.2.1 Aberfoyle mine

#4 Slimes dam area
Prior to the commencement of the proposed environmental rehabilitation works the bucket conveyor could be recovered from the drain and moved to the area of the mill site where it may be utilised in site interpretation

Head-frame area
The tree currently growing beside and into the structure should be removed. The head-frame footings and structural members should be made secure prior to the frame being sandblasted and painted .

A sign containing information about the Aberfoyle mine in general, its history and the role this particular site played in the mining process could be placed in close proximity to the head-frame.

Other areas
No further archaeological recording or conservation work is warranted in relation to the other areas at the Aberfoyle mine site currently subject to environmental rehabilitation proposals. In these areas the works programme may be undertaken on schedule.

1.2.2 Storeys Creek mine

Northern area
The tramway alignment, in particular the section of exposed easement running around the hill opposite the precipitate dam, should be avoided in any earth moving or bank stabilisation works. Works proceeding along the west side of Storeys Creek should be carefully monitored in order to avoid unnecessary disturbance to any continuance of the tramway currently concealed by jig tailings.

Southern area
Disturbance to the mill site, tramway and portal should be avoided as a priority. A buffer zone of at least 10 m should be respected around each of the described features when undertaking creek bank reconstruction and installation of the proposed creek perimeter drain.

2.0 Introduction

2.1 Preamble

Since the closure of the Aberfoyle and Storeys Creek mines in 1982 a number of concerns have arisen relating to contamination of the local environment through mobilisation of heavy metals from the mine tailings. A rehabilitation plan for the mine sites at Storeys Creek and Aberfoyle, Rossarden, drawn up by Thompson & Brett Pty. Ltd., consulting engineers, outlines a number of measures to be taken over the next six years to control the erosion and dispersal of slimes and tailings and thereby inhibit the current unacceptable rate of contamination of Storeys and Aberfoyle creeks and areas surrounding the mine sites (Thompson and Brett 1994). The works schedule has subsequently been revised in order to bring the rehabilitation programme to completion during 1995/1996. Several of the rehabilitation measures proposed have the potential to impact upon the cultural heritage values of the mine sites.

Preliminary rehabilitation works at Storeys Creek and Rossarden carried out during 1992, unrelated to Thompson and Brett's schedule, were preceded by an archaeological inspection and report by consulting archaeologist Denise Gaughwin (Gaughwin 1992). The first stage of the works proposed in the six year rehabilitation plan was preceded by a brief reconnaissance of the effected sites by Back-Tracks Heritage Consultants during October 1994 (Back-Tracks 1994).

This report details the findings of a subsequent site inspection of Storeys Creek and Aberfoyle mines undertaken by Back-Tracks Heritage Consultants. The purpose of this reconnaissance was to survey and report upon those areas of the Storey's Creek and Aberfoyle mine sites likely to be effected by site rehabilitation programs originally scheduled for the remaining five years to 2000 but since brought forward. The archaeological survey was commissioned by Industry Safety and Mines Division of Tasmania Development and Resources. The sites inspected are located on State forest.

2.2 Objectives

The principal aim of the archaeological reconnaissance was to assess the impact of the proposed environmental rehabilitation works on the cultural heritage values of Storeys Creek and Aberfoyle mine sites. The general objectives for the study as outlined in the project brief (Appendix 1) were to:

(i) Examine the rehabilitation plan (Thompson and Brett 1994) and the areas on which work (other than the year one work) is to be done; and

(ii) comment on the impact (if any) the plan as written will have on the heritage values of the site; and

(iii) suggest ways in which such impacts (if any) may be ameliorated; and

(iv) undertake the level of recording required for each site.

The environmental rehabilitation works programme will involve disturbance and alteration to a number of mine features at Storey's Creek and at the Aberfoyle site, Rossarden. The original works schedule at the time the archaeological survey brief was drafted, is given in table 1.

YEAR	STOREYS CREEK	ROSSARDEN
1995/1996	Wetlands maintenance	Excavate slimes dam #4 batter Partial relocation of dam #5 tails to #9 dam Clean out and stabilise drainage Excavation of cover soils and spread Trim and spread soil from dam batters Fertilise and sow 3 Ha Establish seedlings
1996/1997	Wetlands maintenance	Continue relocation of dam #5 tails to #9 dam Excavation of cover soils and spread Import soil and spread Trim and spread soil from dam batters Fertilise and sow 2 Ha Establish seedlings Sand blast and paint headframe
1997/1998		Continue relocation of dam #5 tails to #9 dam Excavation of cover soils and spread Import soil and spread Deep rip and cultivate stripped areas Fertilise and sow 2 Ha Establish seedlings
1998/1999		Excavation of cover soils and spread Import soil and spread Fertilise and sow 5 Ha Establish seedlings
1999/2000		Import soil and spread Maintenance of previously rehabilitated areas

Table 1 Proposed works programme; reproduced from Thompson and Brett 1994

Regardless of the change in programme timing, the areas at the Aberfoyle mine scheduled for disturbance and ultimate rehabilitation can be summarised as follows:

AREA	PROPOSED WORK
Mill site	Place soil cover over tailings mounds and revegetate
Settling dam #4	Excavate and remove slimes, stabilise profile by cutting back to 1:5 batter, cover with soil and revegetate
Settling dam #5	Excavate and remove slimes, remove underlying topsoil, rip and revegetate
Settling dam #9	Infill with slimes excavated from Nos. 4 and 5 dams, cover with soil and revegetate
Settling dam complex, Nos. 1, 2, 3, 6, 7, 8	Cover with soil trimmed from dam bunds and taken from beneath #5 dam, and revegetate
Old tip area	Bury rubbish, regrade site, cover with soil and revegetate
Area between tip and Headframe	Trim tailings from surface, rip and revegetate
Headframe area	Remove tailings heap, sandblast and paint headframe and remove headframe access ladder

Table 2

The specific objectives of the archaeological survey and assessment of the Aberfoyle mine site, based on the general objectives outlined in the project brief but redefined according to the particular requirements of the rehabilitation plan (Thompson and Brett 1994), were to:

1) Examine the mill site, settling dams #1 through 9, and the area extending from the old tip to the headframe site at the Aberfoyle mine site, Rossarden

2) Assess the cultural significance of the areas and features contained within

3) Assess and comment on the effect the proposed works will have on the features and on their significance

4) Formulate recommendations for the amelioration of impact on areas or items of significance

5) Undertake recording of areas or items of significance in accordance with standard archaeological principles

In addition to the objectives specifically linked to the rehabilitation schedule, the archaeological assessment associated with the first stage of the site rehabilitation, scheduled for 1994/1995 and currently under-way, made a number of recommendations for further archaeological work to be undertaken in advance of, or in conjunction with, proposed site rehabilitation activities at Storeys Creek mine. These recommendations were that:

1) An archaeologist should be on site during the removal of the tailings from the compressor in order to prevent damage to the plant or any associated features. The archaeologist should be able to assess the physical condition of the features and determine if further conservation action is required following the exposure of the plant.

2) The tramway, machinery site remains and artefact scatter on the west bank of the creek should be recorded in detail prior to the commencement of site remediation (Back-Tracks 1994)

2.3 Methodology

In accordance with the requirements of the study brief, the project has been undertaken using the criteria for the assessment of cultural significance as set out by the Australian Heritage Commission (Australian Heritage Commission Act, 1975). In issues of heritage management the authors have also utilised and been guided by both the Burra Charter of Australia ICOMOS and The Conservation Plan (J.S. Kerr, 1990).

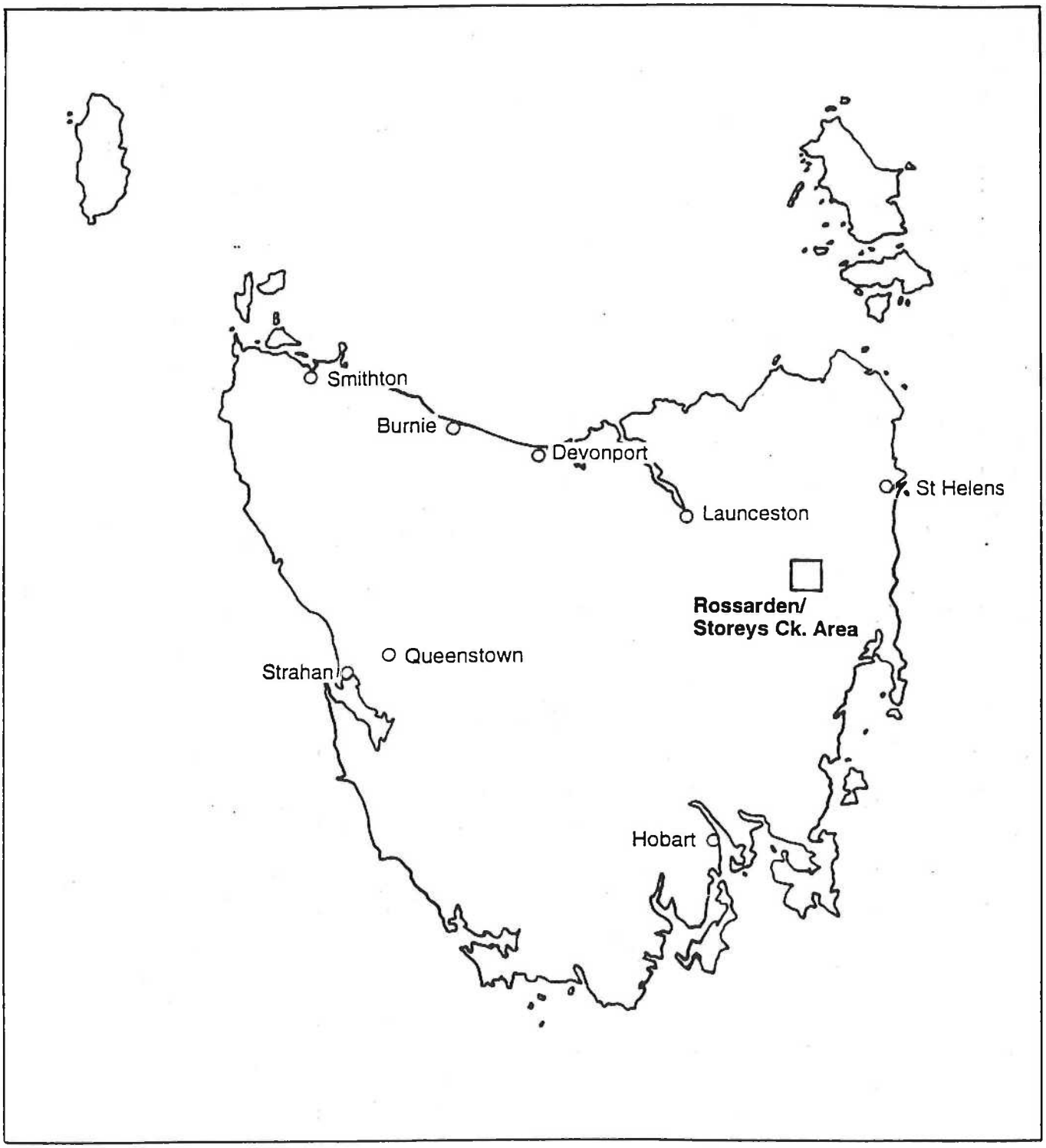
The project was undertaken in three phases:

Historical Research
The first phase, principally undertaken by Kathryn Evans, consisted of a review of documentary material held by Mineral Resources Tasmania and the Archives Office of Tasmania.

Sites Survey
The second phase was undertaken by Greg Jackman and Michael Jones with the assistance of Charles Parkinson, David Leighten and Christine Bingham. The areas of Storeys Creek and Aberfoyle mine sites to be effected by proposed rehabilitation works were surveyed and features recorded in detail. All features were planned, photographed in black and white print and colour slide film and described; the written description included a review of their current condition, purpose and use history.

&

Site Management Strategy Development and Report Production
The final phase was undertaken by Greg Jackman and Michael Jones. The results of the first two phases were compiled and policies and options were developed for the management of the cultural heritage effected by the rehabilitation proposals.



Plan 1: Site location diagram.

3.0 Aberfoyle Mine

3.1 Site History

Early work in the Aberfoyle area

Whilst veins of cassiterite-wolfram were discovered in the Aberfoyle area in 1916, work on them did not commence in earnest until the 1920s. Initially a lease of 80 acres was taken up in 1918 by Lavington Grey Thompson of Launceston (section 8206/M). The lease was cancelled in 1924, but was taken up again soon after by W. Hass, P. Sheppard and J. Lawson (section 9223/M). Nye reported in that year that several lode formations had been opened up, the most important one being on the west central part of the lease. The workings consisted chiefly of trenches and shallow excavations along and across the lode. To the south two shafts had been sunk to depths of 18 feet, but all the deeper trenches and shafts were full of water. He concluded *' As exposed at the surface the veins are too small to be of commercial importance. If however the greater widths exposed in the shafts and elsewhere occur as stated, then further prospecting work at these points appear to be warranted..the length over which the workings have revealed the veins shows that the mineralised zone has an appreciable extent.* (Nye, 1926).

Aberfoyle Tin No Liability

Aberfoyle Tin N. L. was formed in 1926 and the first work undertaken by the company began in that year. In April 1928 the lease of Hass, Sheppard and Lawson was transferred to the Aberfoyle Tin Company and included in the consolidated lease of 200 acres (10361/M). The company also acquired a lease of 5 acres at Aberfoyle Creek as a machinery site (177/M), a water right (2558/W) and a dam site (2553/W)(Mines Department Lease Register). At what was known as Searle's Workings the main western shaft and a second shaft to the east had been sunk to a depth of 60 feet and connected by a crosscut. A five head battery and concentrating mill was in the course of erection and was to be steam powered. J. Scott, who reported on progress in that year, was of the opinion, that the new plant was unsuitable and suggested simple box sluicing until the ore production was at such a scale to warrant the concentrating plant. He concluded that the company had little to show for its heavy capital investment (Scott, 1928). After Scott's report the company instituted a policy of exploration and the erection of the mill was temporarily suspended (Henderson, 1946). Two months later Scott once again visited the mine to examine developments exposed by surface trenching. The first indications of the existence of the Aberfoyle fault system were recorded and it was concluded that the heavy flow of water in the workings had its source in the neighbouring flat swamp lands.(Henderson, 1946). As a result of exploratory work, mining of the vertical shafts was discontinued and a low level adit crosscut commenced from the western slope of Aberfoyle Rivulet gorge.

By 1929 the adit was worked to a length of 1050 feet and had passed through the ore vein system exposed in the shaft workings. Two prospecting shafts were then sunk north and south of the No. 1 adit, and based on the results there it was decided to equip the mine for operation. Production started in 1931/1932. The mine continued to develop and equipment was upgraded until by the end of 1932 the mine was running successfully and productively. A mill was constructed on a level site about 100 foot west of the south prospecting shaft and the main shaft was sunk at that point (O'Malley, 1938). A new dam was built in that year. The plans and accompanying correspondence are held in the State Archives file MIN2/230.

Further developments were undertaken in 1933 when north and south drives were advanced on the major veins at the 125 foot and intermediate levels of the shaft workings. Exploratory work was also undertaken to determine the economic possibilities of other sections of the ore zone (Henderson, 1946). Throughout 1934 the shaft was deepened to 230 feet, and further work done on the No. 2 level. Preparations were then made for the driving of a low level adit to prospect and develop the ore zone below the No. 2 level. In 1937 the operating plant was electrified and further development work done on the ore vein system, including the driving of the No. 2 adit a further 1519 feet.. By 1938 the No. 2 adit had been driven to 1829 feet. and work had commenced on the construction of a second main shaft (Henderson, 1946).

O'Malley reported on the Aberfoyle mine in 1938, by which time it was Australia's principal tin-wolfram producer. According to O'Malley the Aberfoyle mine showed an unusually favourable feature in the high grade, coarse texture and simple character of the ore, which meant that good recoveries of tin and tungsten could be made at coarse sizing. The adit was serviced by an Ingersoll Rand compressor, a haulage winch, an electrical generator and a ventilating fan. The crude oil and kerosene engines had been replaced by electric motors powered by the hydro-electric network. Water supply for the adit came from a concrete dam of 5000 gallon capacity in a gulch 200ft above the creek. A smithy and store were also established at the portal. Eighty men were employed on the underground work and a further 18 on the No. 2 adit. The output of milling ore was about 50 tons per day. The mill was located close to the main shaft and consisted of three main sections - the primary concentration section, the secondary plant for retreatment of sulphidic middlings and the magnetic separation section for final separation of cassiterite and wolfram. The primary plant crushed the ore to 3/8" and recovered the tin and tungsten in jig and table concentrates together with the segregation of the sulphidic middlings. The middlings were then roasted and crushed and the tin and tungsten concentrated on jigs and tables. The output of these two processes were then treated in the magnetic separation plant involving a complicated series of magnetic separations, acid treatments, streaming and sieving. The milling and treatment plant was described in considerable detail by O'Malley.(OMalley, 1938) The recovery of tin was approximately 87%.

By 1938 many of the early problems of mining in the district had been overcome with respect to advancements made in the provision of power, water, timber and transport to the mine. Aberfoyle Tin N.L. erected staff cottages and community facilities at Rossarden which at that time had about 250 residents (O'Malley, 1938). The main work undertaken in 1939 was the completion of the No. 2 shaft (Brandon's) to 408 feet from the surface and its connection to the No. 2 adit. The shaft was equipped with a steel head frame and an electric hoist. Rodmilling and the flotation process were adopted in the treatment plant (Henderson, 1946). The sinking of the main (Spier's) shaft to the No. 4 level was undertaken in 1941 whence it was connected to workings at that level. On the surface a new change house was built and the grinding and flotation units for sulphur elimination were completed (Henderson, 1946). The following year improvements were made to the milling process such as an improved water return scheme and the provision for simultaneous operations of the compressors on the existing power transformers. In 1945 a new 250 ton capacity mill was installed (Henderson, 1946). In 1946 that the total value of production since the inception of milling facilities to December 1945 was reported to be £817560 made up of 2855 tons of metallic tin valued at £679,313 and 515 tons of tungsten valued at £138,147. The mine's annual production had peaked in 1943 with £95924 worth of minerals extracted (Henderson, 1946).

By 1949 production was centred on the No. 4, No. 5 and No. 6 levels, the main shaft had been sunk to 907 feet in order to open up levels 7 and 8 and drilling was being carried out to find ore at levels 9 and 10. The shaft had been sunk to 1380 feet by 1954.

Between the 1930s and the 1950s the tin content of the ore fell whilst the wolfram content rose comparatively (Blissett, 1959). By 1959 Bissett could report that the Aberfoyle Tin N.L. was the major producer of tin in Australia. In 1956 the company produced about a quarter of the nation's total tin output, as well as an important amount of wolfram, with a work force of 230 men and leases amounting to about 400 acres. Exploration was undertaken in 1962 on the Lutwyche workings to the north-east of the Aberfoyle mine, and this ore-body was developed between 1966 and 1970 (Ingram, 1976). The total production of the mine to the end of 1972 was 20 168 tonnes of tin concentrate. (Ingram, 1976)

In the early 1970s lower prices and increased inflation reduced the profitability of the mine while the quota system imposed by the International Tin Council in an attempt to stabilise tin prices led to further difficulties for the Aberfoyle Company. In response, the workforce was drastically reduced and production cut. During the same period the environmental impact of decades of mining and poor tailings disposal methods also became an issue, with concerns being raised that heavy metals from the Storeys Creek and Rossarden operations were contaminating Aberfoyle and Storeys Creeks and neighbouring pasture land as far west as Evandale. Despite improvements in the price of tin and the abolition of production quotas which let to a period of renewed optimism at Rossarden, by the late 1970s the mining operations in the area were being scaled down and the workforce reduced. At the end of 1979 the dwindling workforce was augmented slightly owing to the transfer of the recently closed Storey's Creek mine. In 1982 however the Aberfoyle mine was also closed, bringing to an end 56 years of profitable tin mining (Kilner, p 50).

3.2 Site Analysis

3.2.1 Mill area

The area at the southern end of the mine site containing the remains of the milling plant has been the subject of two previous archaeological inspections, undertaken both prior and subsequent to demolition of the mill building and commencement of site rehabilitation (Gaughwin, 1992, Back-Tracks, 1994). The site was not reassessed during the present survey.

3.2.2 Tea tree reinforced slimes dams

Located in the central and east central area of the site are a series of settlement ponds with bunds formed from earth stabilised by mats of tea tree branches. This form of bund construction differs from that on the settlement dams to the east and north, which were formed entirely from clay soil. Due to the dilapidated condition of the tea tree reinforced slime dams, and the observation of similarly constructed dams elsewhere in the State dating to the 1930s and 1940s it is assumed that these related to an earlier phase of site activity than those dams constructed purely of clay soil. Unfortunately no historical documentation could be located to verify this assumption.

The areas surveyed covered the portions of the site containing slimes dams #4 and #5 and the complex slimes surface defined by Brett & Thompson (1994). Inspection revealed that the area contained the remains of at least four discrete slimes settling ponds including tea tree dams #'s 4 and 5, and two earth walled slimes settling areas.

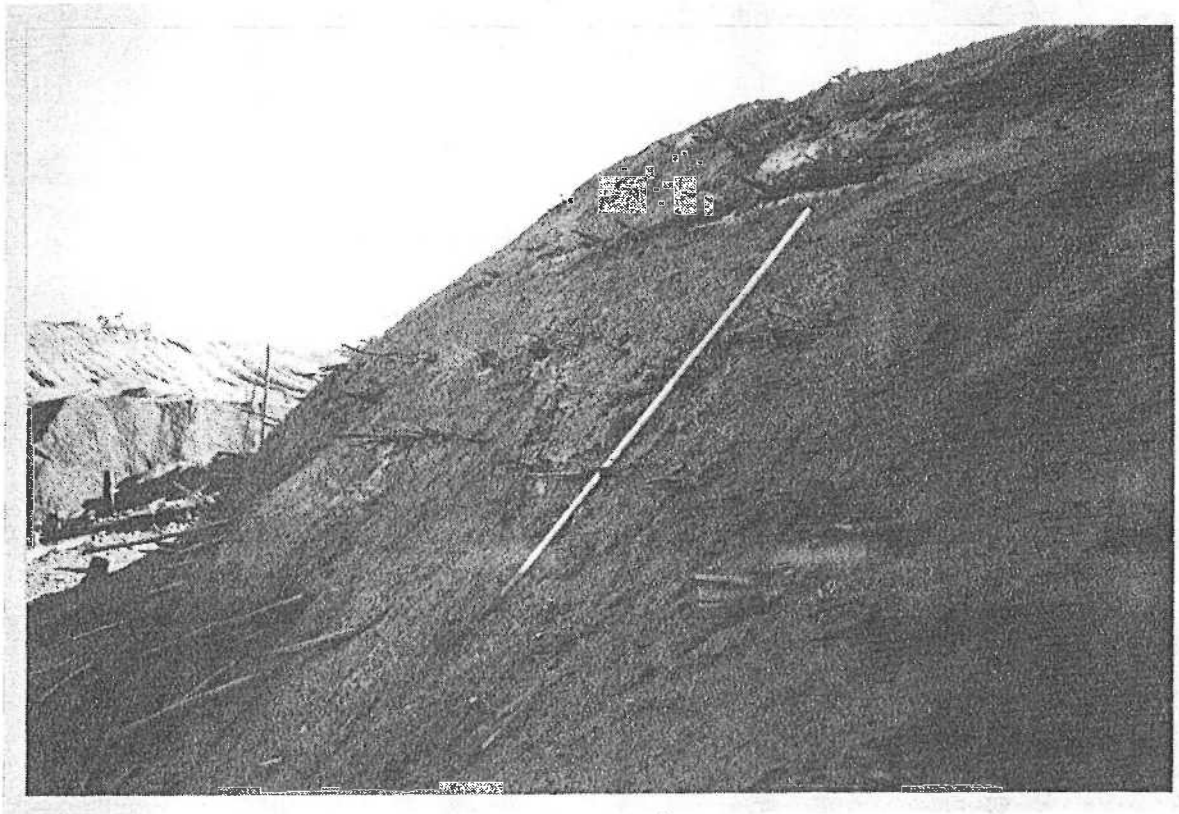
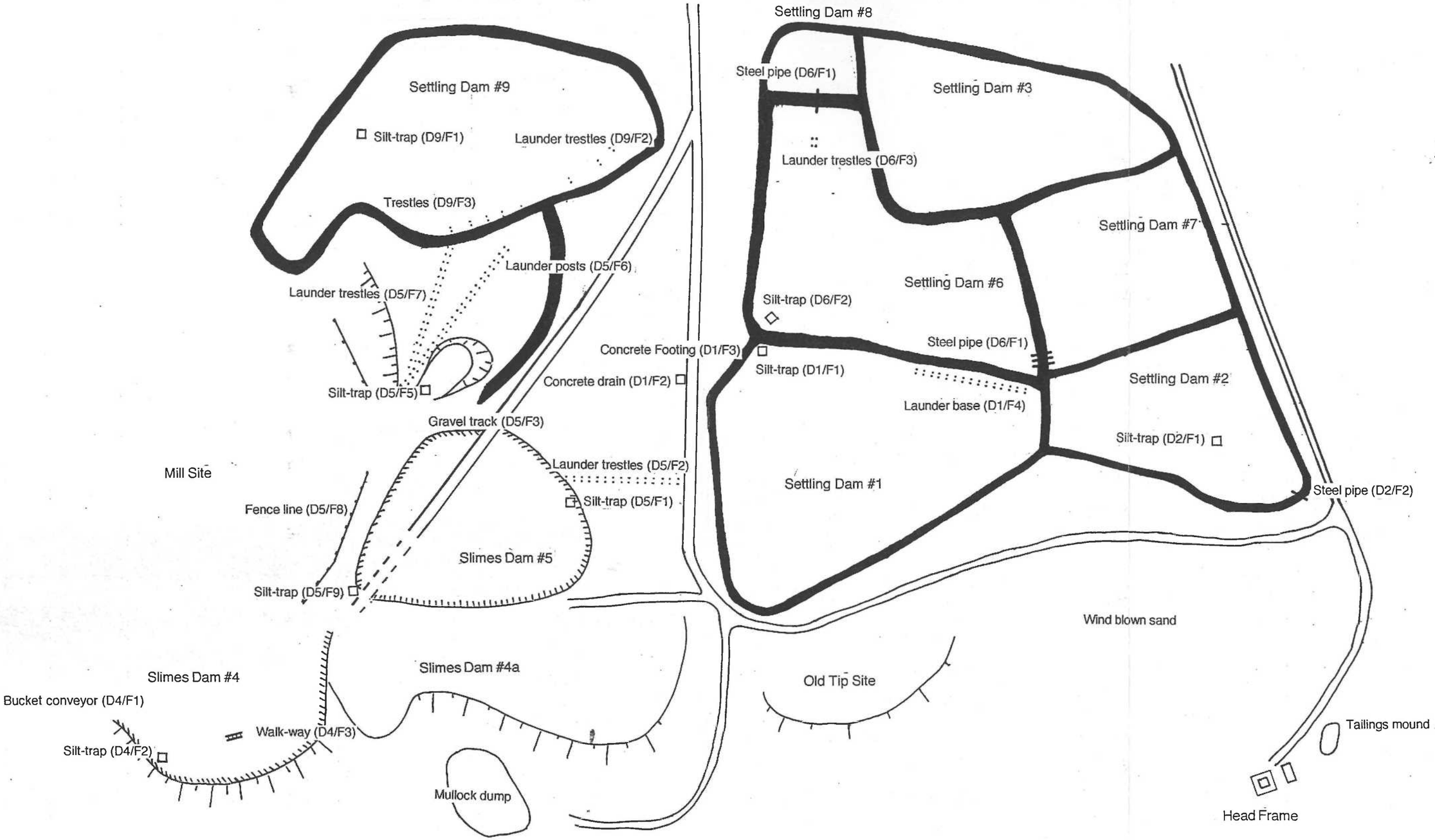


Plate 1: Tea-tree matting in bund of slimes dam #4.



Plan 2: Archaeological features recorded at Aberfoyle mine site Rossarden.

3.2.2.1 Slimes settling dam #4 and #4a

The dam is an extensive elongate area of impounded tailings built around the contour of a steep gully above Aberfoyle Creek and consists of at least two separate ponds of different ages. The older southern pond, covering an area of ~100 metres by ~80 metres has been constructed with a tea tree reinforced earth bund. The south, east and north walls have been formed from earth and clay, reinforced every half metre or so with mats of cut tea tree saplings. The walls are unstable and eroding badly, with the loss of large amounts of tailings to the creek below. A drain has been installed running around the south and east sides but this is only a temporary measure and largely ineffectual in limiting slimes dispersal. Immediately to the west of the slimes pond and adjacent to the drain are several sections of bucket conveyor partially concealed by slimes (see feature 1). Also located in the southern dam was a silt trap (see feature 2), several partially buried sections of walk way (see feature 3), and a number of collapsed pipe trestles (feature 4).

The ~210 metre long by ~90 metre wide kidney shaped settling area directly to the north is impounded by the more common and probably more recent clay bunds. No features were recorded inside this dam.

Features

Feature 1 Bucket conveyor

Located in the gravel drain to the south-west of the slime dam was a long section of bucket conveyor which almost certainly was used at the mill site and which was probably deposited in its current position during the demolition of the mill.

Plate 2: Bucket conveyor to west of slime dam #4.

Feature 2 Silt trap & walk-way

The top of a timber framed silt trap protrudes from the surface of the slimes in the southern part of the small tea tree #4 settling pond. The square frame, which measured 1.82 metres by 1.77 metres, is completely filled with sediment.

A length of wooden access platform runs at an angle from the silt trap across the compacted slimes surface. The platform, measuring 11.2 by 0.6 metres, probably once connected with feature 3 on its way to the dam wall.

Plate 3: Feature #2, silt-trap at south-eastern end of slime dam #4..

Feature 3 Planking

A second length of board and rail walkway measuring 4.7 by 0.5 metres, the walk way was isolated in the centre of the dam so it was not possible to determine what its original purpose had been.

Feature 4 Miscellaneous trestles

Spread over an area of approximately 100 m^2 in the northeast corner of dam #4, near the junction with dam #5, is a cluster of timber posts, post stumps and collapsed trestle fragments. No particular configuration to the features is readily evident, the elements probably representing the remains of several different structures associated with the transportation of elevated slurry around the site.

Management Policy

Significance

The tea tree reinforced slimes dams at Aberfoyle, arguably dating to the 1930s, illustrate the final stages of ore processing and waste management and are able to provide information not only about the technology applied in their construction but also the nature of the process of waste dispersal around the site. Although the construction method utilised in dam #4 may appear curious it is by no means unique. The technique of terra forming using alternate layers of earth and vegetation has considerable antiquity. Notably, examples from the same time period in a better state of preservation, and less hazardous to the environment, exist elsewhere in Tasmania (ie. Georges Bay mine, St Helens).

The silt traps, access walk-ways and trestles contained within the pond are insubstantial and expedient constructions and are likely to have been modified or replaced several times during the life of the mine. While they illustrate aspects of the waste management process, the structures themselves are considered to have little historical or archaeological significance. The bucket conveyor was also associated with the transference of ore products during the milling process and has no greater level of significance than the other features in dam #4 or than many of the other items of machinery lying in piles around the site. Nonetheless it is an instantly recognisable device and one which would not look out of place as a feature on the rehabilitated landscape.

The heritage value of the #4 slimes dam is offset by several important factors:

- Slimes dams are a common feature on mining fields.
- The dam in question is a significant source of environmental pollution, both as a result of leaching toxins into the local waterways and through covering nearby vegetation by wind blown fines.
- Due to the low shear strength of slimes when wet, slimes deposits are extremely unstable features which have been known to collapse with tragic consequences.

For these reasons, and despite the nominal heritage value of the site, it is considered inappropriate to leave the dam in its current condition.

Effect of proposed work

In order to reduce the rate of slimes erosion into Aberfoyle creek it is proposed to batter down the eastern side of the #4 pond to 1:5 batter, and to stabilise the toe with rock fill. The angle of reduction will almost totally remove the evidence of the tea tree reinforced bund. Soil cover will be added and revegetation attempted subsequent to the pond being re-contoured. The excavated slimes will be removed to the #9 slimes dam. It is proposed that the soil cover will eventually be extended to cover the #4 dam as far as the mill site, concealing any objects not already removed, including the bucket conveyor.

Recommendation

Prior to the commencement of the proposed environmental rehabilitation works, the bucket conveyor should be recovered from the drain and moved to the area of the mill site where it may be utilised in site interpretation

No further archaeological recording or conservation work is warranted in relation to slimes dam #4. The proposed site rehabilitation work can be undertaken on schedule.

3.2.2.2 Slimes settling dam #5

The area defined as settling dam #5 and the complex slimes surface by Thompson & Brett (1994) contained the remains of at least two slimes settling areas. Only the westernmost has its bund reasonably intact although very badly eroded. The walls of this dam have been formed up from compacted tailings reinforced with two inward dipping mats of tea tree saplings 0.7 metres apart. The north eastern section of the tea tree bund has been cut away to provide access to a sand pit in the centre of the pond. An extensive area of impounded slimes and tailings between #5 and #9 dams is without a bund along its southern margin.

Features

Feature 1 Silt trap

A collapsed timber structure, identified as a demolished silt trap, protrudes from the northern end of tne deflating and eroded tea tree reinforced bund at the edge of a shallow sand pit recently cut into the centre of the dam. Due to its state of disrepair it was not possible to determine the original dimensions of the construction.

Plate 4: Feature 1, silt-trap located in slime dam #5.

Feature 2 Launder trestles

An alignment of 18 square frame hardwood trestles extends for 50 metres from the north edge of the tea tree bund across the silt covered ground towards the terraced slimes complex in the north west corner of the mine site. The cross-braced timber trestles measure 1.0 metres in width and stand 0.4 metres above the silt surface. Nails for fastening a double line of 6" planks, supports for a slurry pipe which is no longer present, remain in the centre of the top rails.

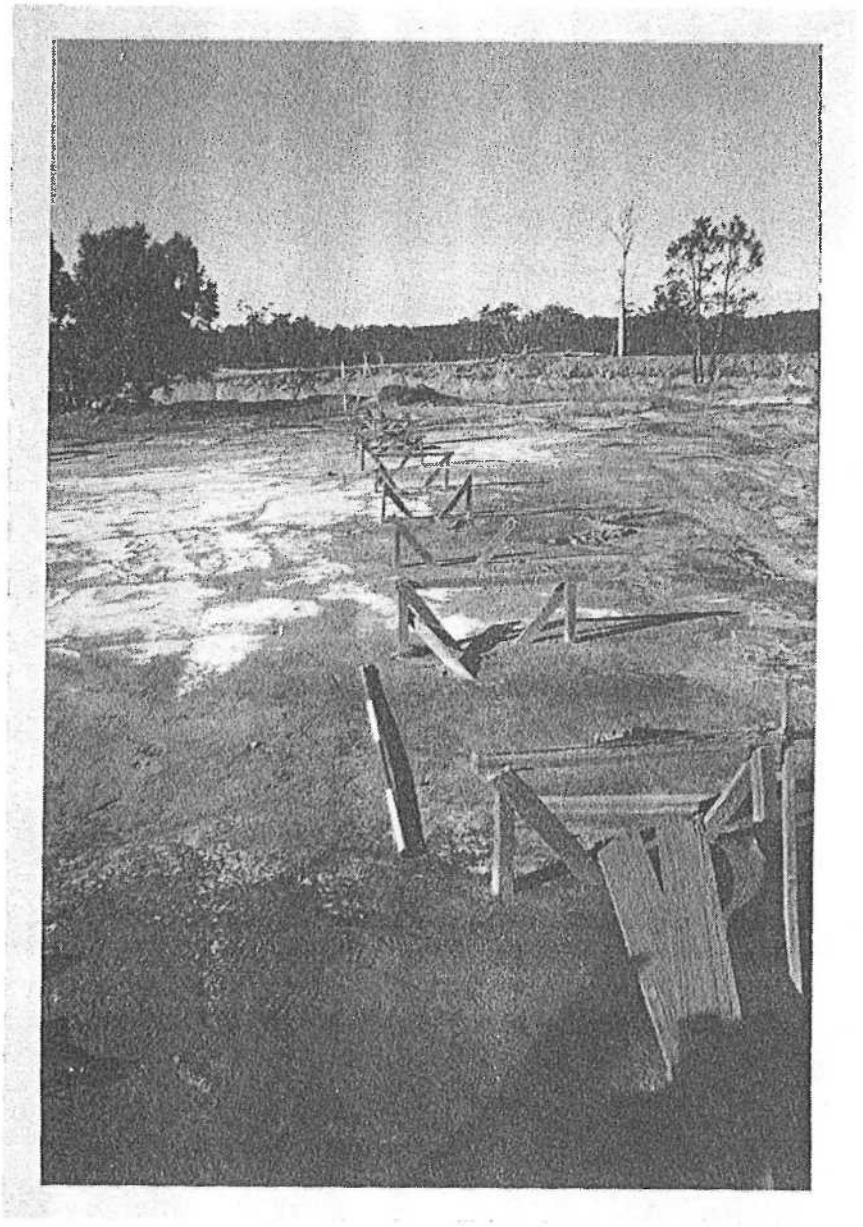


Plate 5: Feature 2, base of launder in settlement dam #5.

Feature 3 Gravel track

A four metre wide gravel track runs in a north westerly direction from the junction of the #4 and #5 dam bunds across the #5 pond and adjacent slimes areas to connect with the modern mine road north east of the #9 dam. The track is surfaced with compacted coarse hornfels and quartz tailings and edged with coarser hornfels and metapelite waste. A line of squared timber sleepers, possible supports for a slimes pipe, runs for several metres along the south side of the track.

Feature 4 Pipe trestle

A single X frame hardwood trestle is situated on the north side of the gravel track in the excavated and deflated central portion of the #5 slimes dam. The former pipe brace, with side lengths of 1.5 metres, appears to be of fairly recent construction.

Feature 5 Silt trap

A second silt trap, partially buried in tailings, is situated adjacent to the south west corner of the #5 dam tea tree bund at the edge of Scheppein's sand pit. The 0.7 metre box frame is filled with sediment. A sheet of heavy aluminium mesh has been fixed to the north east side of the trap.

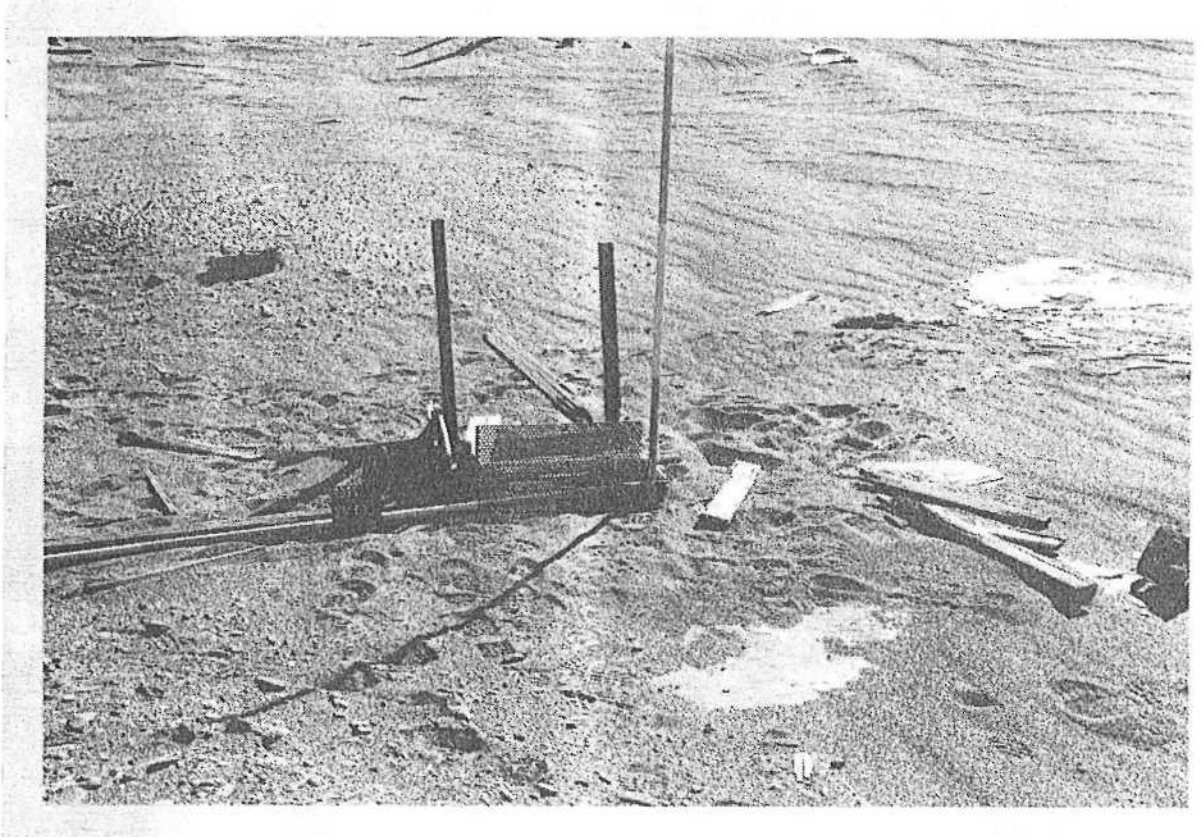


Plate 6: Feature 5, silt-trap located in slime dam #5.

Feature 6 Launder posts

A double line of pine posts runs in a northwesterly direction from the west side of Sheppein's sand pit to the # 9 settling dam (see plate 7). The post sets are spaced every 5 to 7 m and tensioned with wire braces set into the ground beneath the slimes. Steel W brackets have been fastened through the heads of the posts to support two flexible pipe lines (since removed). A number of collapsed square trestles have been interspaced with the posts along the length of the alignment.

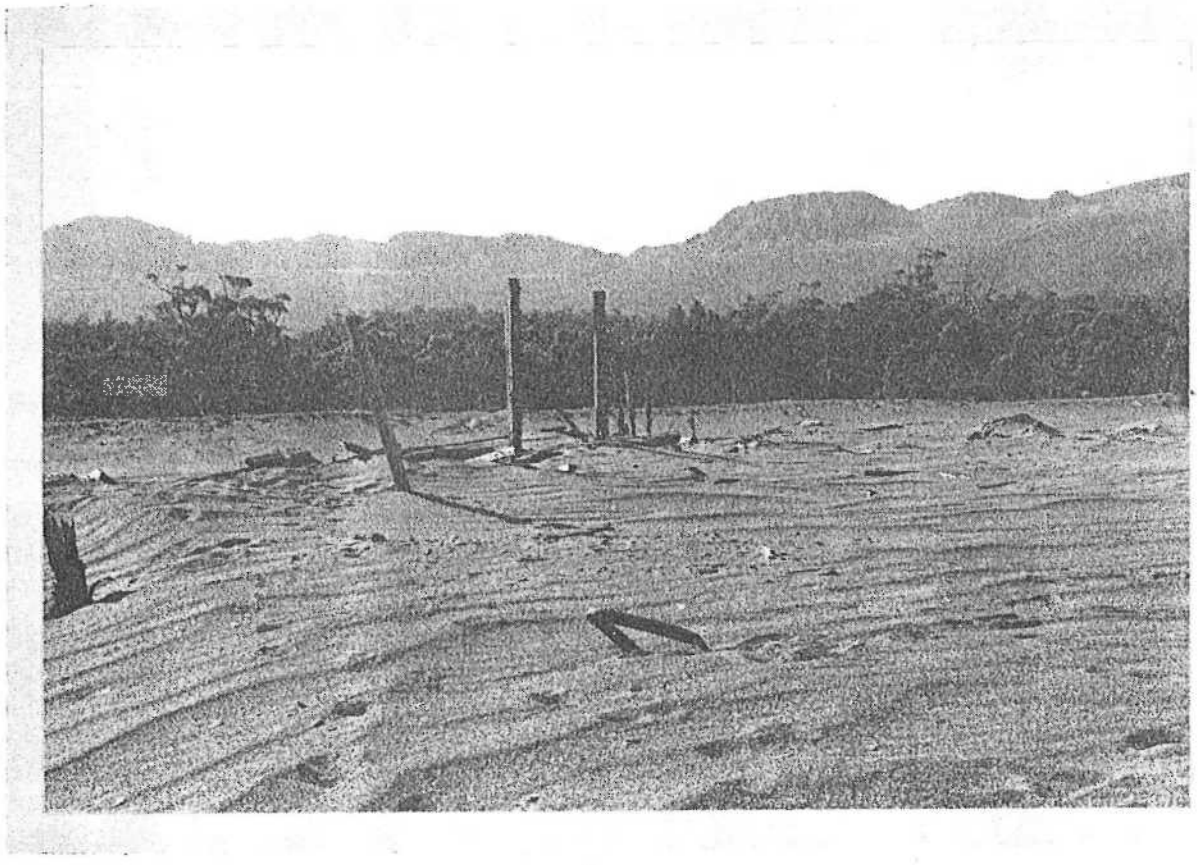


Plate 7: Feature 6, base of launder in settlement dam # 5.

Feature 7 Launder trestles

An alignment of four collapsed timber trestles, south of feature 6, extends for 56 m from the west side of Scheppein's sand pit to the east bund of the #9 settling dam. The trestles represent the remains of a second disused slimes launder.

Feature 8 Fence line

Running along the southern side of the dam #5 area was a roughly constructed post and wire fence which ran for almost 145 metres. It was assumed by the consultants that this fence once formed the southern boundary of the lease belonging to J.K. Scheppein.

Plate 8: Feature 8, fence line to south of slime dam # 5.

Feature 9 Silt trap

The upper portion of a second timber sit trap projects from an eroding face of compacted slimes inside the southeast corner of the # 5 bund. The square timber frame, measuring 1.0 by 0.97 m, is completely filled with sediment. An access ladder descends into the slimes on the inner east side. Several lengths of 6" steel water pipe, running from the trap, emerge from the base of the eroding tea tree bund and can be traced for 9 m running southeast across the surface of the neighbouring # 4 slimes dam.

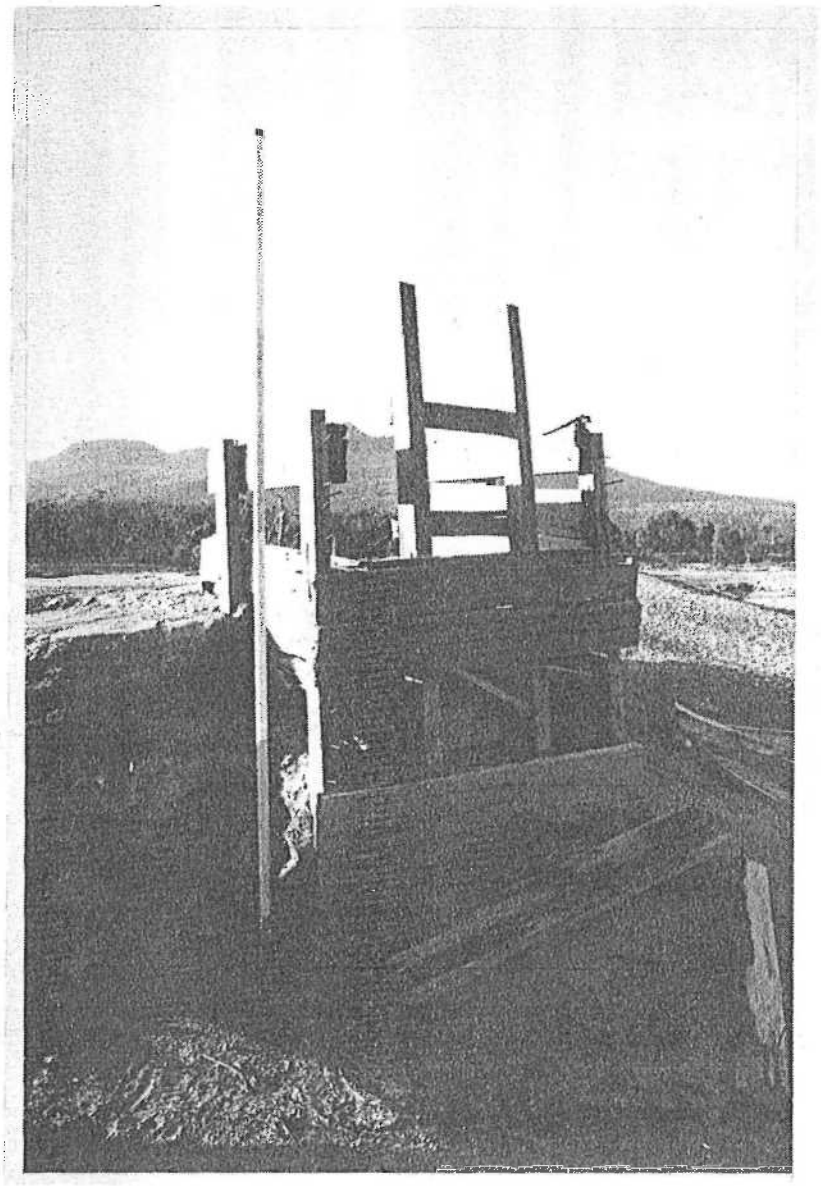


Plate 9: Feature 9, silt -trap in southeast corner of slime dam #5.

Management Policy

Significance

The tea tree reinforced slime dams at Aberfoyle, arguably dating to the 1930s, illustrate the final stages of ore processing and waste management and are able to provide information not only about the technology applied in their construction but also the nature of the process of waste dispersal around the site. Although the construction method utilised in the area defined as dam #5 may appear curious it is by no means unique. The technique of terra forming using alternate layers of earth and vegetation has considerable antiquity. Notably, examples from the same time period in a better state of preservation, and less hazardous to the environment, exist elsewhere in Tasmania (ie. Georges Bay mine, St Helens).

The silt traps and launder supports contained within the #5 dam and adjacent areas are insubstantial and expedient constructions and are likely to have been modified or replaced several times during the life of the mine. While they illustrate aspects of the waste management process, the structures themselves are considered to have little historical or archaeological significance.

The heritage value of the #5 slimes area is offset by the same important factors of structural instability and toxicity as outlined for dam #4. For these reasons, and despite the nominal heritage value of the site, it is considered inappropriate to leave the dam in its current condition.

Effect of proposed work

It is proposed that the slimes which are located in this area should be excavated and deposited within the adjacent settling dam #9, the site will then be ripped and revegetated. This process will result in the destruction of the cultural features which were recorded within the dam #5 area.

Recommendation

No further archaeological recording or conservation work is required on or around this area. The proposed site rehabilitation work can be undertaken on schedule.

3.2.3 Earth bund settlement dams

Due to the better condition of the earth walled settling dams it has been assumed that these dams had been constructed more recently than those reinforced with tea tree matting. Unfortunately no historical documentation could be located to verify this assumption.

With the exception of dam #9 these dams were located in the northwest corner of the site. All were distinguished from the southern settlement ponds as having bunds formed from unreinforced clay soil. The terraced arrangement of earth walled dams covers approximately 6 Ha and is comprised of six discrete settling ponds, #1, 2, 3, 6, 7, 8 (from Thompson & Brett 1994), separated from each other by clay bunds with crest widths ranging from 4 to 5 m. Tailings depth varies between 1 and 3 m across the complex.

Pond #9 was isolated from the other clay built dams and lay to the west of the #5 dam area. Both the terraced slimes settling complex and dam #9 retain structures and other features associated with the transfer of supernatant fluid and drainage of the ponds.

Most of the dams contained a silt trap which was generally located at the lowest end of the pond. On the surface they characteristically took the form of a 1 m ^{2} boarded timber frame protruding from the surface of the consolidated slimes and filled with sediment. From our investigation of these features, it was determined that the wooden frame was built on top of a concrete trap (see plan 3), and would have acted to keep the slimes out of the column while the water entered. Fitted into one side of the box was a perforated alloy plate which would have allowed the passage of water from the dam while keeping out large objects.

The water which entered the traps exited through a small hole ~2 metres above the base of the trap. The water would then have run through pipes and out of the dam through the base of the bund.

Several of the silt-traps had walk-ways running out to them from the dam wall. These would have provided access to the trap while the settlement pond was full of water.

Information relating to the depth of tailings and slimes deposits in each of the dams is listed in Thompson & Brett (1994). Although certainty can be attached to the quantity of slimes present in each of the ponds nothing is known about what material might lie concealed beneath the surface. It is not uncommon for abandoned features and the remains of structures to be buried beneath several metres of tailings and slimes.

3.2.3.1 Slimes settling dam # 9

This large lozenge shaped settling dam, ~210 metres by ~110 metres in size, is situated at the western edge of the site adjacent to the tea tree reinforced slimes dam #5. As with the dams located in the northwest corner of the site the 2 m high dam bunds were formed from clay soil. Three features were recorded within dam #9.

Features

Feature 1 Silt trap

Located on the southern side of the dam was a square wooden frame set into the surface of the slimes. This 990 mm x 980 mm feature was the top a silt trap which had been totally filled with sediment. A sheet of heavy mesh was fixed to the western side of the trap and was slumped over and partially buried in the tailings. A short length of ladder was attached to the inner eastern wall of the trap and had been cut off 250 mm below the top in order that two sections of 200 mm diameter steel pipe could be fitted to the trap. The pipes ran through the east wall of the dam and would have served as a drainage conduit prior to the dam going out of service. A series of posts and beams protruded from the silt around the silt trap. The function of these posts was not determined but they may have been the remains of a trap service walkway (see plate 10).

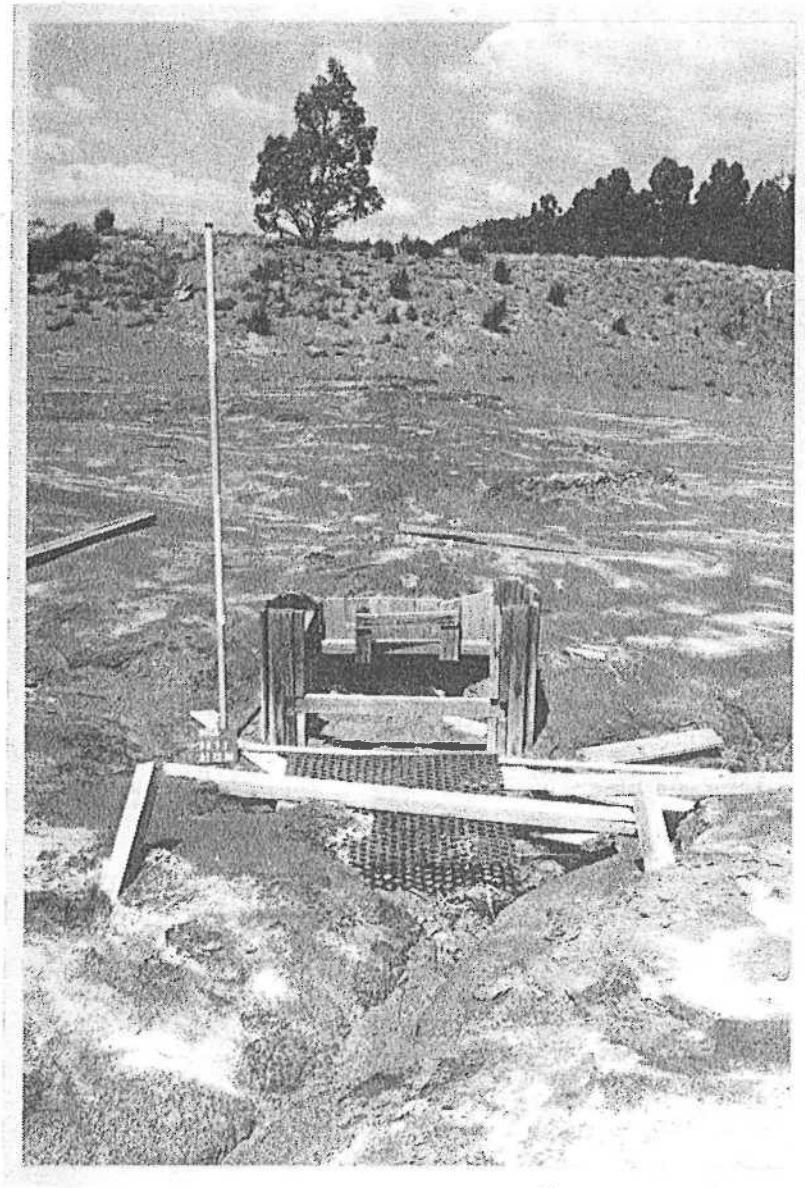


Plate 10: Feature 1, silt-trap in settlement dam # 9.

Feature 2 Launder trestles

An alignment of four collapsed hardwood trestles runs for 34 m along the inside edge of the eastern bund. The trestles may represent a continuation of the pipe launder #5 feature 7.

Feature 3 Miscellaneous trestles

A crude alignment of three collapsed and partially buried trestles and bed-logs extends for 50 m from the end of the pipe launder #5 feature 6 into the centre of the #9 pond. The features are roughly constructed and may represent the end point and outflow supports of the slimes launder.

Management Policy

Significance

The earth walled slime dams at Aberfoyle, arguably post-dating the tea tree dams, illustrate the final stages of ore processing and waste management and are able to provide information not only about the technology applied in their construction but also the nature of the process of waste dispersal around the site in later years. The silt trap and launder supports contained within the #9 dam are insubstantial and expedient constructions and are likely to have been modified or replaced several times during the life of the mine. While they illustrate aspects of the waste management process, the structures themselves are considered to have little historical or archaeological significance.

The heritage value of the #9 slimes area is offset by the same general factors of structural instability and toxicity as outlined for dam #4. For these reasons, and despite the nominal heritage value of the site, it is considered inappropriate to leave the dam in its current condition.

Effect of proposed work

It is proposed that the slimes which are currently located dam #4 and #5 should be excavated and placed within settling dam #9, the site will then covered with top soil and revegetated. This process will result in the burial of the cultural features which were recorded within dam #9.

Recommendation

No further archaeological recording or conservation work is required on this area. The proposed site rehabilitation work can be undertaken on schedule.

3.2.3.2 Slimes settling dam # 1

This roughly triangular dam measures ~170 metres long by ~150 metres wide at its broadest point. As was characteristic of the ponds in the northwestern terraced slimes complex the bunds which impound the sediments in dam #1 are formed from unreinforced clay soil. The southwestern corner of the dam wall, where it joins the #6 bund, has a recently bulldozed breach.

Four features were recorded within and adjacent to the dam and included two silt traps, a pump house footing and a series of rudimentary launder bed logs.

Features

Feature 1 Timbered outlet and silt trap

Situated at the edge of the adjacent #6 settling dam at the southwest corner of the #1 pond is a square wooden frame set into the face of the bund. This 900 mm square feature is the top of a silt trap which has been completely filled with sediment washed off the bund face.

A series of posts and beams protruded from the silt around the silt trap. The function of these posts was not determined but they may have been the remains of a trap service walkway (see plate 11).

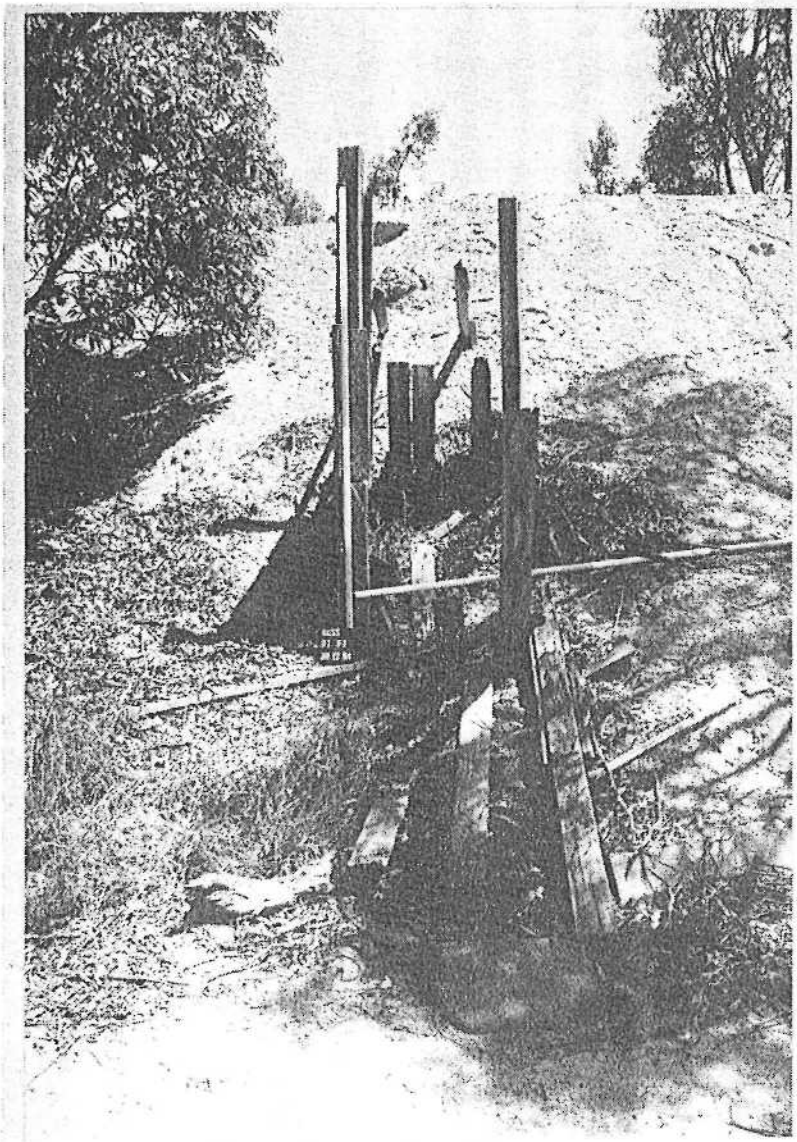


Plate 11: Feature 1, silt-trap in settlement dam # 1

Feature 2 Concrete drain column

This feature is situated on the edge of the mine road adjacent to the southern side of settling dam #1. The feature consisted of a two tiered reinforced hollow concrete column 2.64 metres high with corner timbers raised a further 1.35 metres above the top of the concrete. The space inside the hollow column measured 0.9 by 0.9 m and ran down to ground level. A 1" diameter steel pipe passed through the concrete column wall approximately 2 m above the ground.

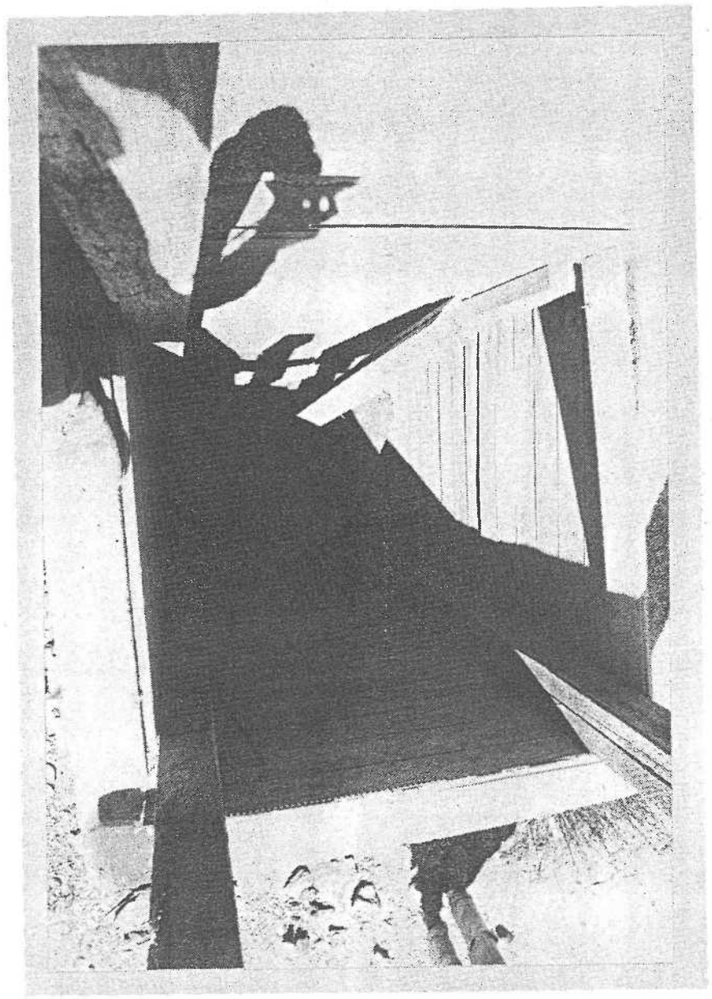
The concrete had been formed up by creating a box of planks around the corner posts which remained set into the concrete. The outer form-work appeared to have been a combination of wood and empty cement bags. One of the planks utilised as form-work remained in place fastening one end of the steel drain pipe. The concrete had been made locally utilising coarse tailings as fabric.

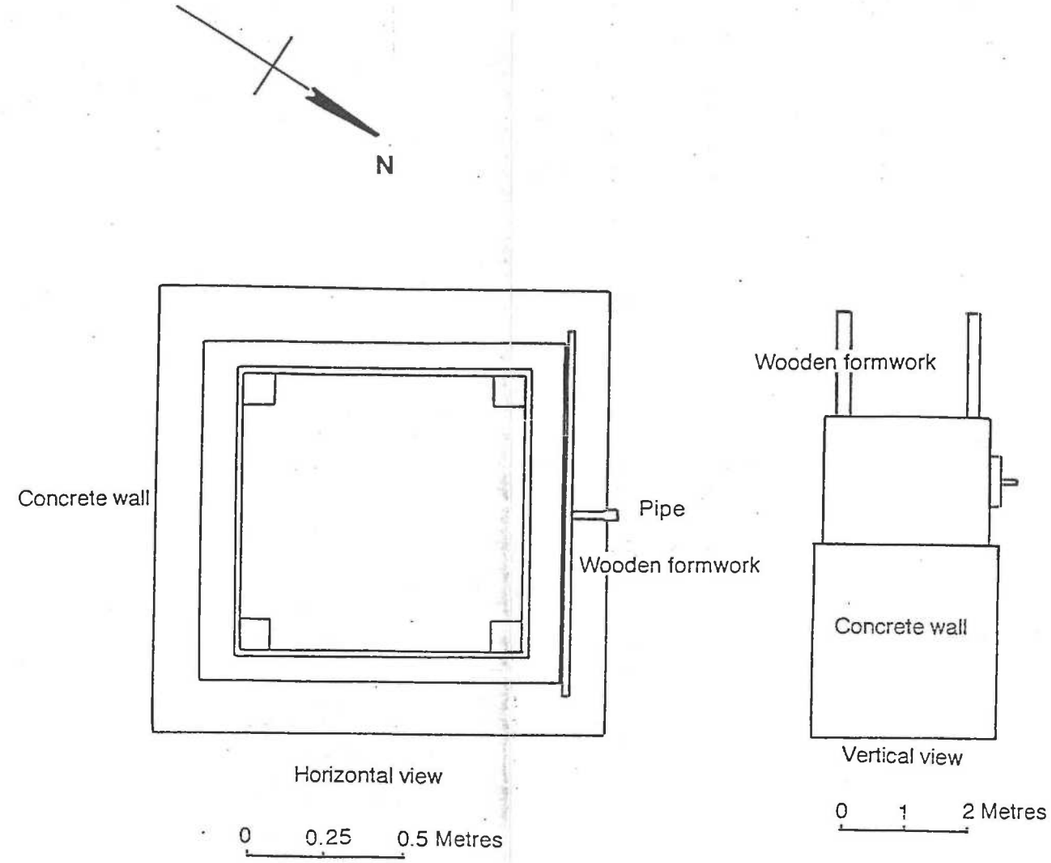
Though it was uncertain if the feature had ever been used, it was evident that the feature was a large silt-trap. It was assumed that a concrete silt trap identical in construction to this feature would have been placed at the lowest point in each of the settlement ponds prior to flooding. The rectangular wooden silt traps, ubiquitously observed embedded in the compacted silts, would be built upon these concrete bases as the slimes built up within the dam.

Plate 12: Feature 2, concrete base of silt-trap on track to south of settlement dam # 1.

Feature 3 Concrete footing

A fragmented concrete floor slab is situated adjacent to the breach at the southwest corner of the #1 dam wall. Several segments of broken 1 ft diameter concrete water pipe and sections of protruding electrical conduit associated with the slab suggest that the disturbed features represent the remains of a pump house footing, used in the transportation of slimes to the terraced pond complex during the later years of mine operations.





Plan 3 & Plate 13: Feature 2, concrete base of silt-trap adjacent to settlement dam #1.

Feature 4 Launder base

A line of wooden sleepers was located and recorded during the survey of dam #1. These posts formed the base of one of the many temporary launder pipes which were once utilised for the transportation of the slimes and tailings about the site. The line of bed-logs is 10 m long and runs across the surface of the silt from the north-west corner of the dam in a southerly direction along the base of the western bund. No sections of pipe remained fixed to the posts.

Management Policy

Significance

The earth walled slime dams at Aberfoyle, arguably post-dating the tea tree dams, illustrate the final stages of ore processing and waste management and are able to provide information not only about the technology applied in their construction but also the nature of the process of waste dispersal around the site in later years. The silt traps , footings and launder supports contained within and adjacent to the #1 dam are either insubstantial or expedient constructions and are likely to have been modified moved or replaced several times during the life of the mine. While they illustrate aspects of the waste management process, the structures themselves are considered to have little historical or archaeological significance.

The heritage value of the # slimes area is offset by the same general factors of structural instability and toxicity as outlined for dam #4. For these reasons, and despite the nominal heritage value of the site, it is considered inappropriate to leave the dam in its current condition.

Effect of proposed work

It is proposed that the slimes which are currently located dam #1 will be covered with top soil and revegetated. This process will result in the burial of the cultural features which were recorded within dam #1.

Recommendation

No further archaeological recording or conservation work is required on or around this area. The proposed site rehabilitation work can be undertaken on schedule.

3.2.3.3 Slimes settling dam # 2

This roughly triangular dam measures ~120 metres long by ~100 metres wide at its broadest point. As was characteristic of the ponds in the northwestern terraced slimes complex the bunds which impound the sediments in dam #1 are formed from unreinforced clay soil.

Two features were recorded within the dam, including a silt trap and a steel pipe set into the bund wall.

Features

Feature 1 Timbered outlet and silt trap

Situated on the eastern side of the dam is a square wooden frame set into the surface of the slimes. This 940 mm square feature was the top of a silt trap which had been totally filled with sediment. Only three sides of the silt trap could be seen projecting above the top of the compacted silts.

The remains of a wooden walkway is attached to the northern side of the silt trap. This 1.72 m long platform would have once run to the wall of the dam, providing access to the silt trap (see plan 4 & plate 15).

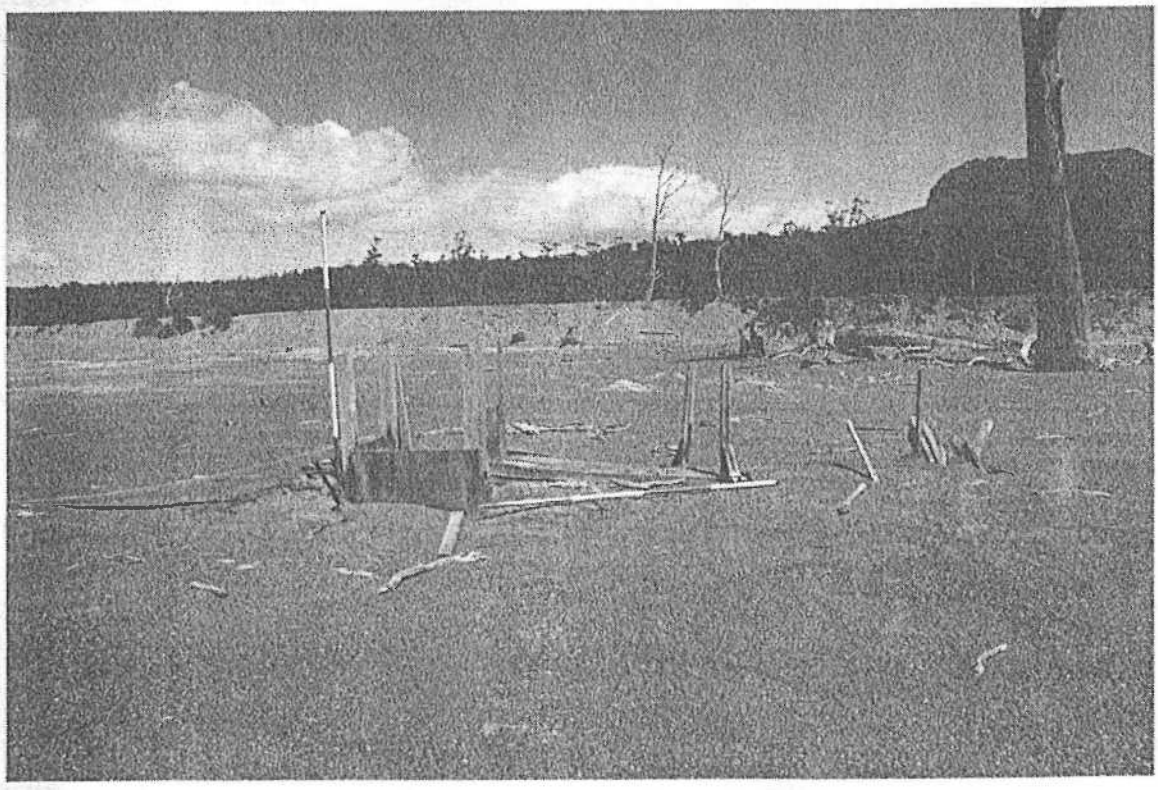
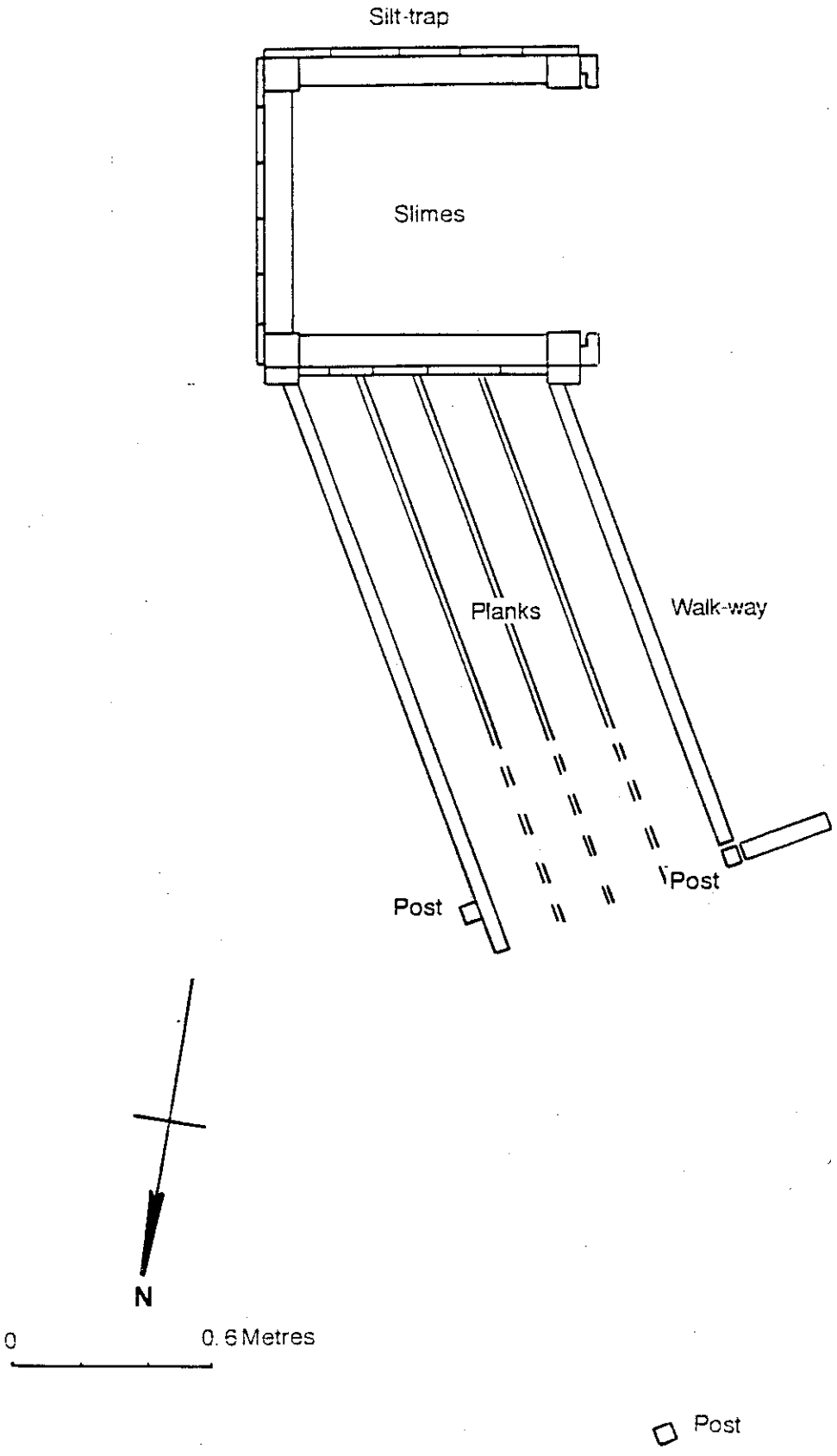


Plate 15: Feature 1, silt-trap and walk-way at north end of settlement dam #2.



Plan 4: Feature 1, silt-trap and walk-way at north end of settlement dam #2.

Feature 2 Steel overflow pipe

Located 4 metres to the south-east of the north-east corner of settlement dam #2 is a length of 20 cm diameter steel pipe cutting through the top of the clay bund. The pipe was assumed to have served as an over flow.

Plate 16: Feature 2, pipe overflow in settlement dam # 2

Management Policy

Significance

The earth walled slime dams at Aberfoyle, arguably post-dating the tea tree dams, illustrate the final stages of ore processing and waste management and are able to provide information not only about the technology applied in their construction but also the nature of the process of waste dispersal around the site in later years. The silt trap and overflow pipe contained within the #2 dam are either insubstantial and expedient constructions and are likely to have been modified or replaced several times during the life of the mine. While they illustrate aspects of the waste management process, the structures themselves are considered to have little historical or archaeological significance.

The heritage value of the #2 slimes area is offset by the same general factors of structural instability and toxicity as outlined for dam #4. For these reasons, and despite the nominal heritage value of the site, it is considered inappropriate to leave the dam in its current condition.

Effect of proposed work

It is proposed that the slimes which are currently located dam #2 will be covered with top soil and revegetated. This process will result in the burial of the cultural features which were recorded within dam #2.

Recommendation

No further archaeological recording or conservation work is required on or around this area. The proposed site rehabilitation work can be undertaken on schedule.

3.2.3.4 Slimes settling dam # 3

This roughly triangular dam measures ~160 metres long by ~100 metres wide at its broadest point. As was characteristic of the ponds in the northwestern terraced slimes complex the bunds which impound the sediments in dam #1 are formed from unreinforced clay soil.

No features were recorded within this dam

Management Policy

Significance

The earth walled slime dams at Aberfoyle, arguably post-dating the tea tree dams, illustrate the final stages of ore processing and waste management and are able to provide information not only about the technology applied in their construction but also the nature of the process of waste dispersal around the site in later years.

The heritage value of the # slimes area is offset by the same general factors of structural instability and toxicity as outlined for dam #4. For these reasons, and despite the nominal heritage value of the site, it is considered inappropriate to leave the dam in its current condition.

Effect of proposed work

It is proposed that the slimes which are currently located dam #3 will be covered with top soil and revegetated.

Recommendation

No further archaeological recording or conservation work is required on or around this area. The proposed site rehabilitation work can be undertaken on schedule.

3.2.3.5 Slimes settling dam #6

This L shaped dam measures ~100 metres long by ~200 metres wide at its broadest point. As was characteristic of the ponds in the northwestern terraced slimes complex the bunds which impound the sediments in dam #1 are formed from unreinforced clay soil.

Several features were recorded within the dam. These included a silt trap, a series of steel pipes set into the bund wall and two timber trestles.

Features

Feature 1 Steel pipes

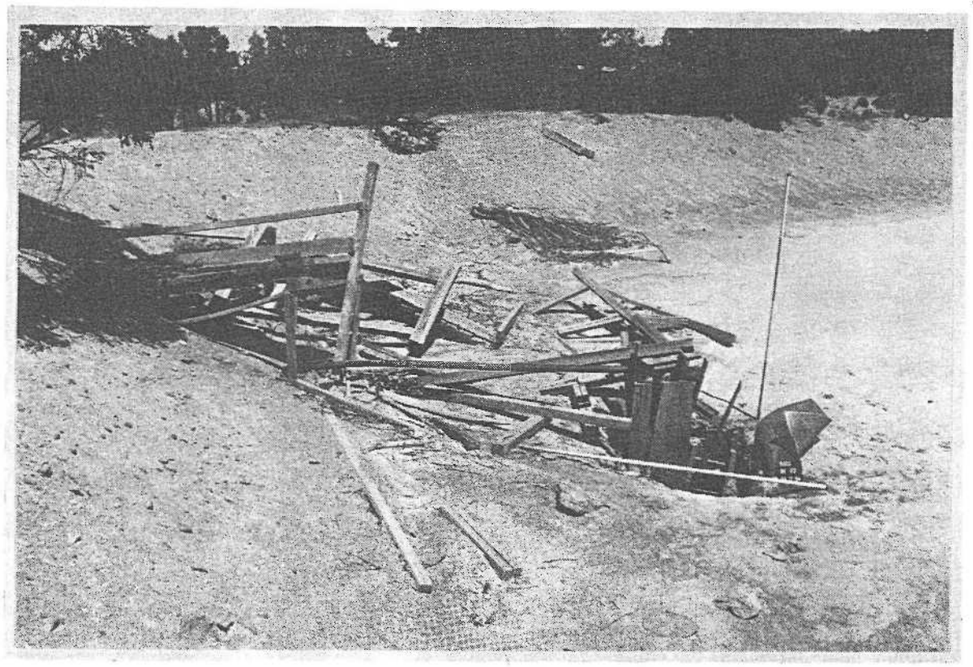
Three steel pipes lie embedded in the top of the bund at the northeast corner of the pond, providing a means of channelling the surface runoff between dam #6 and dam #7 to the north. The three parallel pipes, constructed of 5 mm thick steel with an internal diameter of 21 cm, have been laid at 90 ^{o} to the bund. Each section of pipe is of a different length: the western most is 6 metres long, the central pipe is ~4.5 metres long and the eastern pipe is 5.6 metres long.

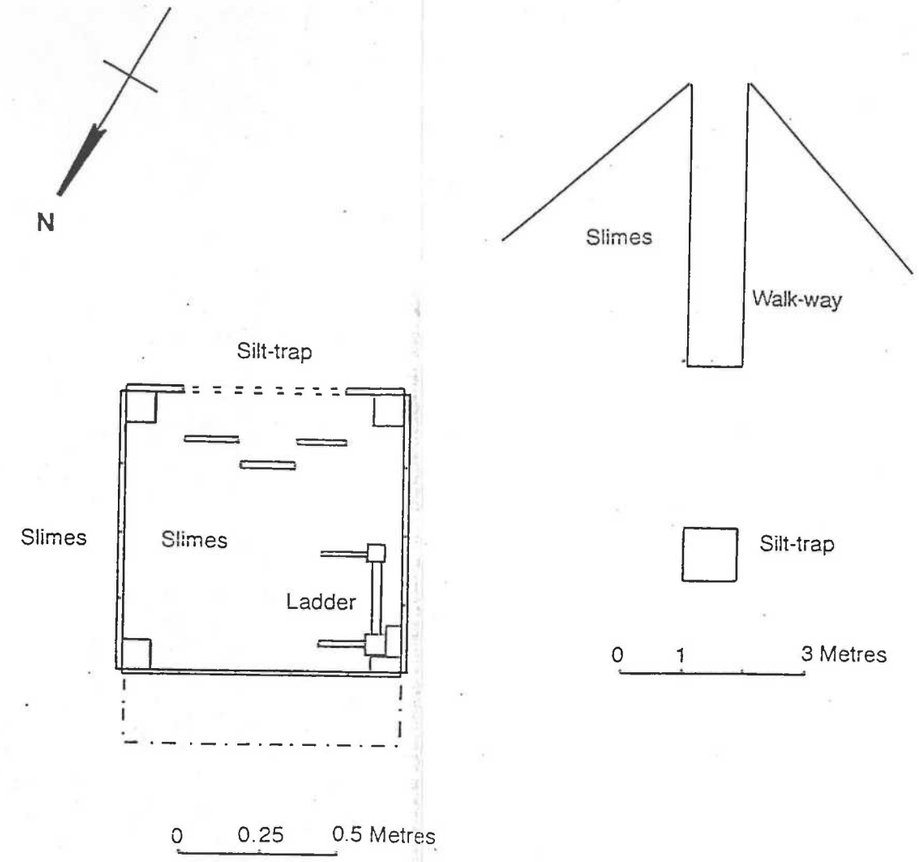
Plate 17: Feature 1, Steel overflow pipes in settlement dam #6

Feature 2 Timbered outlet and silt trap

Located in the southeast corner of the dam is a square wooden frame set into the surface of the slimes. This 900 mm square feature is the top a silt trap which has been totally filled with sediment. A sheet of heavy 1 cm gauge mesh is fixed to the north-west side of the trap and lies slumped over and partially buried in the tailings. A length of ladder is also attached to the inner southwest wall of the trap.

Directly to the southeast of the trap are the remains of a collapsed timber walkway. This 4.6 m long access platform once connected the trap to the dam edge (see plan 5 & plate 18).





Plan 5 & Plate 18: Feature 2, silt-trap and walkway in settlement dam # 6

Feature 3 Launder trestles.

Four square timber posts with cross braces, representing the remains of a line of slurry pipe trestles, lie almost totally buried in slimes near the southwest corner of the pond.

Management Policy

Significance

The earth walled slime dams at Aberfoyle, arguably post-dating the tea tree dams, illustrate the final stages of ore processing and waste management and are able to provide information not only about the technology applied in their construction but also the nature of the process of waste dispersal around the site in later years. The silt trap, launder supports and overflow pipes contained within the #6 dam are either insubstantial or expedient constructions and are likely to have been modified or replaced several times during the life of the mine. While they illustrate aspects of the waste management process, the structures themselves are considered to have little historical or archaeological significance.

The heritage value of the # slimes area is offset by the same general factors of structural instability and toxicity as outlined for dam #4. For these reasons, and despite the nominal heritage value of the site, it is considered inappropriate to leave the dam in its current condition.

Effect of proposed work

It is proposed that the slimes which are currently located dam #6 will be covered with top soil and revegetated. This process will result in the burial of the cultural features which were recorded within dam #6.

Recommendation

No further archaeological recording or conservation work is required on or around this area. The proposed site rehabilitation work can be undertaken on schedule.

3.2.3.6 Slimes settling dam #7

This rectangular dam measures ~100 metres long by ~90 metres wide. As was characteristic of the ponds in the northwestern terraced slimes complex the bunds which impound the sediments in dam #1 are formed from unreinforced clay soil.

No features were recorded within this dam.

Management Policy

Significance

The earth walled slime dams at Aberfoyle, arguably post-dating the tea tree dams, illustrate the final stages of ore processing and waste management and are able to provide information not only about the technology applied in their construction but also the nature of the process of waste dispersal around the site in later years.

The heritage value of the # slimes area is offset by the same general factors of structural instability and toxicity as outlined for dam #4. For these reasons, and despite the nominal heritage value of the site, it is considered inappropriate to leave the dam in its current condition.

Effect of proposed work

It is proposed that the slimes which are currently located dam #7 will be covered with top soil and revegetated.

Recommendation

No further archaeological recording or conservation work is required on or around this area. The proposed site rehabilitation work can be undertaken on schedule.

3.2.3.7 Slimes settling dam #8

This small and roughly square dam measures ~50 metres long by ~30 metres wide. As was characteristic of the ponds in the northwestern terraced slimes complex the bunds which impound the sediments in dam #1 are formed from unreinforced clay soil.

Only one feature was recorded within this dam.

Features

Feature 1 Steel pipe

A single steel overflow pipe, with an internal diameter of 21 cm and a total length of 7.6 m, cuts through the top of the clay bund separating Slimes dams # 8 and # 6. The horizontally laid pipe is flush with the slimes surface in dam # 8 and projects 80 cm above the surface of pond # 6 to the east.

Management Policy

Significance

The earth walled slime dams at Aberfoyle, arguably post-dating the tea tree dams, illustrate the final stages of ore processing and waste management and are able to provide information not only about the technology applied in their construction but also the nature of the process of waste dispersal around the site in later years. The steel overflow pipe contained within the #8 dam is an insubstantial and expedient construction and, while it illustrates aspects of the waste management process, the structure itself is considered to have little historical or archaeological significance.

The heritage value of the #8 slimes area is offset by the same general factors of structural instability and toxicity as outlined for dam #4. For these reasons, and despite the nominal heritage value of the site, it is considered inappropriate to leave the dam in its current condition.

Effect of proposed work

It is proposed that the slimes which are currently located dam #8 will be covered with top soil and revegetated. It is probable that the overflow pipe will either be removed or subsumed in the process.

Recommendation

No further archaeological restoration or conservation work is required on or around this area. The proposed site rehabilitation work can be undertaken on schedule.

3.2.4 Northeast area sites

3.2.4.1 Head-frame Area

Located at the far north east of the site, over looking the gully through which the Aberfoyle Rivulet runs, is the site of a large steel head-frame (see plate 19). A series of concrete footings lie to the west and east of the headframe (see plan 6).

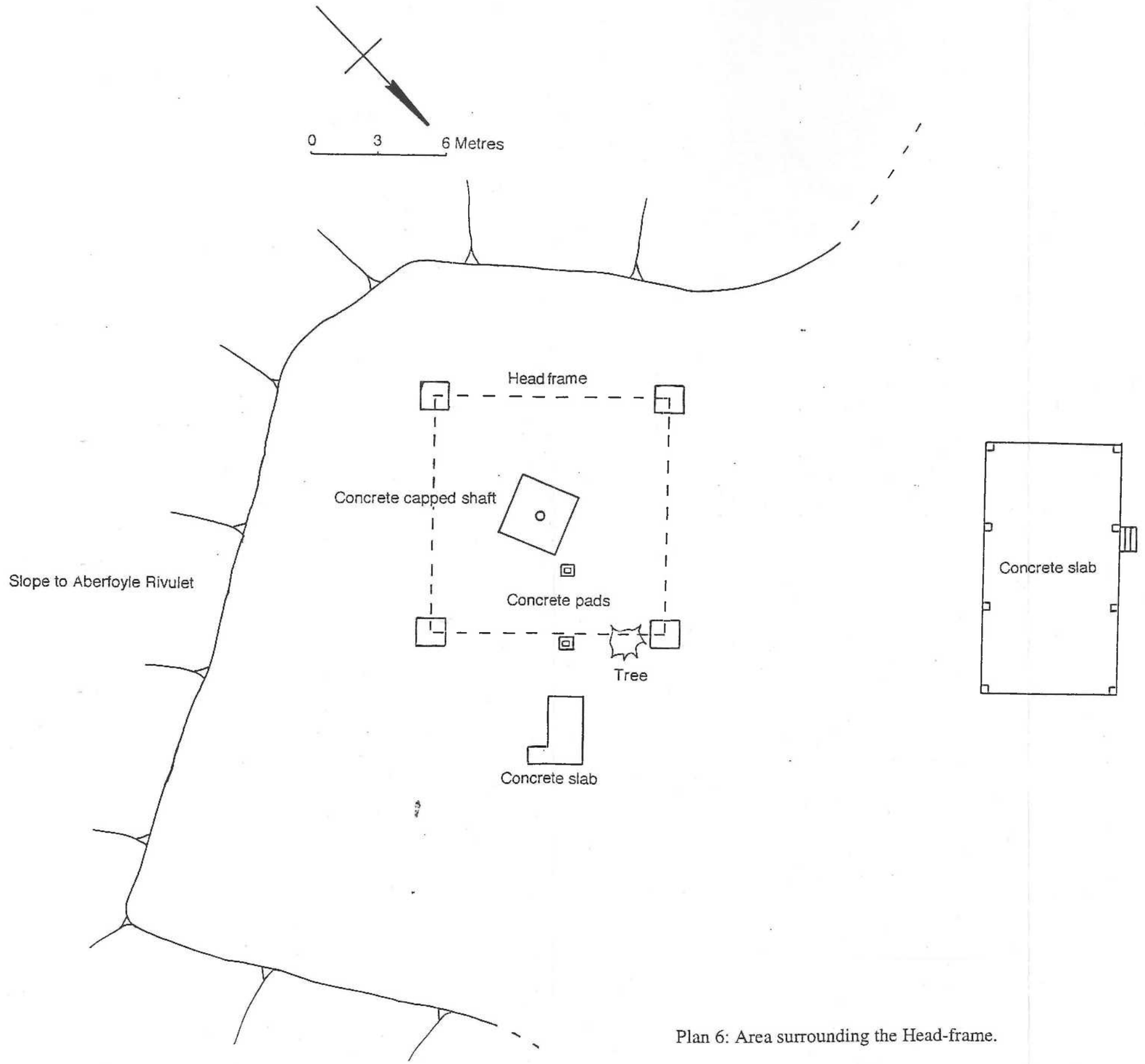
The steel head-frame has a floor span of 11.85 m by 11.75 m and stands approximately 10 m high. The lower series of horizontal girders had been removed prior to the site survey, ostensibly in order to prevent people climbing up the structure.

At the time of the survey a tree was growing up next to the northern leg of the frame and forking directly below the second row of horizontal girders.

A rectangular concrete slab, measuring 2.78 m by 2.9 m and laid in April 1982, covered the shaft beneath the centre of the head-frame. Two other small concrete slabs, both 600 mm by 400 mm in size are situated below the head-frame on its north-east side. These are aligned with a larger L shaped slab 2.8 m to the northeast of the head-frame. As the three slabs are aligned, it is possible that all three were footings for a single machine or machine complex.

Lying at a distance of 14 m to the northwest of the head-frame is a large concrete slab footing for the winding engine, measuring 11.3 m by 6.1 m and standing 1.12 m high. The presence of 8 evenly spaced impressions along the edge of the slab indicated that the engine had been enclosed inside a solid building.

A small pile of coarse tailings, covering an area of 20 m by 10 m, lies to the northwest of the engine house footing.



Plan 6: Area surrounding the Head-frame.

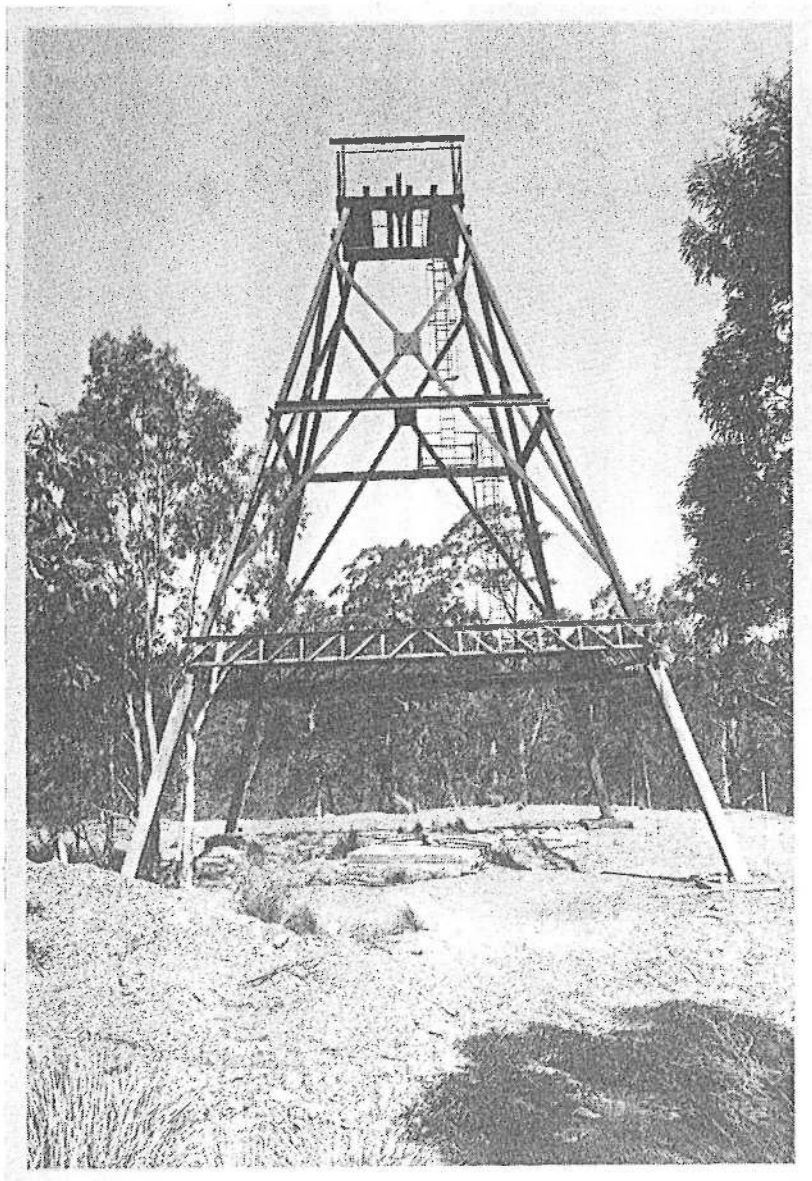


Plate 19: Head-frame at Rossarden

Management Policy

Significance

The head frame and its associated concrete slabs date from the latest and final period of operations at the Aberfoyle mine and illustrate the first point in the mining process, that of ground opening and ore extraction. The features remaining at the site are reasonably structurally intact and generally in good condition. The site, although not particularly historically significant, has strong aesthetic qualities and represents a heritage asset for the future. If the site is made safe then it may be suitable for interpretation purposes.

Effect of proposed work

During the 1996/1997 work program it is planned that the head frame will be sandblasted and repainted and that the small pile of tailings to the northwest of the head-frame will be removed.

Recommendation

At the present time a tree is growing below and partially into the head frame. The tree should be removed prior to it growing further into the construction and becoming a structural hazard.

As indicated by Thompson and Brett (1994) the head frame should be sandblasted and painted as this procedure will assist in its long term preservation against the elements. Prior to cleaning and painting, all footings bolts and cross members on the structure should be made secure.

The small pile of tailings to the northwest of the head-frame may be removed.

This site would be suitable for utilisation in site interpretation. A sign containing information about the Aberfoyle mine, its history and the role this area played in the mining process could be placed in close proximity to the head frame.

3.2.4.2 Old tip area

The tip area is located on the eastern side of the site, directly to the north of slimes dam #4. The tip contains a combination of discarded mining related and general mechanical items, car bodies, white goods and general domestic rubbish deposited since closure of the mine. The area continues to function as the unofficial Rossarden town rubbish dump.

Management Policy

Significance

The tip area and items contained within it are not considered to possess heritage value.

Effect of proposed work

It is planned to bury the rubbish, regrade and cover the site with soil and revegetate the general area as part of the environmental rehabilitation program.

Recommendation

No archaeological recording or conservation work is required on or around this area. The proposed site rehabilitation work may be undertaken on schedule.

3.2.4.3 Area Between Tip & Head-frame

This ~170 metre long by ~100 metre wide area contains very little cultural material, although it is covered by a blanket of water and wind deposited tailings.

Management Policy

Significance

The area and the features identified within it are not considered to have great heritage value.

Effect of proposed work

It is planned that during the works program this area of the site will be trimmed of surface tailings, ripped and then revegetated.

Recommendation

No archaeological restoration or conservation work is required on or around this area. The proposed site rehabilitation work may be undertaken on schedule.

4.0 Storevs Creek

4.1 Storeys Creek mine History

Earliest years

Alluvial tin was first discovered in the Avoca/Ben Lomond district at Gipps' creek in 1871 but it was not until the potential richness of the State's tin resources were revealed at Mt. Bischoff on the other side of the island two years later that the rush to exploit the base metal in the Tasmanian Northeast began in earnest. By the end of the decade leases totalling thousands of acres of promising tin ground were taken up around Gipps' Creek and along the upper reaches of Aberfoyle and Storeys Creek further to the east. Six hundred and forty acres were under lease at the head of Storeys Creek alone by 1881, 80 acres each in the hands of Stephen Grueber (Avoca), Francis Grueber (Conara), Humphrey Falkiner (Longford), John Falkiner (Longford), Hamlet Fletcher (Maria Island), Thomas Bruce (Launceston) and Robert Hamilton (West Tamar). Several years of prospecting and shallow ground sluicing along the sides of the steep creek gully had won encouraging amounts of coarse unwaterworn crystals of tin and wolfram ore for the miners, washed from decomposing quartz vein sets shooting through the folded quartzites and shales of the district. The common goal of exploiting the rich but shallow surface tin deposits in the rugged and isolated hills flanking Ben Lomond ultimately resulted in the formation of a formalised working arrangement between the leaseholders.

The Storeys Creek Tin Mining Company 1882 - 1901

The Storeys Creek Tin Mining Company was consequently floated in February 1882 with 4 400 shares of ten shillings each and with major shareholders including Stephen and Francis Grueber, Humphrey and John Falkiner, Fletcher, Bruce and Hamilton. Henry Edgell was appointed mine manager. Initially the work was carried out on only a small scale, concentrating on exploiting cassiterite and wolfram lodes at the southern end of the vein field which were attacked from adits driven from the north side of Side Creek, which flowed from the south-east into Storeys Creek. At the time there was no market for wolfram and tin was the main object of production. The lease was worked throughout the 1880s and 1890s but had been abandoned by 1901 (Kilner, p. 17).

In 1891-1892 A. Montgomery of the Mines Department reported on mining operations in the area. While a large number of sections had previously been taken up near the head of Storeys Creek, at the time of his visit many of the leases had been forfeited and very little work was being done. On the Storeys Creek Tin Mining Company's property (sections 2141-87M, 1089 and 1077 held in the names of J. Genders and R. Benell) one or two men were still employed. Montgomery noted that far more work had been done by the Storeys Creek Tin Mining Company than on the neighbouring leases, particularly surface sluicing, which had laid bare numerous small quartz veins containing pockets of coarsely crystalline cassiterite and wolfram. The surface-workings were on flattish ground forming part of a terrace which extended to Gipps Creek (though cut off from the main part of it by the dissection of Nesbitts Creek). The underground workings were located within the deep gully of Storeys Creek itself and consisted of levels driven into the steep western flank about 100 ft above the bed of Storeys Creek. The main level, Miers adit, had been driven about 300 ft along the principal lode (No.1) in a northwesterly direction with an east crosscut of equivalent length driven 120 ft from the adit mouth. Another promising vein, No.2 lode, had been intersected in the crosscut and some stopes taken out. Montgomery observed that

throughout the workings wolfram was more abundant than the tin ore. At the time however tin was still considered to be the more valuable mineral.

By 1892 a small crushing and dressing plant installed by the company was falling into a state of disrepair. It consisted of ten stamps, a pair of spitzbutten, one 3-sievejigger, one shaking table and several ties. The power was supplied by a 32 ft overshot waterwheel, the water for which was brought by a pipe from a race over the terrace and supplied by a dam higher up Storeys Creek. Montgomery noted that the mill would need to be relocated for the future development of the mine, in particular through the opening of an adit some 60 ft below the level of the battery site (Montgomery 1891-92).

G. Waller of the Mines Department reported on mining in the Ben Lomond District in 1901. In regards to the Storeys Creek Tin Mining Company (Leases 3272-93M, 3275-93M and 856-93M - 125 acres) he noted:

A great deal of alluvial tin has been obtained from these sections in years past, and two men are still working the surface soils and gravels... As far as I can learn the only underground mining which has been carried on of late years is in connection with some quartz veins which were worked for wolfram.

In the decade since Montgomery's visit most of the underground work had been confined to driving and underhand stoping of the No.2 lode from a drive off the east crosscut from Mier's tunnel. Waller goes on:

Apparently the results obtained by the company were not satisfactory, as it has sold its battery and concentrating appliances and these have been lately removed. A number of small tin veins have also been discovered on the property. (Waller, 1901, p 35)

The Storeys Creek Tin Mines N.L. Company 1906

The Storeys Creek Tin Mines No Liability Company was formed in June 1906 with its head office in Melbourne. This company continued to work the lodes from the adit openings at the southern end of the lease. A milling plant powered by a water wheel was erected, but the venture was short-lived due to fluctuating tin and wolfram prices (Kilner, p.17).

Storeys Creek Tin Mining Syndicate 1914 - 1928

For the next few years, up until the outbreak of World War 1, small parties of miners continued to work the outcropping lodes on the Storeys Creek leases. In 1914 The Storeys Creek Tin Mining Syndicate was formed after John and Alex McKenzie and D. McLeod purchased the leases from miners working the area. Mr Joseph Miller was appointed mine manager, a position which he held until 1928 (Kilner, p 17). A low level adit was driven into the hillside on the southern side of Storeys Creek at the northern end of the prospect to intersect the dipping No.1 and main lodes and underground development began in earnest. By 1915 forty five men were employed at the mine, working in two shifts. Whilst the price of tin took a downturn during the war years, the demand for wolfram (tungsten) increased, ensuring the viability of the enterprise (Kilner, p.17).

Further expansion of the mine took place in subsequent years. In 1916 Loftus Hills of the Mines Department reported that steps were being taken to provide a suitable concentrating plant. The mill site had been chosen on the west bank of the creek 300 m southeast of the main adit, and connected to the adit by a tramway. A haulage line from

the mill site to the ridge was cleared with intentions to erect a electro-magnetic plant for more efficient treatment of the ore (Hills, 1916 and Kilner, p. 18). The capacity of the proposed concentrating mill was to be 50 tons of crude ore per day. The motive power was to be provided by a suction gas plant. The output at the time (using hand methods) was 5 tons of concentrates per fortnight. The ore was passed over a grizzly and the coarse portion stacked for future treatment. After crushing, the fines were treated in streaming boxes to obtain a mixed tin and wolfram concentrate which was sent to Launceston for electro-magnetic separation. Mining infrastructure clustered about the main adit portal in Storeys Creek gully at the northern end of the mine site included a steam engine house, underground manager's office, blacksmith's workshop and workers' shower room. Hills suggested further capital injection was necessary to allow working of the southern end of the lease (Hills, 1916).

The Storeys Creek mine employed over 90 people by 1920. However, work was disrupted at the mine in August of that year when the miners went on strike in search of higher wages. The industrial dispute and a subsequent labour shortage as men left to take up positions in other mines resulted in a disruption to mining operations until mid-1922 (Kilner, p.23).

The Company struggled to increase production over the ensuing years and by 1927 was once again making a small profit. The population at Storeys Creek peaked at about 250 in the mid-1920s. The township consisted of houses, a general store, a hall and school. Nevertheless facilities were crude and the road from Avoca was no more than a rough track that took several hours to traverse by horse (Kilner, p 23-24).

Although further expansion took place at the mine in the late 1920s, it was not enough to ensure its viability. A. MacIntosh Reid and Q. Henderson of the Mines Department reported on the mine in 1928. They found that although the Storeys Creek mine was the most important on the field, it had not been explored to any great depth (less than 300 ft). The failures of mining in the area in general were attributed to :

1. Insufficient initial capital
2. The use of inefficient machinery
3. The high cost of power
4. Small scale operations
5. Costly methods of mining.

In relation to the Storeys Creek Mine in particular they reported:

The mine is being operated on a small scale by the Story [sic] *Creek Tin Mining Syndicate under the supervision of Mr J. Miller.. The operations of the present syndicate may be regarded as satisfactory, taking into consideration the fact that from the smallest beginnings the mine has been explored along their courses 1200 to 2000 feet. Moreover, milling and concentrating plants, magnetic separators, and power plants have been purchased and erected, and a considerable sum has been distributed among shareholders from the proceeds of ore sales.* (Reid & Henderson, 1929, p31)

The area leased by the company was 336 acres (sections 7250m and 7105M, as well as water rights.) The rate of production at the time was 35 tons a day (a rate too low to allow economic operation). Problems included the shortage of power, the backwardness of underground development and the low capacity of the milling and concentrating plant. For the year ended 30th June 1927 from 9 968 tons of stone tin was obtained to the value of £25 601 and wolfram to the value of £6 584. Profit for the year was £5 056. Between January 1916 and July 1927 tin and tungsten ores to the value of £255 612 were produced. Two main veins were being worked, Nos 1 and 2, and the main development at the time was the recent sinking of the main shaft from the adit to No 3

level. The underground ore was being drilled with jack hammers worked by air pressure, and the workings, although extensive along the strikes of the veins, were at their deepest only 240 ft below the surface.

Between the main workings and the old south workings there still remained a block of ground 500 ft in length which was awaiting development. It was suggested that the intervening ground could be easily reached by extending the crosscut on Mier's adit to open on the surface at a point 20 ft lower than the main adit and substantially closer to the milling plant.

The milling and concentrating plants were designed to separate the valuable minerals in as coarse condition as possible in order to avoid the creation of slimes. The operation of concentration was divided into three main processes:

1. Crushing and gravitative concentration in water

This plant consisted of two gyratory rock breakers, revolving and screen ore-feeders, crushing rolls, trommels, jigs, classifiers, card tables, tossing-tub, hydraulic cleaners, all driven by a 55 hp Tangye gas engine connected to a 75 hp Commonwealth wood-gas producer.

2. Calcining

Tin bearing pyrites were subjected to the process of roasting in an 'Edwards' mechanical furnace before retreatment.

3. Magnetic separation

Wolfram was separated from tin ore in the mixed concentrate by means of electro-magnetic separators. The plant consisted of crushing rolls, dryer, screen classifiers, two dynamos, and two 'Rapid' type (Thompson - Davies patent) electro-magnetic separators, each having three poles, three discs, and a 15 inch feed belt. The plant was driven by a 25 hp Tangye engine connected to a 33 hp Commonwealth wood-gas producer.

The syndicate also held two water rights to Storeys Creek to provide water for milling and concentrating processes.

Reid and Henderson concluded:

Story [sic] *Creek tin-tungsten mine opens two vein systems of great length and profitable value. with several undeveloped offshoots to the southward. These veins are being worked on a very small scale under conditions that cannot be regarded as economical, yet the ores are producing at a profit. The conditions for mining and treatment are generally favourable, but the layout of the treatment plant with relation to the mine cannot be regarded as altogether satisfactory. That, however, is due to extraordinary circumstances in connection with the development of the mine. For instance, it would prove of great advantage to mine the ore from the south end, where, also, are suitable sites for power and milling plants. Taking everything into consideration, the general result reflects credit on the manager, who has exhibited a high degree of engineering skill.*

It is recommended that consideration be given to the design of a treatment plant on modern lines with a capacity of 200 tons per day of 16 hours, providing also for the use of electric power...Under such conditions of operation, Story Creek mine - an important tin ore producer, and the most important wolfram producer in Tasmania - would become of much greater value to the State. (Reid and Henderson, 1929, p.39)

The mine ceased operations late in 1928. (Kilner, p 25) The Syndicate in its years of operation raised up to 12 000 tons of ore a year, the yield per ton ranging from 0.75 to 1.75 percent tin oxide, and from 0.75 to 2 percent wolfram. (Edwards, 1953)

Egan's Era 1929-1940s

In 1929 Edward (Ted) Egan, an experienced local miner, offered to work the Storeys Creek mine, paying a tribute of 20% of the metal raised to the shareholders. J. Scott of the Mines Department reported on progress at the mine in 1934. He noted that:

The workings are approached by means of a short tunnel from the valley of Storeys Creek. It has been worked out from a point of intersection to the surface. Operations are at present confined to driving on the lode at depth of underlie of 600 ft below surface.. The vertical distance below surface is about 250 ft...At the lower (no. 4) level, the lode has been driven on for a distance of 513 feet without reaching its lineal extension...In the upper level the separate lodes ..were worked over a length of 1200 to 2000 feet. (Scott 1934, p 189)

The output of ore from the mine for the half year to June 1934 was 5 232 tons of crude ore which yielded 16.75 tons of metallic tin valued at £3 875, and 90.2 tons of wolfram valued at £12 075. With regards to the milling plant Scott noted that fine crushing was not necessary to effect a satisfactory recovery of the tin-wolfram concentrate. He remarked that the mine offered 'excellent facilities for its development by means of a vertical shaft from the surface to intersect the lode at any point below the present workings', and went on to conclude that the future of the mine was 'very encouraging', with considerable potential for development on a more comprehensive scale, in particular through the upgrading of the concentrating and treatment plants (Scott, 1934, p 190).

The mine employed 70 men at this stage and Egan financed the building of huts to house the workers and their families. The single men's huts were mainly one roomed dwellings with an open fire for cooking and heating, whilst the married mens' had two bedrooms, a lounge and kitchen. Two rows of huts were built and nicknamed Red Face (on eastern hill) and Flea Flat. A third row of corrugated iron huts, called Tin Pot Row, was added in the 1940s (Kilner, p. 30).

Storeys Creek Tin Mining Company N. L.

Egan floated the Storeys Creek Tin Mining Company NL in 1937 in an attempt to increase capital investment, but continued on in the position of mine manager until the mid 1940s. In 1937 11 736 tons of ore were milled recovering 239 tons of wolfram concentrates and 27 tons of tin concentrates (Blissett, 1959). From 1932 to 1941 about 340 tons of cassiterite and 1 740 tons of wolfram were recovered from 97 200 tons of ore (Edwards, 1953). The outbreak of war in 1939 saw renewed demand for wolfram and production at the mine was based on this mineral (Kilner, p 39).

In 1946 it was reported that the mill located in the creek gorge below the lower adit portal, operating with old and periodically altered machinery, was to be replaced with a modern mill in a different location (Dunkin 1946, p 49). By this stage the ore was being crushed in a gyratory crusher and by rolls in closed circuit with a vibrating screen. The mixed tin/tungsten concentrate was passed up a steep haulage to the concentrate treatment plant on the plateau above the gorge, where it was dried, screened and divided in magnetic separators. The overall recovery of valuable minerals was

estimated at 80%. For the financial year ended 30th June 1945 12 457 tons of ore were treated for the production of 150.5 tons of wolfram concentrate and 38.5 tons of tin concentrate.

Despite a labour shortage eighty men were employed at the end of 1945, working two shifts underground, and the mill operated 12 hours a day to process 50 tons of ore per day. Electric power was available by this time to run the mill plant and the company held water rights on Storeys Creek and on a low level dam. Compressed air was delivered to the working faces from a Canadian built 1 080 cu.ft. Ingersoll Rand type VH compressor powered by a G.E. 200 hp motor. A 600 cu.ft. Sentinel compressor powered by a Metropolitan-Vickers 125 hp motor was available on standby.

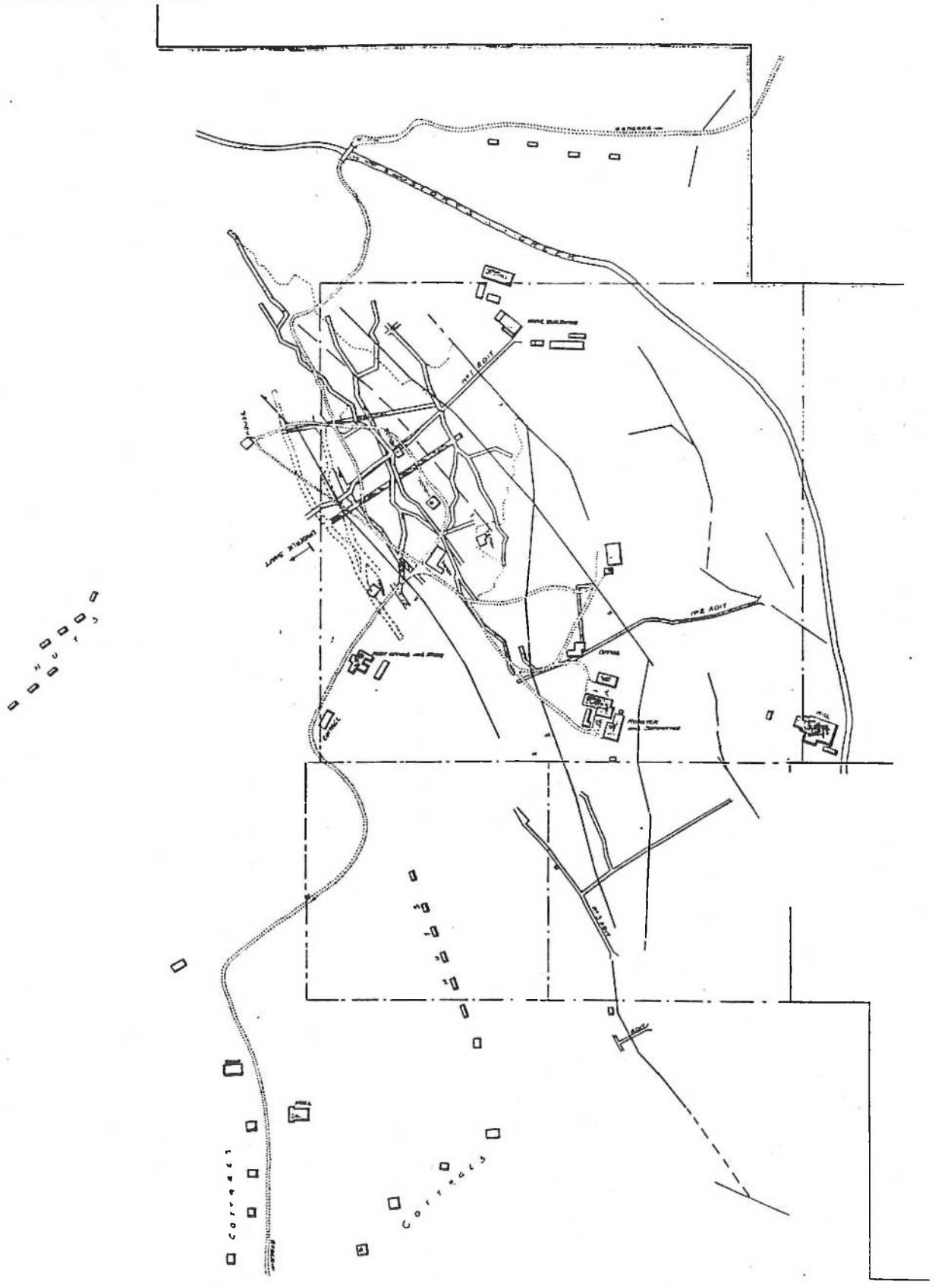
Surface shops at the mine site included a mechanical workshop, oxyacetylene and electric welding shops and a carpenters shop. It was intended to sink a new shaft and erect the modern mill nearby. Excavation for the mill had apparently started. It was claimed that the new works would have the effect of centralising surface operations and reducing milling costs and improving recovery rates. The coarse mill tailings were to be used for mine filling (Dunkin, 1946, p 51).

Aberfoyle Ltd - 1950s - 1980

After Egan's departure the mine was taken over by Aberfoyle Ltd. A new plant was installed by the early 1950s to remove impurities by the flotation process. By 1959 the old mill situated on the edge of the creek was closed and the new mill at the top of the hill had been completed. In that year Blissett reported that since 1950 the yearly tonnage mined had more than doubled and the output of wolfram had increased in proportion and the output of tin concentrates had trebled. The mine was opened up to the 435 foot (no. 8) level and in 1956 an average of 81 men were employed. The company at the time held leases 27m/46 - 383 acres and 399P/M - 80 acres. (Blissett, 1959) In 1968 the mine employed 107 men including 66 underground miners, 11 mill workers, 20 surface workers and 10 other staff (Kilner p41). In 1971 all milling operations ceased at Storeys Creek and ore was transported to Rossarden to the Aberfoyle Mine for crushing.

A downturn in prices and increased inflation during the early 1970s heralded a tough era for the mine. The workforce was drastically reduced and production cut. The quota system imposed by the International Tin Council in an attempt to stabilise tin prices added further troubles to the Aberfoyle Company's woes. The environmental impact of decades of mining and poor tailings disposal methods also became an issue, with concerns being raised that heavy metals from the Storeys Creek and Rossarden operations were contaminating Aberfoyle and Storeys Creeks and neighbouring pasture land as far west as Evandale.

By 1976 tin prices were improving and production quotas abolished, leading to a period of renewed optimism at Rossarden, however, the Storeys Creek mine was nearing the end of its working life. Tests were done by diamond drilling in the lower areas of the mine, but no new major lodes were discovered. The mine operations were scaled down and the workforce reduced to just 22 in 1979. The mine finally closed late that year and the remaining employees were transferred to the Aberfoyle mine at Rossarden (Kilner, p 50)



Plan 7: Storeys Creek Mine site 1930.

4.2 Site Analysis

Details of areas of Storeys Creek mine site directly effected by the first phase of planned rehabilitation are included in the associated archaeological reconnaissance report (Back-Tracks 1994). The following section deals only with those remaining areas of the site which are potentially effected by proposed works and areas for which future study was recommended in the aforementioned report.

4.2.1 Northern workings

A number of structures and features lie clustered around the main adit portal, in use between 1916 and 1957, at the northern end of the mine site. The portal itself has collapsed and was not assessed during the survey.

4.2.1.1 Features

Feature 1 Compressor site

The most visible feature at this site, occupied from 1916 to 1957 by the steam engine house (Kilner, p 20), is a large duplex compressor partially buried by sandy mine tailings and obscured by blackberry and weeds. The twin horizontal pistons and central flywheel are visible and the relic is mounted on a low concrete plinth. A vertical gas producer, similarly buried, lies at the edge of the tailings pile 15 m to the southwest of the compressor. A number of iron pipe and possible air receiver fragments and a small collapsed timber and corrugated iron construction lie partially concealed between the two in situ relics. (Plan.8)

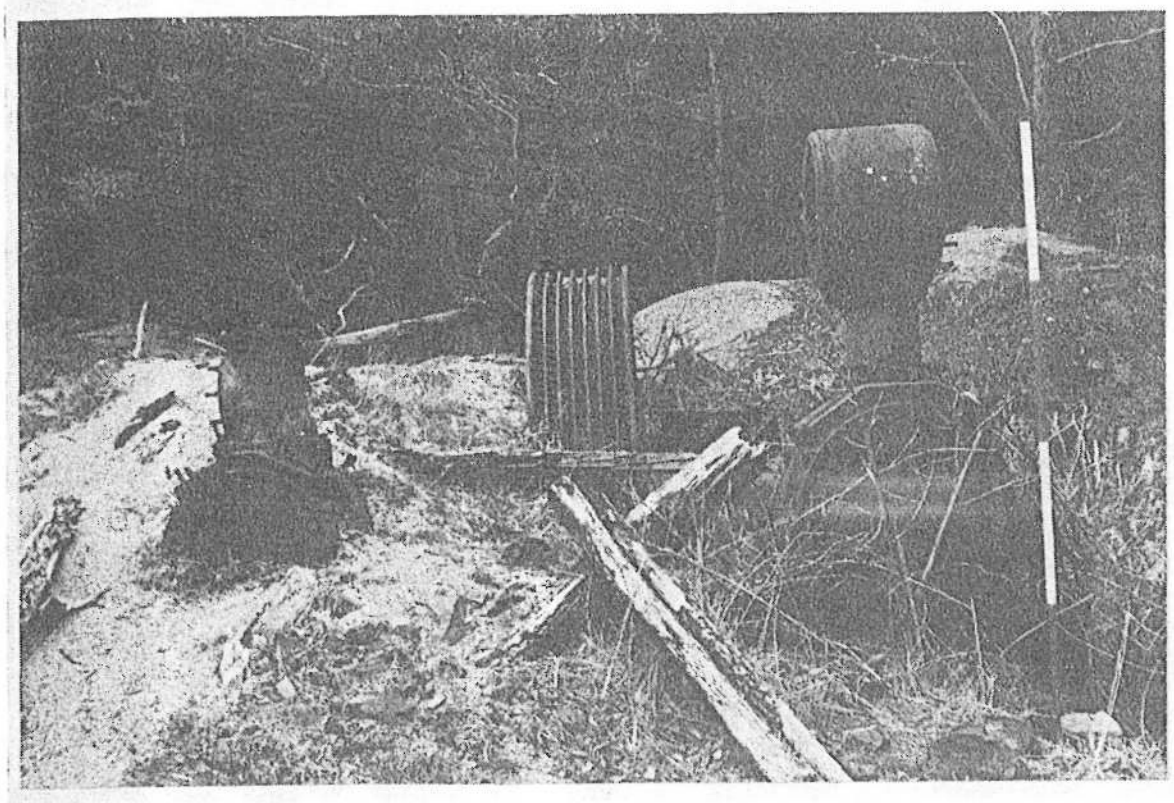


Plate 20: Duplex compressor, Northern workings, Storeys Creek mine.

Significance

While compressed air was being used to power the rock drills in the underground workings by 1928, the compressor currently at the site, believed to be an Ingersoll Rand type VH, is not referred to prior to 1946 (Dunkin 1946, p 50). At the time the compressor was powered by a G.E. 200 hp motor, suggesting that the wood-gas producer nearby to the southwest was redundant by this stage or at least not associated with the production of compressed air after the mid 1940s. Both the gas producer and the compressor are visually impressive historical relics and illustrate continuity of operation, through technological adaptation, at the site from the 1920s until 1957. A more detailed assessment of the use history of the site and consequently of the interpretive potential of the relics must await the excavation of the encasing tailings mound.

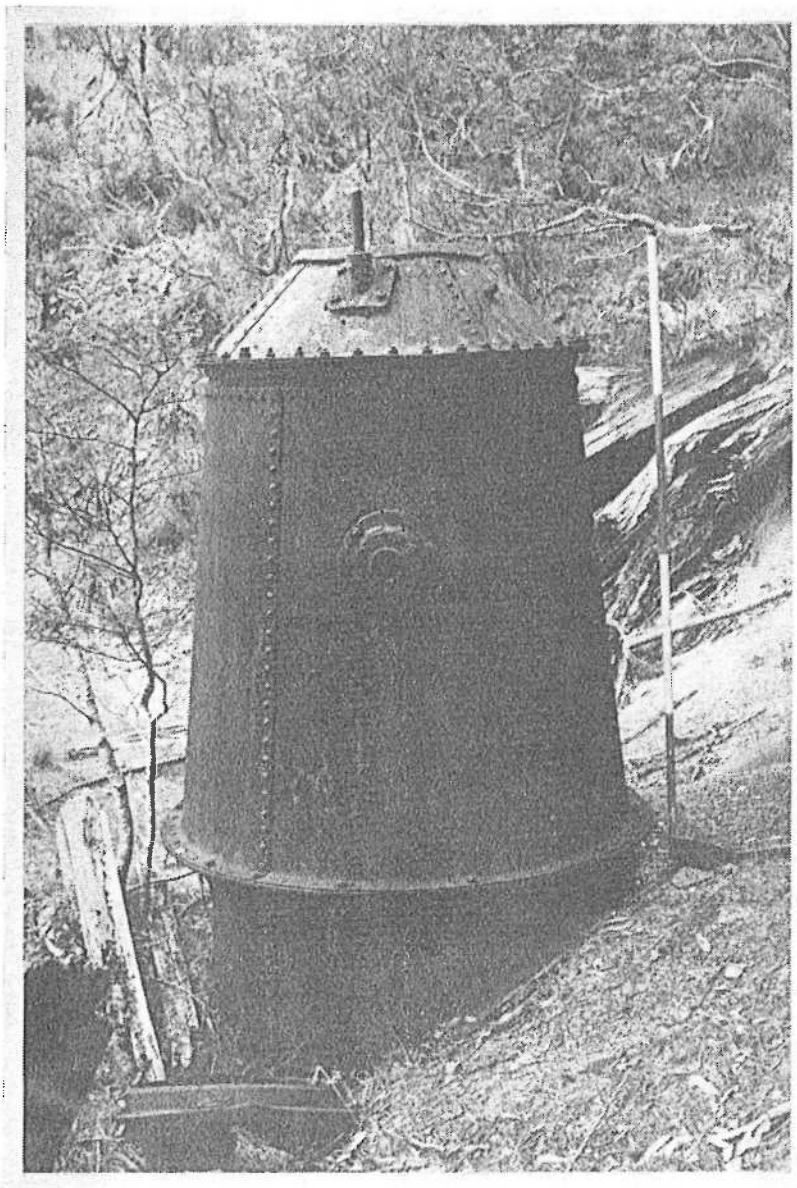
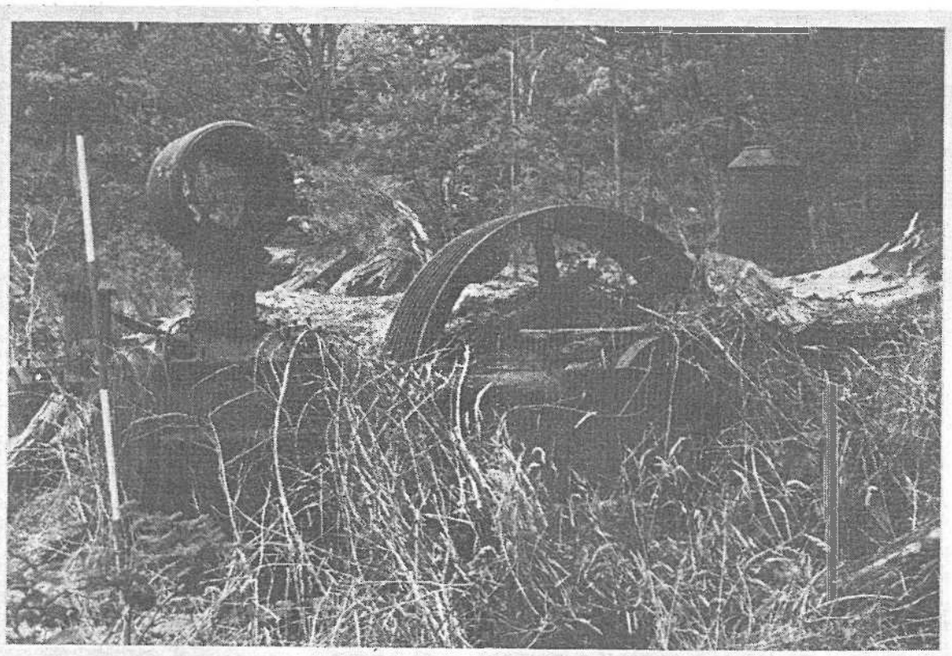
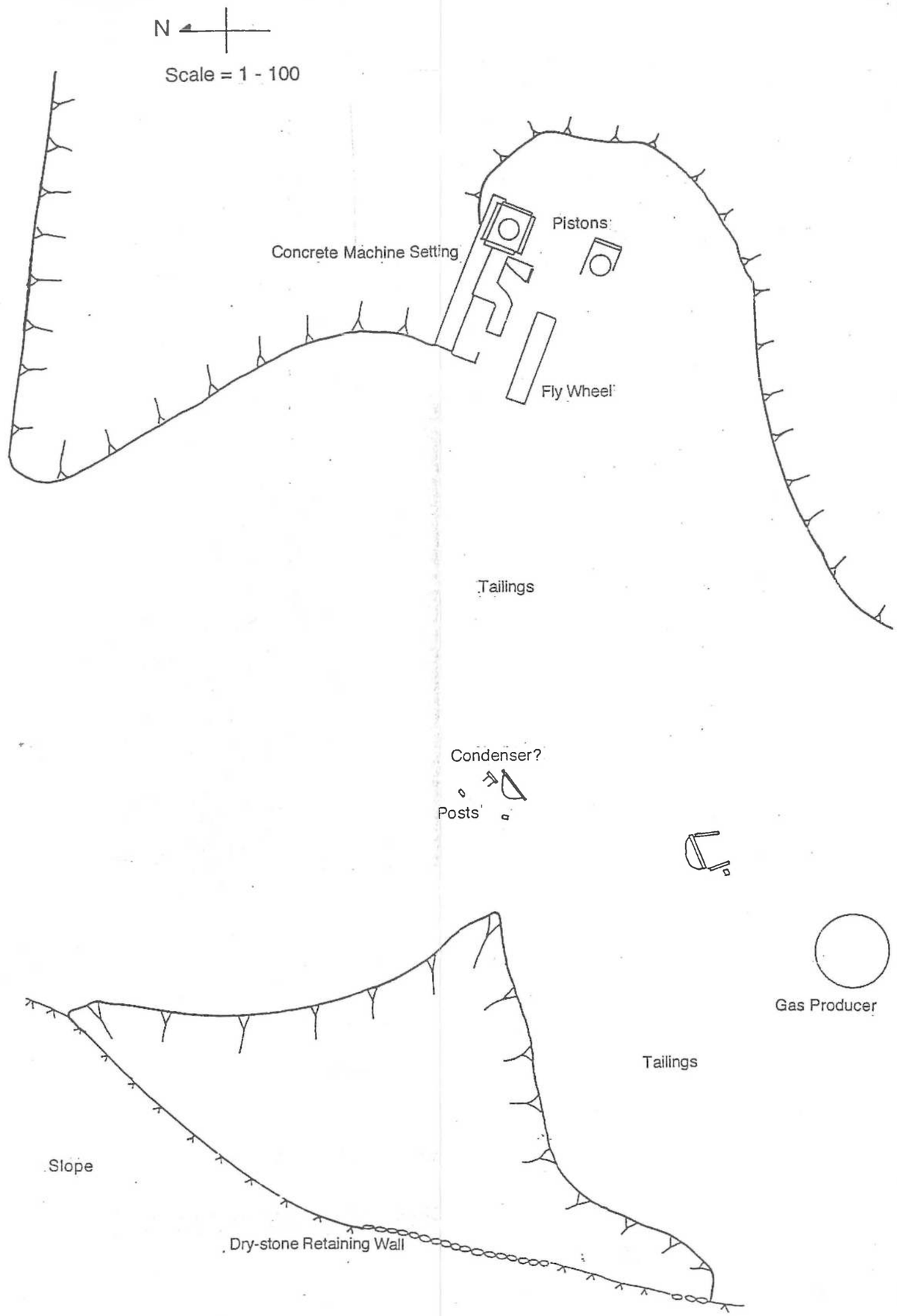


Plate 21: Vertical gas producer, Northern workings compressor site.



Plan.8 & Plate 22 Compressor site, Northern workings, Storeys Creek mine.



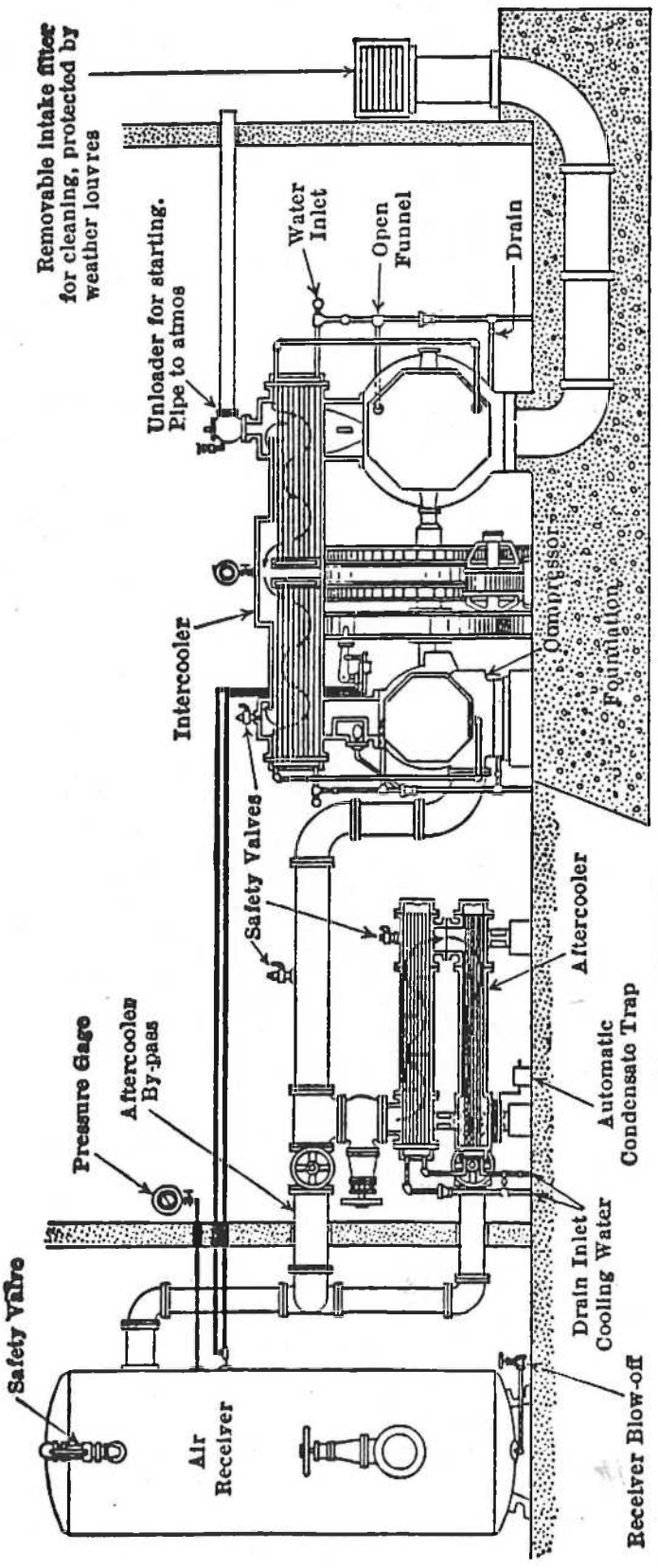


Fig 27. Typical Layout for Compressor Installation

Plan. 9 Layout for a compressor installation (reproduced from Peele 1945, p 15-24)

Feature 2 Shower room

On the east side of the collapsed main adit portal is a level bench 33 m in length by 5 m wide. The platform is cut into the hill on the south side and built up to the north with timber reinforced mullock. Two square concrete slabs measuring 3.2 by 5 m and 5.5 by 5 m respectively, being the remains of floor sections for small timber and corrugated iron constructions since removed, are situated at the eastern end of the bench. The remainder of the levelled area is covered with a thin layer of sandy mine tailings.

Significance

From 1916 to 1957 the platform supported two single storey timber buildings, the larger structure being the miners' shower room. A smaller two roomed office for the underground works manager sat to the west (Kilner p 20). Both structures illustrate important aspects of the daily routine experienced by the mine workers and their immediate supervisors, from the planning and organisation of shift parties and work details at the beginning of the shift through to the miners' washing and dressing at the end of the work day. No indisputable remains of either structure were identified however and the present concrete floor slabs would appear to be later constructions. Their function has not been determined.

Feature 3 Ore hopper frame

Running along the north boundary of the shower building terrace and projecting several metres into the adjacent gully are the collapsed and burnt remains of a heavy timber framework. An elongate dump of coarse mullock lies 20 m to the north of the structure. The western half of the construction, measuring 16.5 by 3 m, consists of a framework of hardwood sleepers fastened to a series of long stringer beams and infilled with waste ore. The eastern 17 m long section has largely been destroyed, however a series of in situ uprights, formerly buttressed, are still evident.

Significance

The timber reinforced mullock platform and vestigial timber uprights arguably represent the remains of a timber ore hopper constructed in 1916 (Kilner p 20). The structure and the adjacent mullock heaps relate to the process of handling and separating the ore on the surface prior to transportation to the battery, and for the temporary storage of waste for backfilling.

Plate 23: Shower room terrace and collapsed hopper frame, Northern workings area.

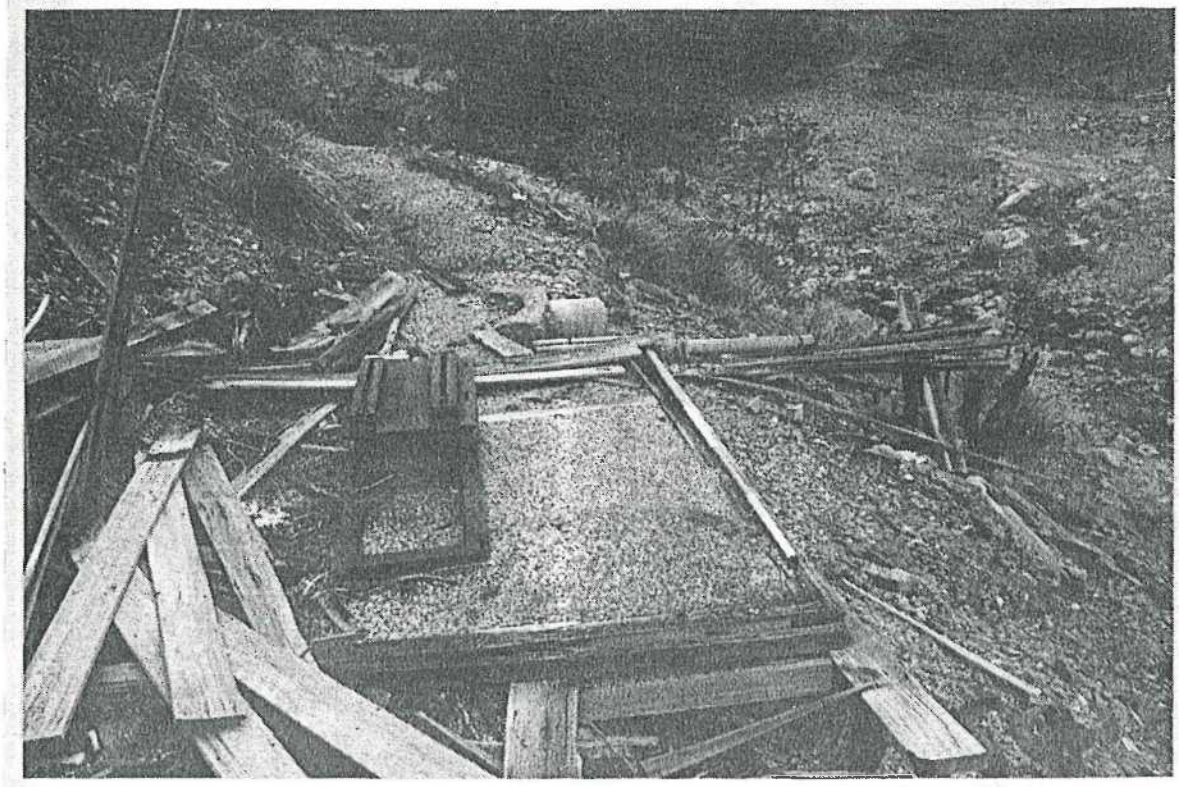


Plate 24: Remains of Pump house on tramway easement, Northern workings area.

Feature 4 Tramway

A narrow tramway easement, 1.5 m wide and traceable for 85 m where benched into the hillside, runs from the east end of the collapsed hopper frame around the south side of the creek towards the mill site. The remainder of its length is obscured by coarse jig tailings. Several hardwood rail sleepers, measuring 1.2 by 0.15 m with 0.75 m spacing for the 0.7 m gauge rail line remain visible at the head of the tramway. Sections of hardwood planking fluming run along the easement on the north side of the track. A collapsed timber paling hut with a concrete floor slab, measuring 3 by 2 m with a large centrally located steel mounting, is situated midway along the exposed tramway section, 45 m from the head of the easement. A small concrete drain guide or culvert abuts the slab on the west side. Both structures, possibly part of a pump house, are of substantially more recent date than the tramway.

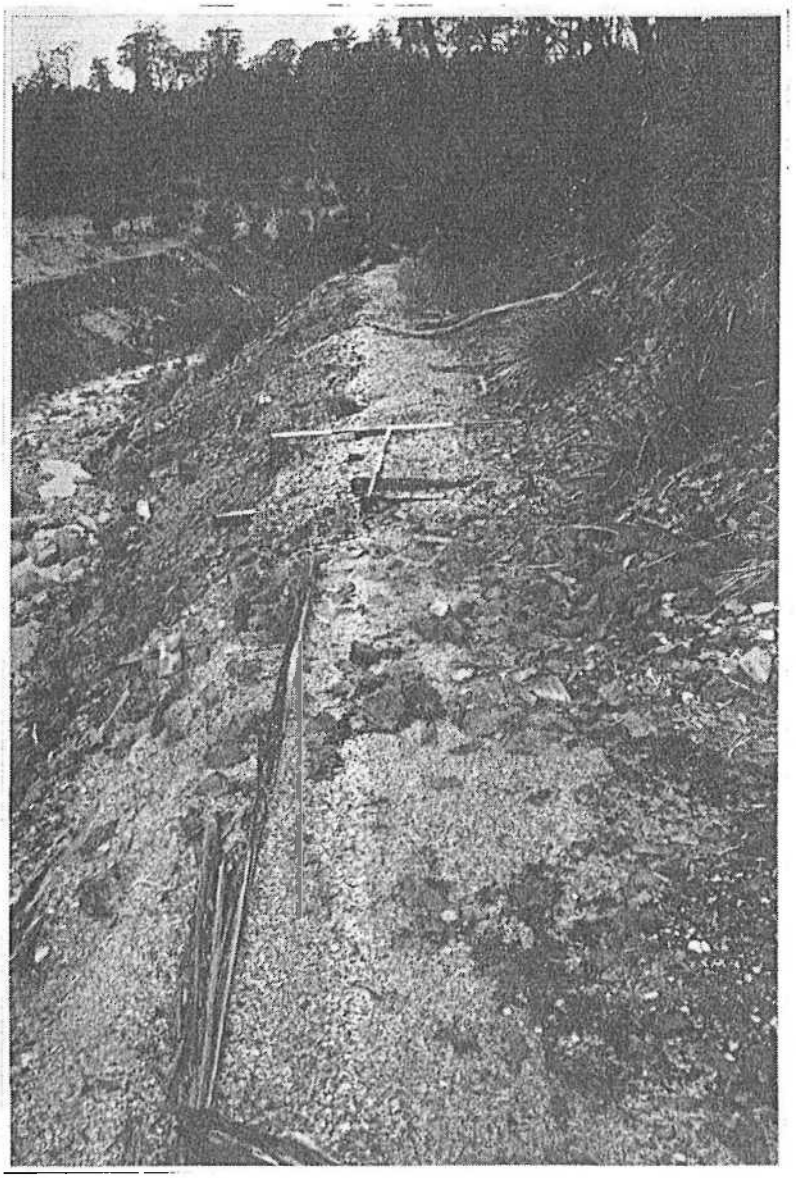


Plate 25: Tramway easement, running east from Northern workings area.

Significance

The tramway linking the main adit to the mill site was built in 1916 (Hills 1916, p 21) and remained the sole means of transporting the ore for crushing up until the mill above the creek closed in 1957. Sections of the easement, although eroding, are still in reasonable condition. The exposed segment of easement is arguably the best preserved and certainly the most visible remaining indicator of the important process of ore transportation around the site. The precise function of the concrete and steel structure and of its associated culvert/overflow, both apparently dating from the 1970s, has not been determined.

4.2.1.2 Management Policy

Effect of proposed works

With the possible exception of sections of the tramway, the features recorded at the northern end of the mine site lie outside the area scheduled for environmental rehabilitation. Details of the related proposal to remove mine tailings from the compressor site for interpretative purposes and its effects on the integrity of the site are given in Back-Tracks 1994. This work was originally scheduled for the 1994/1995 financial year but has since been delayed.

Recommendation

The tramway alignment, in particular the section of exposed easement running around the hill opposite the precipitate dam, should be avoided in any earth moving or bank stabilisation works. Works proceeding along the west side of Storeys Creek should be monitored in order to avoid unnecessary disturbance to any continuance of the tramway currently concealed by jig tailings.

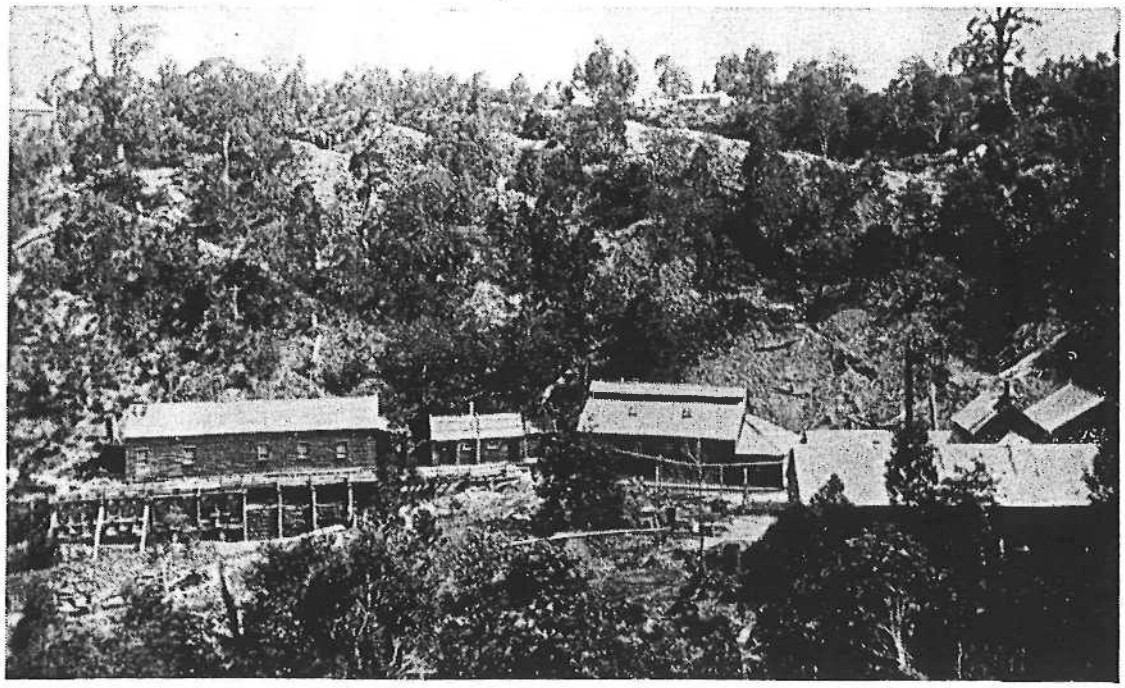
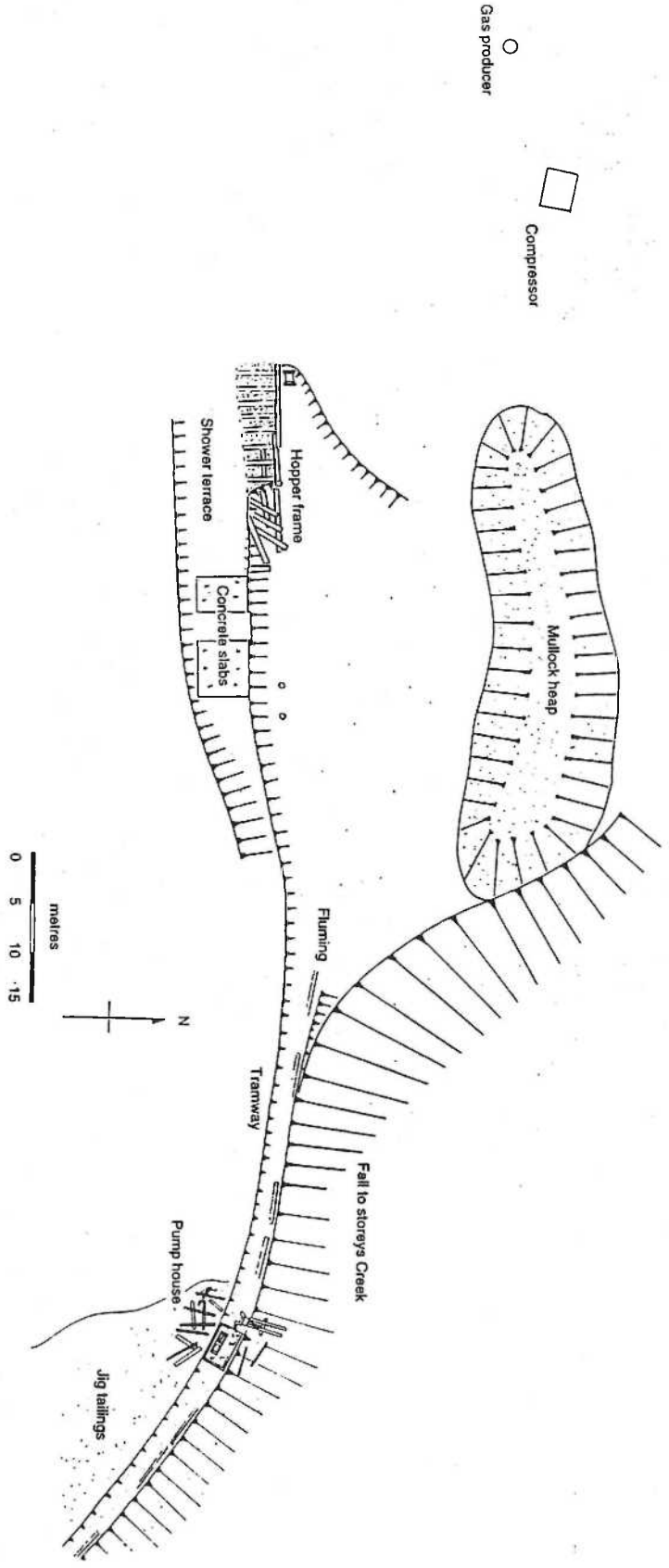


Plate 26: Buildings around north adit portal.



Plan.10: Shower terrace, hopper and tramway terminus, Northern workings.

4.2.2 Mill site

The remains of the ore processing complex for the mine, in operation between 1916 and 1959, and the nearby entrance to the southern workings is located on the steep western flank of the hill overlooking Storeys Creek 300 m southeast of the Northern workings area.

4.2.2.1 Features

Feature 1 Mill ruins

Ruins of a multi-terraced timber and corrugated iron building, measuring 16 by 20 m, extends down the face of the hill above Storeys Creek. Much of the structure is concealed beneath a thick blanket of coarse jig tailings. The underpass of an ore hopper, built of timber and mullock, and a concrete machinery footing sit at the head of the site. The edges of sections of timber floor and alignments of footings bolts protrude through the jig tailings on the terraces below. A single shaft and pulley assembly remain in situ in the centre of the ruined structure. A large quantity of discarded machinery items and scrap metal, some dating from the period of mill operation, lie scattered about the site.

Plate 27: Storeys Creek milling plant, in use from 1916 to 1958 (Kilner p 31).

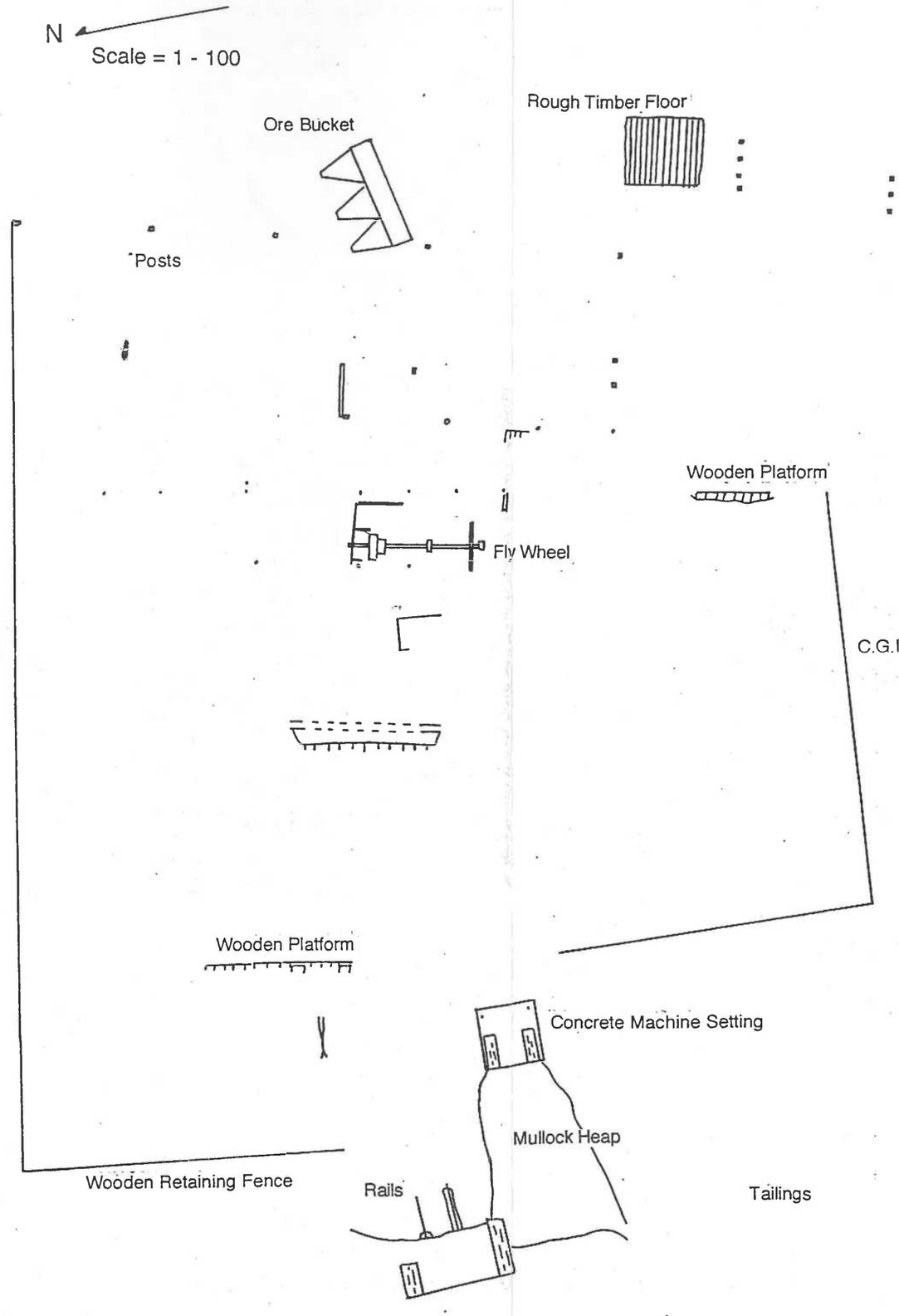
A water jacketed gas producer stands partially buried by tailings 15 m to the south. The vessel has an internal length of 2.9 m with a fire brick lined internal diameter of 0.7 m. The relic is suffering from exposure to the elements, but appears to be relatively substantially intact.

Several lengths of 4.5 inch steel water pipe can be traced descending the hill to terminate above a concrete water tank, 20 m west of the main building. According to an inscription cut into the rim when laid, the tank was constructed in 1938.

Significance

Constructed in 1916 and dismantled by 1959, the milling complex comprised a four terraced timber and corrugated iron crusher house and dressing shed with smaller outbuildings clustered about the main structure. The gas producer power plant for the complex was housed in a small building at a little distance on the south side of the site.

Plate 28: Gas producer, storeys Creek mill.



Plan. 11 & Plate 29: Archaeological site plan and photograph showing mill layout.

A short haulage for transporting concentrates ran between the gas producer and dressing shed on its way up the hill to the magnetic treatment plant. The haulage easement is concealed by jig tailings. Surface indications suggest that the terraces and machine footings at the mill building, although largely obscured by tailings, are largely intact.

The mill played a vital role in the economic operation of the mine. The abandoned mill site complex, both through its remaining structural integrity and the associated scatter of discarded ore processing equipment, arguably constitutes the most important interpretive focus at Storeys Creek mine.

Feature 2 Adit portal

Situated at a distance of 45 m southwest of the mill ruins is the entrance to a flat roofed adit 2.5 m wide at the base with a ceiling height of 2 m. The tunnel is timbered with heavy hardwood beams but the outer 8 m and portal have collapsed, leaving an exposed face 5 m high.

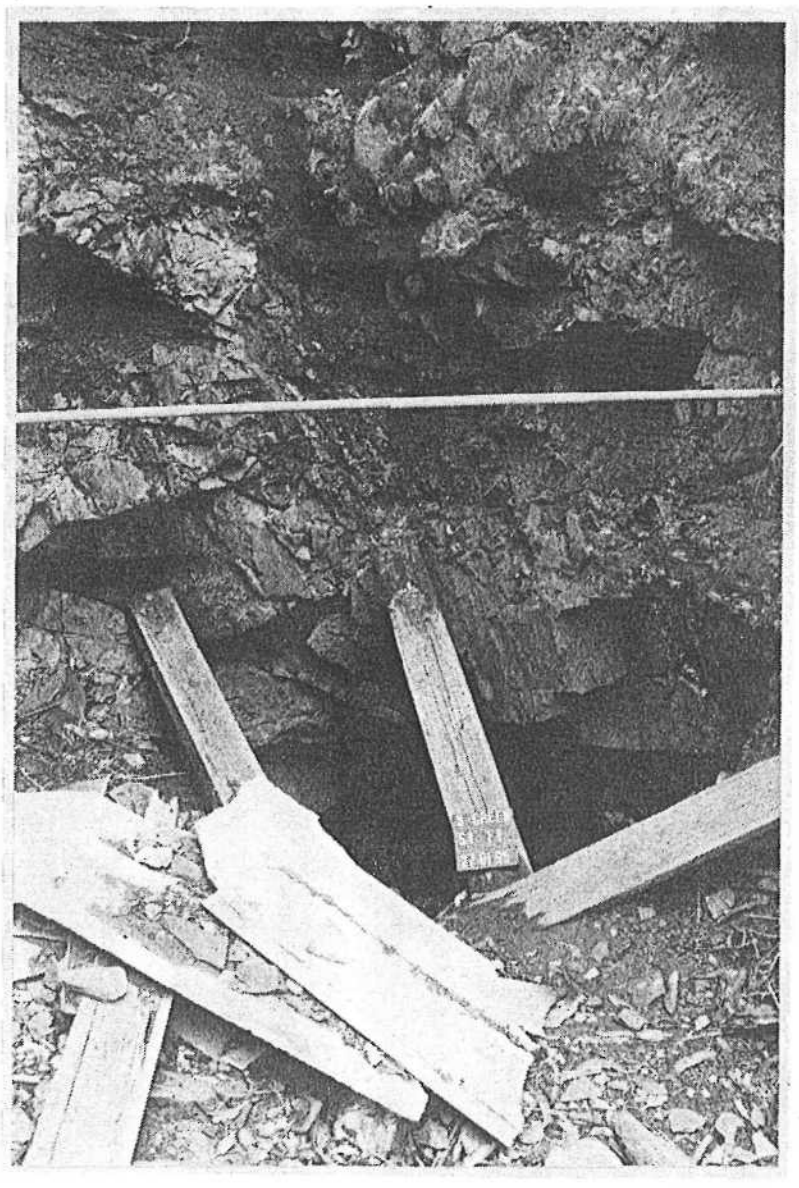


Plate 30: Collapsed portal to adit crosscut on Mier's drive.

Significance

The collapsed portal marks the point of egress onto the surface of the east crosscut from Mier's adit, which both Hills (1916, p 21) and Reid and Henderson (1929, p37) recommended be made but which was not put through until some time between 1930 and 1953 (Edwards 1953). The completion of the opening would have permitted access to the Nos. 1 and 2 lodes at the southern end of the workings. The adit is the only opening still reasonably accessible at the mine site; both the main adit portal to the north and Mier's adit in Side Creek having collapsed. A fourth opening (No 2 on Plan 7), 80 m north of the mill, lies concealed by coarse jig tailings and was not relocated.

Feature 3 Tramway

A spur of ore waste extends for several metres eastwards from the collapsed adit portal, and forms the corner embankment for a short mullock built tramway easement running from the portal 40 m towards the mill site. Crude dry stone walling faces several small sections of the narrow mullock embankment and the base of a "Jaques" rock breaker lies midway along the easement. An alignment of post heads protruding from the thick blanket of jig tailings at the north end of the embankment continues on for 15 m to the head of the mill terrace.

Plate 31: Mullock tramway linking adit to mill.

Significance

The short stone built tramway embankment appears to have been constructed some time between 1930 and 1953 in order to enable transportation of the ore from the then recently reopened southern workings to the mill (Edwards, 1953). The remains of a timber trestleway which carried the rail from the end of the easement to the head of the mill building lies buried beneath a thick accumulation of jig tailings. The tramway remains provide an important linking structural context to the sites of mineral extraction and processing on the hillside and a neat visual clue regarding the workings of the gully complex.

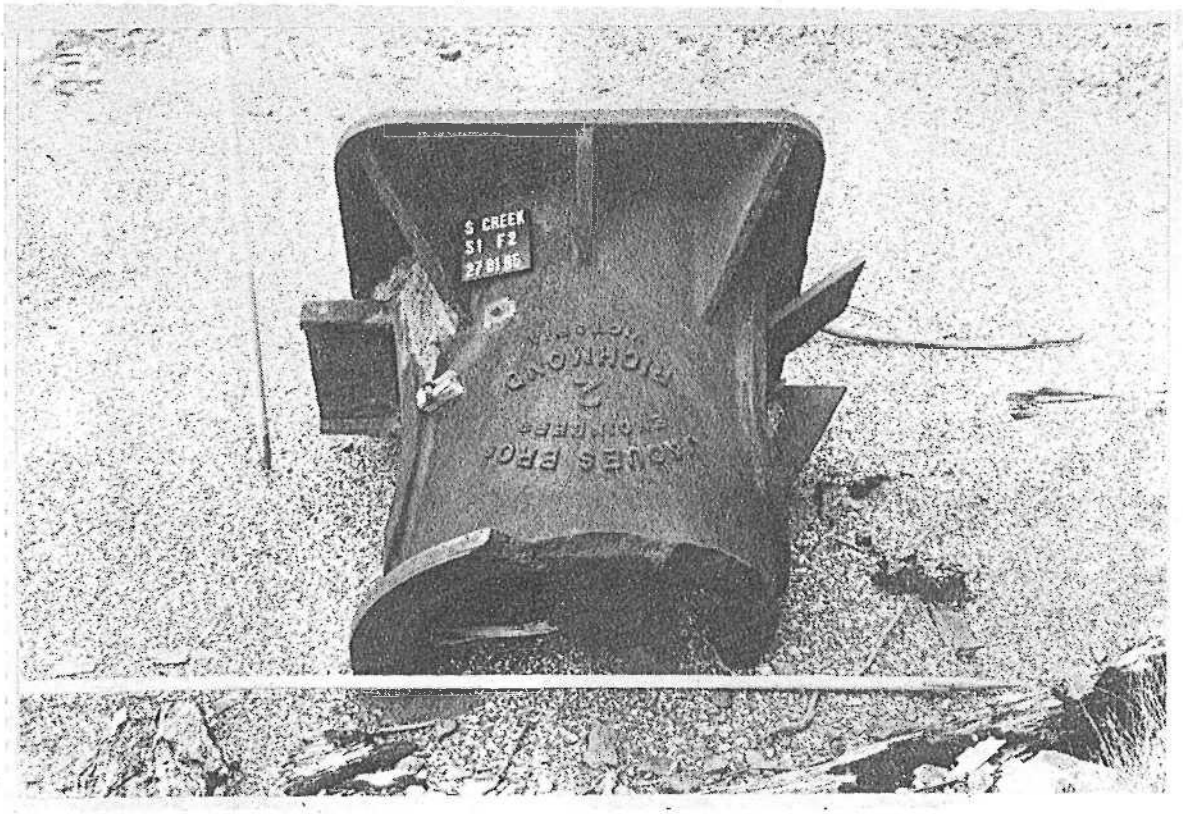


Plate 32: Rock breaker discarded along tramway easement.

4.2.2.2 Management Policy

Effect of proposed works

The adit portal and tramway lie outside the area proposed for rehabilitation and should not be effected by the works programme. The mill area is situated on the edge of the zone proposed to be modified through the creation of a creek perimeter drain designed to intercept surface and subsurface drainage from the tailings covered hillside.

Recommendation

The mill feature and associated tramway and adit are of considerable historic and archaeological significance. Disturbance to these areas should be avoided as a priority. A buffer zone of at least 10 m should be respected around each of the described features when undertaking creek bank reconstruction and installation of the proposed creek perimeter drain.

5.0 Conclusions

This report addresses only those areas of Aberfoyle and Storeys Creek mine sites which are subject to the rehabilitation proposals originally scheduled for the remaining five years to 2000 but since brought forward to be completed during 1995/1996. Assessment of areas not effected by the works programmes did not form part of this project and consequently was not attempted, regardless of the significance of the remaining areas. This document should not be regarded as constituting the results of an exhaustive inventory or archaeological survey of either mine site.

The remaining stages of environmental rehabilitation works as proposed appear unlikely to adversely effect the historically significant fabric of either Aberfoyle or Storeys Creek mine sites. The structures and features at the Rossarden site likely to be destroyed or subsumed as a result of the programme principally relate to the process of managing mill waste during the last 20 or so years of the mine's life. The only appreciably earlier structures identified, the tea tree reinforced #4 and #5 slimes dams, are already in so poor a state of preservation and constitute so large a proportion of the current environmental problems at the site that they represent more of a health hazard for the future than a heritage asset. Any movable items of mining material culture, including the bucket conveyor or other relics unearthed during site remodelling, which are deemed to have heritage and interpretive value may be relocated as required away from the areas to be disturbed without the significance of the site or objects being unduly compromised.

The head frame site at the northern end of the Aberfoyle mine area is an appropriate site for conservation and suitable for interpretation provided that matters of public safety are addressed.

The ability to objectively ascribe significance to most site features identified at the Aberfoyle site has been limited through want of detailed historical plans and information regarding the former configuration and history of use of those features. Much of the significance of individual items therefore have to be based on generalisations and assumptions as to their age and role in the mining process.

Sites of historical and archaeological significance which were recorded at the Storeys Creek mine lie on the perimeter of the areas currently zoned for disturbance and remodelling. These sites have a high heritage value and have considerable potential for interpretation. This potential should become clearer as future planned work, such as excavation of the compressor site, is undertaken. In the meantime, the greatest care should be exercised during the rehabilitation works to avoid disturbance to the sites described. A buffer zone of at least 10 m should be respected around the historic features as a minimum protective measure.

5.1 Discussion of Cultural Significance

Due to the constrained frame of reference for the project, which specified only a partial survey of the Aberfoyle and storeys Creek mine sites, it has not been possible to formulate a comprehensive statement of site significance. Such a statement must await the completion of a more thorough sites assessment than has been possible during this survey. In its stead, a brief discussion of some of the factors to be considered in the creation of a formal statement of significance is presented.

Both the Burra Charter of Australia ICOMOS (19--) and the Australian Heritage Commission Act (1974), indicate that sites of cultural heritage significance consist of those places, being components of the cultural environment of Australia, that have aesthetic, historic, scientific or social significance or other special value for future generations as well as for the present community.

5.1.1 Aberfoyle Mine Rossarden

Mining of the tin deposits at Rossarden commenced as early as 1916. The major operator at the site, Aberfoyle Tin N. L. was formed in 1926 and did not cease production until 1982, a total of 56 years of continuous operation. For much this period the Aberfoyle mine was the State's largest annual tin producer and was regarded as one of the larger tin mines in the world. The Aberfoyle mining complex is of considerable historical significance.

The township of Rossarden was formed to service the Aberfoyle tin mine and several generations of its residents spent their working lives in the shafts and mill at the site. The mine provided the economic *raison d'etre* for the isolated community, and for the residents of the township a common endeavour and sense of cohesion. Despite the closure of the mine many residents have stayed on at the town. The Aberfoyle mine is considered to have social significance at the regional level.

In the years following the end of mining activity at the Aberfoyle mine the majority of structures at the site have been removed or destroyed. Within the survey area only a head frame with some associated concrete slabs and machinery footings remain to reflect the many industrial operations which once took place at the mine site. The mill was demolished several years ago and today little apart from the loading ramp and several concrete footings remains to demonstrate the process by which the tin and tungsten was extracted. The vast majority of the *in-situ* archaeological features at Aberfoyle relate to the treatment of the waste products which resulted from the mining and processing of the ore.

The slimes dams, tailings and mullock heaps at Aberfoyle illustrate the final stages of ore processing and waste disposal and are able to provide information principally about the technology applied in their construction and the nature of the process of waste dispersal around the site. The heritage value of these sites is offset their inherent structural instability and toxicity.

Although the relatively intact head-frame is of some significance the Aberfoyle site as a whole is considered to have little archaeological integrity and is therefore deemed to be of marginal heritage value and significance.

It is difficult to argue that the Aberfoyle site currently has any great aesthetic significance, it is a landscape in the throws of death. Nothing grows in those areas where the slimes and tailings were dumped during the years of mining and wind borne silts have since blanketed much of the surrounding area. Upon this veneer of sterile and toxic earth lies a vast assortment of cultural items, consisting in the main of mining equipment which has been broken up to the stage where the parts can no longer be identified, structural rubble including concrete and sheets of galvanised iron, and in places a large quantity of domestic garbage. Visitors to the site today have their visual perception of a wasteland enhanced by the acrid smell of decomposing sulphides.

5.1.2 Storeys Creek Mine

Mining at Storeys Creek had commenced by 1880 and continued intermittently for the next century. During the years of operation the mine developed into the State's largest producer of wolfram as well as being a significant producer of tin, making a sizeable contribution to the economic wealth of the region. The mine is of historical significance at the regional level.

From at least 1916 to 1979 the mine supported the small township of Storeys creek, providing relative economic stability for the close nit community which was made up both of long time residents and itinerant miners and their families. The size of the residential population has dwindled markedly since mine closure and only a few houses remain occupied in contrast to Rossarden where a substantial number of people have chosen to stay on. Nonetheless the site continues to fulfil a valuable recreational and educational role within the wider regional community, being visited on a regular basis by local school parties and other groups. The site has social significance at the local to regional level.

The most visually striking elements of the mine area are the extensive deposits of oxidised coarse tailings which cover the ridge and blanket the steep slope on the west side of Storeys Creek, and which present a stark contrast to the imposing blue backdrop of Ben Lomond. The waste both conceals and highlights a number of historic features which are easily recognisable and provide a neat visual clue to aspects of the working history of the mine. The site has definite aesthetic appeal, arguably at the local level of significance. Despite their benign appearance however the eroding tailings at the site have been identified as a significant source of heavy metal pollution.

The archaeological features recorded during the survey illustrate various important facets of the mining process. Ore extraction is represented by the compressor and adit portal, the processes of ore handling and transportation by the hopper frame and tramways, and the separation of the wolfram and tin from the gangue by the mill site. The structural integrity of many of these features is surprisingly high and consequently the site is considered to be of regional archaeological significance.

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7.0 Acknowledgments

This report was prepared by Back-Tracks Heritage Consultants under commission from the Industry Safety and Mines Division of Tasmania Development and Resources.

Aberfoyle and Storeys Creek mine site histories were researched and prepared by consultant historian Kathryn Evans.

Back-Tracks Heritage Consultants thanks the following individuals for their assistance during the site survey phase:
Christine Bingham
David Leighton
Charles Parkinson

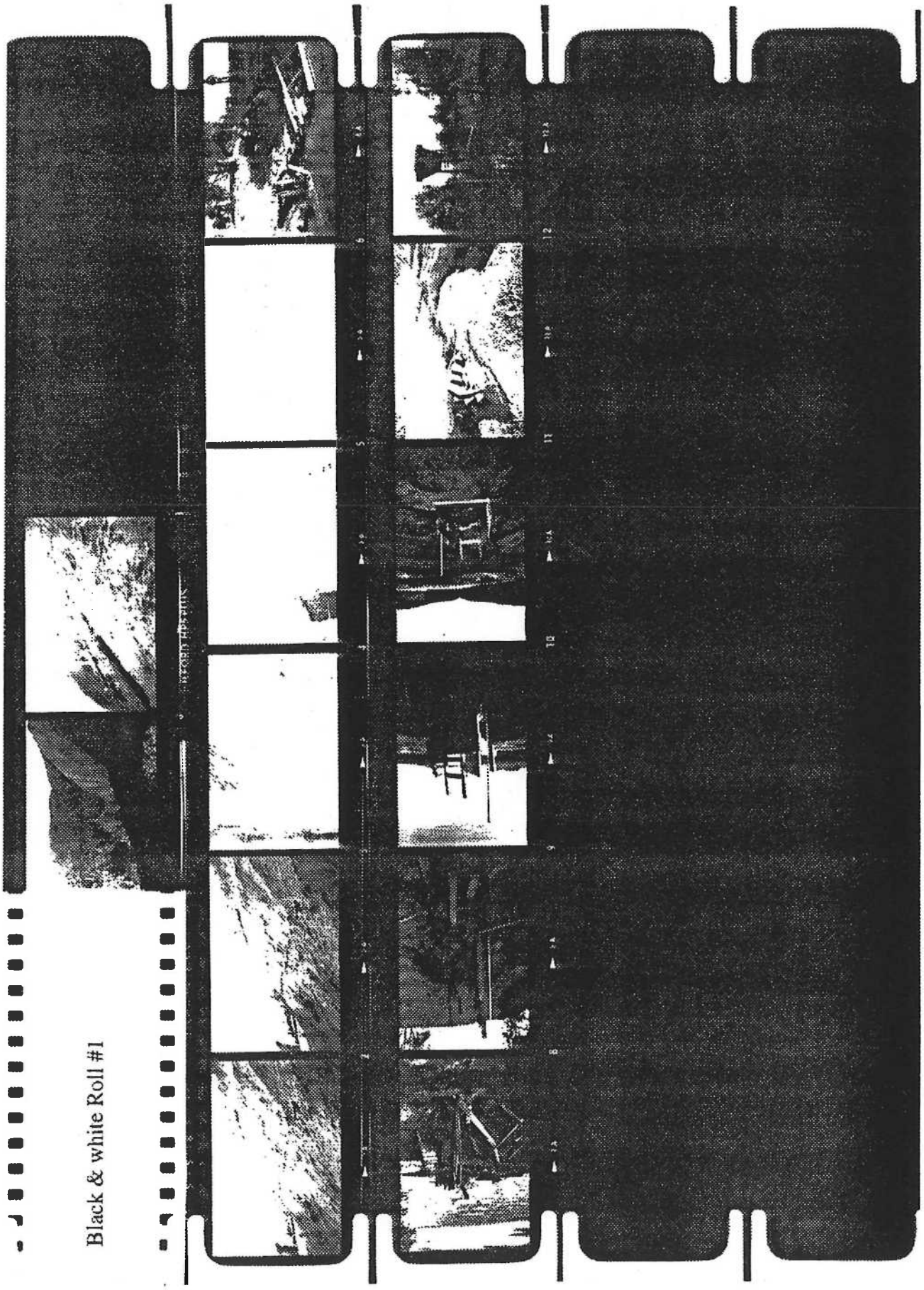
Helpful comments on the draft report were provided by Susan Lawrence Cheney, Flinders University of South Australia.

8.0 Appendices

8.1 Appendix 1: Site photographs

8.1.1 Black and white print Roll # 1

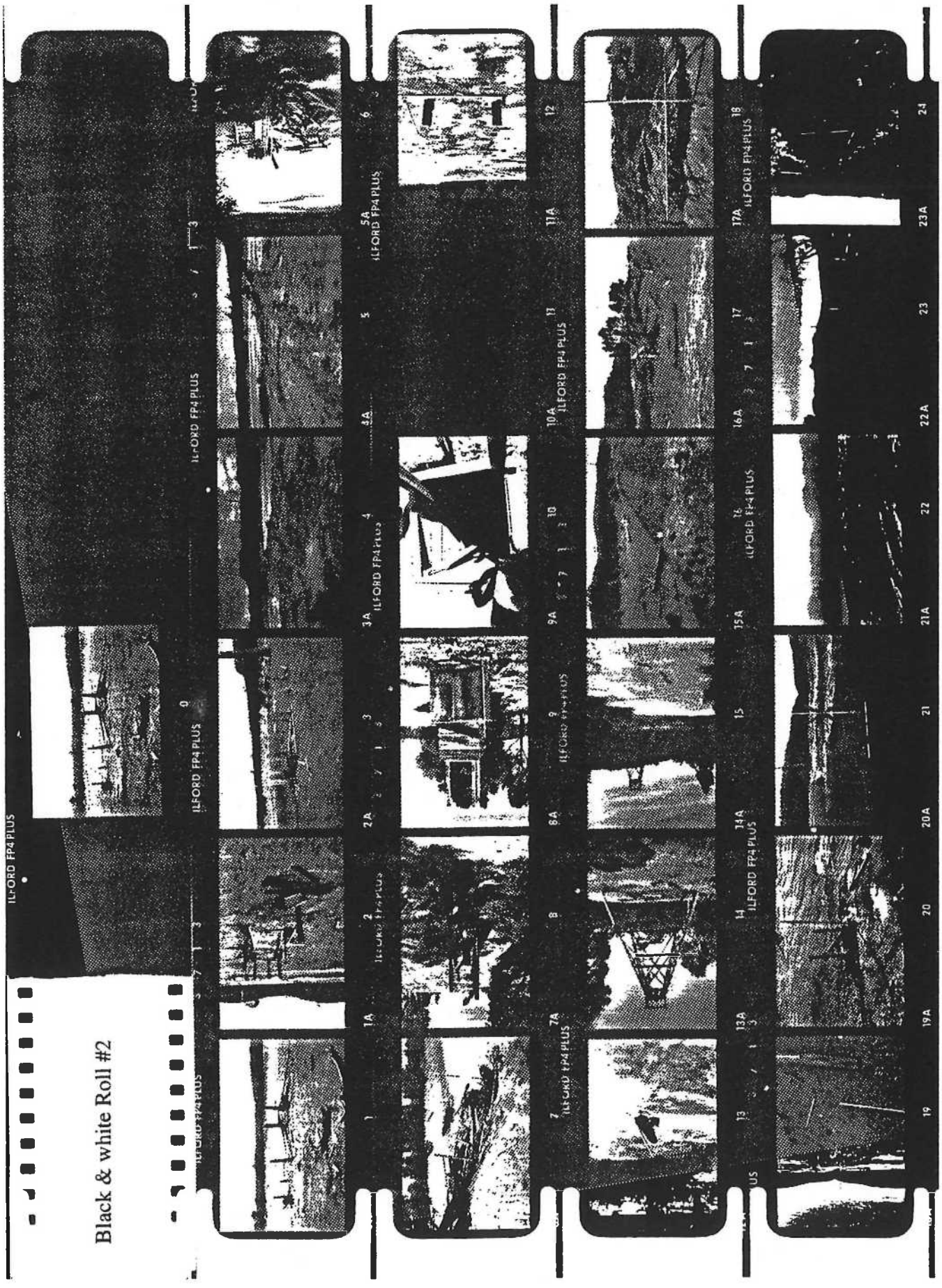
Exp. #	Description
0	General view of coarse tailings dump from dam # 4, Aberfoyle mine
1	Tea tree matting in dam # 4 bund, Aberfoyle mine
2	Tea tree matting in dam # 4 bund, Aberfoyle mine
3	Tea tree matting in dam # 4 bund, Aberfoyle mine
4	Tea tree matting across deflating crest of # 4 bund, Aberfoyle mine
5	Tea tree matting across deflating crest of # 4 bund, Aberfoyle mine
6	Dam #6, Feature 2, collapsed walkway and silt trap, Aberfoyle mine
7	Dam #6, Feature 2, collapsed walkway and silt trap, Aberfoyle mine
8	Dam #6, Feature 2, collapsed walkway and silt trap, Aberfoyle mine
9	Dam #1, Feature 1, buried silt trap, Aberfoyle mine
10	Dam #5, Feature 9, Silt trap at edge of deflating tea tree bund
11	Dam #5, Feature 9, Silt trap at edge of deflating tea tree bund
12	Dam #4, Feature 1, partially buried bucket conveyor segment
13	"Home made" sorter, Mill area, Aberfoyle mine



Black & white Roll #1

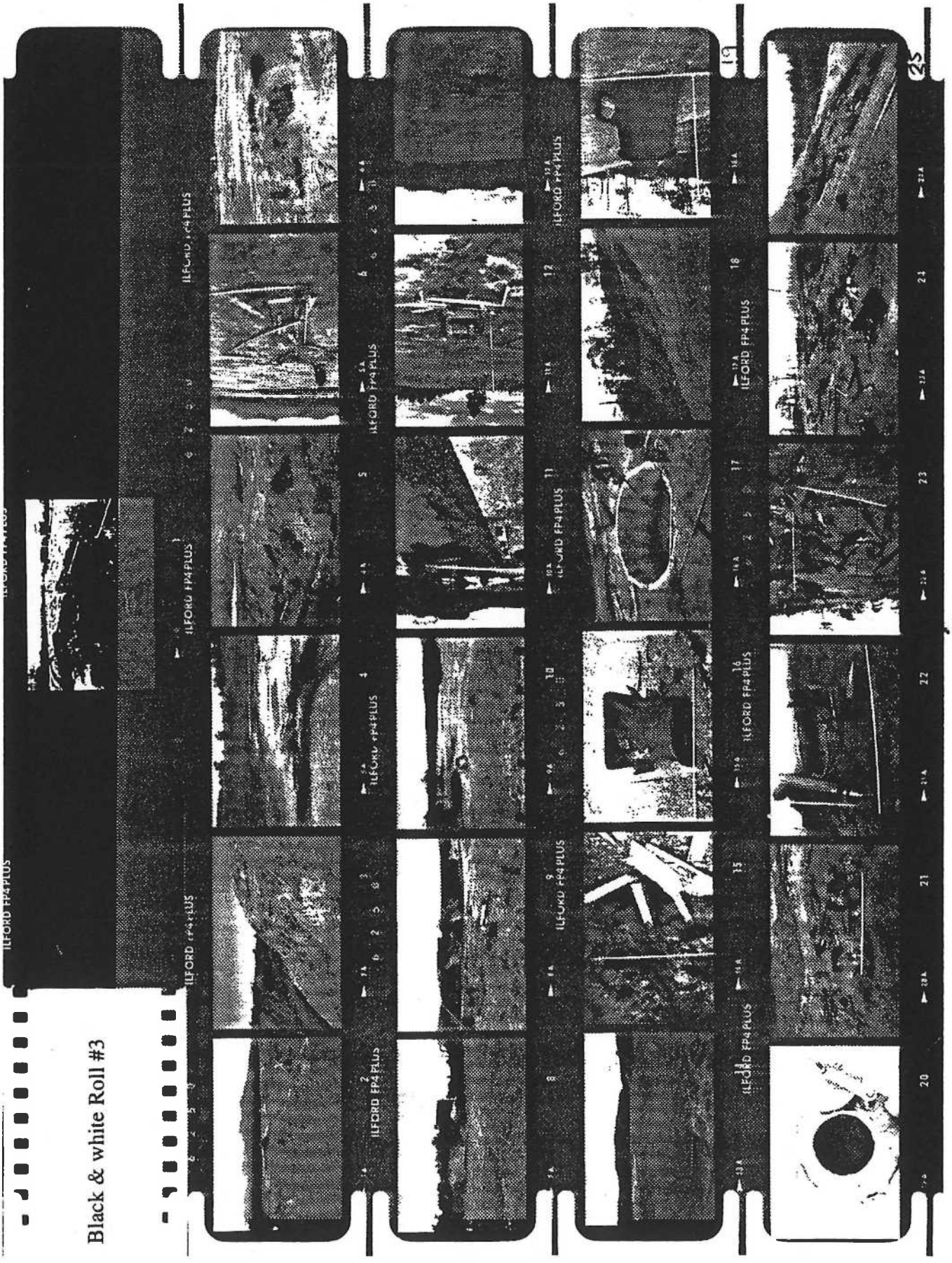
8.1.2 Black and white print Roll # 2

Exp. #	Description
0	Dam #2, Feature 1, timbered fluid outlet and silt trap, Aberfoyle
1	Dam #2, Feature 1, timbered fluid outlet and silt trap, Aberfoyle
2	Dam #2, Feature 1, timbered fluid outlet and silt trap, Aberfoyle
3	Dam #2, Feature 1, timbered fluid outlet and silt trap, Aberfoyle
4	Dam #6, Feature 1, steel overflow pipes set across clay bund
5	Dam #6, Feature 1, steel overflow pipes set across clay bund
6	Dam #6, Feature 2, collapsed silt trap and walkway, Aberfoyle mine
7	Dam #6, Feature 2, collapsed silt trap and walkway, Aberfoyle mine
8	Dam #1, Feature 1, buried silt trap adjacent to dam #6 clay bund
9	Concrete base of silt trap, track opposite dam # 1, Aberfoyle mine
10	View inside timbered concrete column, silt trap opposite dam #1
11	
12	Dam #6, Feature 3, buried launder trestles, Aberfoyle mine
13	Dam #8, feature 1, steel overflow pipe, Aberfoyle mine
14	Steel headframe, north end of Aberfoyle mine site
15	View toward headframe, Aberfoyle mine site
16	Dam #2, Feature 2, steel overflow pipe set in west side clay bund
17	Dam #5, Feature 1, collapsed and buried silt trap in reinforced bund
18	Dam #5, tea tree reinforcing in deflated north bund section
19	Dam #5, Feature 3, gravel track across slimes area, Abefoyle mine
20	Dam #5, Feature 5, partially buried silt trap, Aberfoyle mine
21	Dam #5, Feature 4, hardwood launder trestle, Aberfoyle mine
22	Dam #5, Feature 6, alignment of launder posts, Aberfoyle mine
23	Dam #5, Feature 8, timber and concrete fence post alignment
24	Tea tree reinforcing in deflating south side of dam #5 bund


Black & white Roll #2
ILFORD FP4 PLUS

8.1.3 Black and white print Roll # 3

Exp. #	Description
1	Tea tree matting in deflating south side of dam # 5, Aberfoyle mine
2	Dam #4, Feature 4, arrangement of miscellaneous launder trestles
3	Tea tree reinforcing in south face of slimes dam #4 bund
4	Dam #4, Feature 2, silt trap and boardwalk, Aberfoyle mine
5	Dam #4, Feature 1, partially buried bucket conveyor segment
6	Dam #4, Feature 3, planking section from collapsed walkover
7	Dam #4, Feature 1, partially buried bucket conveyor segment
8	Remains of ore loading structure, Mill area, Aberfoyle mine
9	Remains of ore loading structure, Mill area, Aberfoyle mine
10	View of Mill area from ore loading structure, Aberfoyle mine
11	View of mullock-built access ramp onto loading bay, Aberfoyle
12	Dam #9, Feature 1, partially buried silt trap and overflow, Aberfoyle
13	Dam #9, Feature 3, alignment of collapsed launder trestles
14	General view of dam # 5 area from crest of dam #9 bund, Aberfoyle
15	Mill adit portal, Feature 2 southern workings, Storeys Creek
16	"Jaques "rock breaker, Feature 3 southern tramway, Storeys Creek
17	Concrete cistern above mill ruins, Feature 1 southern workings area
18	Mullock tramway embankment, Feature 3 southern Storeys Creek
19	Buried gas producer, mill site, Feature 1 southern area Storeys Creek
20	View inside gas producer, Storeys Creek mill site
21	Remains of mill, Feature 1 southern workings area Storeys Creek
22	Hopper unloading bay, mill site, Feature 1 southern workings area
23	Industrial artefact scatter, Mill site, southern workings area
24	Industrial artefact scatter, Mill site, southern workings area
25	Remains of mill, Feature 1 southern workings area Storeys Creek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8.2 Appendix 2: Project Brief

ARCHAEOLOGICAL SURVEY: ROSSARDEN/STOREY'S CREEK

PROJECT BRIEF: SIX YEAR REHABILITATION PLAN

INTRODUCTION

A plan has been prepared outlining a series of rehabilitation projects which will be undertaken over the next 5 years of so by Mineral Resources Tasmania in the Rossarden/Storeys Creek area.

STOREYS CREEK MINE

Mining of tin and wolfram commenced at Storeys Creek in 1895, and continued until 1982. A processing plant was in operation at this site from circa 1960 to December 1971 when the plant closed and ore was carted by road for treatment at Rossarden.

Tailings were initially discharged into Storeys Creek, then later piled in dumps on the banks of Storeys Creek.

ABERFOYLE MINE, ROSSARDEN

Extraction from a tin and wolfram ore body near Rossarden began in 1931. The workings were called the Aberfoyle Mine. The ore was treated in a mill on site. Tailings were dumped around the mill building during the early years of the Mine's operation. Eventually tailings ponds were constructed and these can be seen at the site covering an area of many hectares.

ENVIRONMENTAL CONCERNS

There are a number of environmental concerns at each of these sites, including:

- water quality;
- sediment escape from sites;
- dust; and
- visual amenity.

As a result of this Mineral Resources Tasmania has commissioned a Rehabilitation Plan for both sites. The plan prioritises works at both Rossarden and Storeys Creek to be undertaken over a five year period.

Prior to the implementation of the plan, Mineral Resources Tasmania wishes to have a brief archaeological inspection made of the sites to be rehabilitated. Last year's work was subject to a brief survey by Ms Gaughwin. This year's work will be preceded by a survey by Back Tracks. This work is in fact described in year one of the Rehabilitation Plan.

STUDY AREA

The areas to be viewed comprise the areas of the former Storeys Creek Mine and the Aberfoyle Mine Rossarden as outlined in the Rehabilitation Plan.

SKILL

The skills for this study are intended to be drawn from a planning discipline in the industrial heritage conservation field.

DOCUMENTATION

The consultant will provide 2 copies of a brief report prepared following a field inspection.

RELEVANT STANDARDS

The study shall conform to the process embodied in the Australian ICOMOS Burra Charter (1992).

OBJECTIVES

The consultant will carry out the following:

(i) examine the rehabilitation plan and the areas on which work (other than the year one work) is to be done; and

(ii) comment on the impact (if any) the plan as written will have on the heritage values of the site; and

(iii) suggest ways in which such impacts (if any) may be ameliorated; and

(iv) undertake the level of recording required for each site.

LIAISON

The project will be supervised by Ms C Bacon, Mineral Resources Tasmania [telephone (002) 33 8326, fax (002) 33 8338]. Matters relating to safety should be referred to Mr T Christianson, Chief Inspector of Mines [telephone (002) 33 8356].