

Case Study

Geofabrics

Project: Shamrock Gold Mine, QLD – Flue Dust Cell Lining
 Year: 2001
 Client: D'Aguilar Gold
 Consultant: Tennant, Isokangas & Earthtech
 Contractor: D'Aguilar Gold

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The rehabilitation of a mine site is becoming an increasingly important phase of the lifecycle of a mine.

The end use of a mine is carefully planned and programmed by mine operators to maximise the health and amenity of the surrounding environment. Rehabilitation and decontamination of a mine site may also be required to enable a mine to become operational again.

At the D'Aguilar Gold Shamrock Mine site, construction of a containment cell was required to safely store contaminated rock and flue dust material, preventing migration of contaminants into the groundwater table.

ELCOSEAL[®] X1000 was chosen as the lining system of the cell due to simplicity of installation, and improved hydraulic and mechanical performance, compared to traditional lining systems. This consisted of a base liner and cell cap.



In order to recover precious metals from the flue dust material, an above-liner collection system was specified using a **Megaflo[®]** Flat Panel collection system.

Megaflo[®] was also used in the under-liner groundwater drainage and monitoring system. The leachate is collected in two separate wells and pumped to the head of the processing plant for re-treatment.

The construction of the cell commenced with construction of a clay core on the downstream wall adjacent to the nearby tailings dam.

Following installation of the drainage/collection systems and the **ELCOSEAL[®]** GCL base liner, the cell was divided into 'sub' cells. The 'sub' cells were created using the contaminated waste rock as internal partitions. These 'sub' cells were used to store the flue dust material and to form the leachate dam.



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SHAMROCK GOLD MINE, FLUE DUST CELL

CONSULTANTS: Tennant, Isokangas & Earthtech

CLIENT: D'Aguilar Gold

CONTRACTOR: D'Aguilar Gold

PRODUCTS USED: ELCOSEAL X1000

Megaflo 150

Megaflo 450

INTRODUCTION

The rehabilitation of a mine site is becoming an increasingly important phase of the lifecycle of a mine. The end use of a mine is carefully planned and programmed by mine operators to maximise the health and amenity of the surrounding environment.

Also, rehabilitation and decontamination of a mine site may be required to enable a mine to become operational again.

At the D'Aguiar Gold Shamrock Mine site, shown in Figure 1, construction of a containment cell was carried out to safely store contaminated rock and flue dust material.



Figure 1 – Location of Site

THE MATERIAL

In the past, part of the Shamrock Mine site has been used as a repository for flue dust material from Mt Morgan gold and copper mine and Le Panto mine in the Philippines.

This consisted of 10,000 tonnes of flue dust from Mt Morgan, 3,000 tonnes of material from Le Panto and about 17,000 tonnes of rock contaminated as a result of flue dust spread around the site. This contaminated material covered an area of about 3 ha and contained metals such as arsenic, bismuth, chromium, manganese, gold, copper, silver, iron and other metals.

THE CELL

The location of the cell on the site is shown in Figure 2.



Figure 2 – Location of Flue Dust Cell

The lining system of the cell was designed using ELCOSEAL X1000 - see Figure 3. This consisted of a base liner and cell cap. A detailed drainage system was originally specified with a mineral drainage layer and circular pipe collection system. Drainage and collection of potential leachate was required both above and below the base liner. The leachate will be collected in two separate wells and pumped to the head of the processing plant for re-treatment.

Prior to construction, the circular pipe collection system was replaced with Megaflo sub-soil drainage panels laid horizontally. Under the liner, Megaflo 450 was laid in two lines with Megaflo 150 branches entering from either side. The collection system above the liner consisted of a single longitudinal drain of Megaflo 150 with Megaflo 150 branches.

The crush strength and ease of installation of Megaflo were the main reasons it was chosen over the circular pipe.

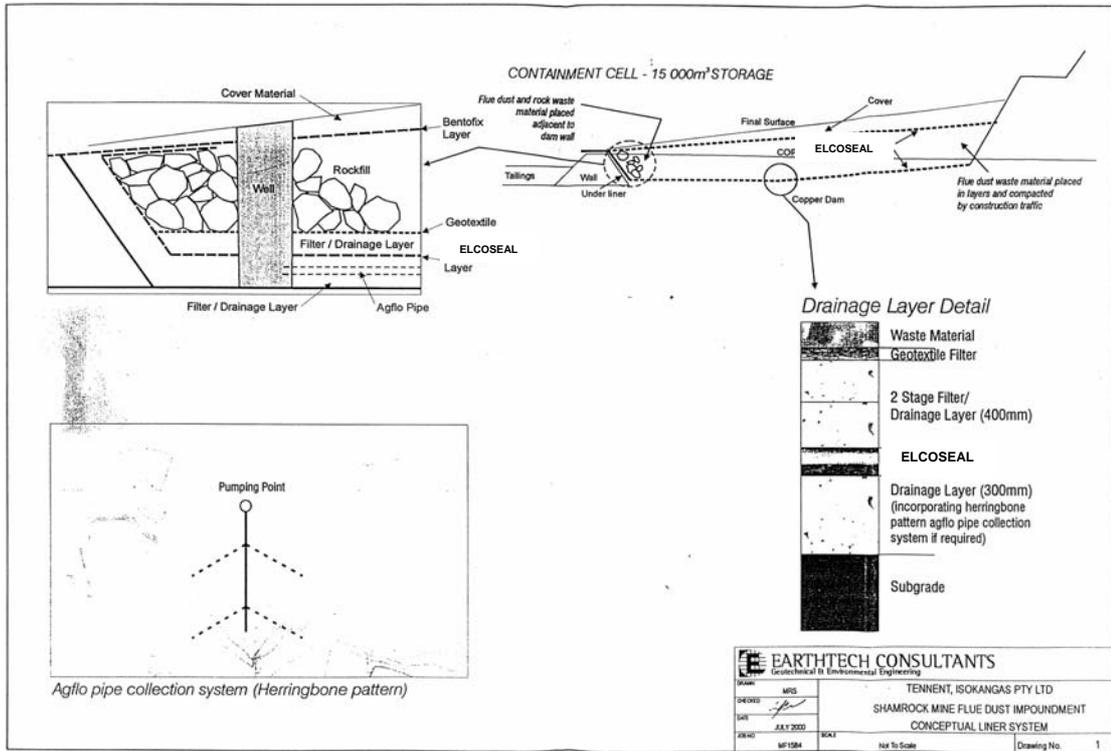


Figure 3 – Liner & Drainage System Layout

CONSTRUCTION OF THE CELL

The construction of the cell commenced with construction of a clay core on the downstream wall adjacent to the nearby tailings dam.

Following installation of the drainage/collection systems and the base liner – see Photos 1,2 & 3, the cell was divided into ‘sub’ cells. The ‘sub’ cells were created using the contaminated waste rock as internal partitions – see Photo 4. These ‘sub’ cells were used to store the flue dust from Mt Morgan and Le Panto and to form the leachate dam – see Photo 5.

After the cells were filled, the top of the cell was levelled at about a 1:14 slope. The ELCOSEAL capping layer was then installed and covered with a 200mm topsoil layer – see Photo 6.

Recently, the leachate dam was lined with ELCOSEAL X1000 to complete construction of the containment cell.

TOTAL QUANTITIES

Over the 11 month duration of this project, the quantities of each product taken were:

ELCOSEAL X1000 -	12,000m ²
Megaflo 450 -	150m
Megaflo 150 -	300m

along with various fittings and ancillary products.

CONCLUSIONS

Recent monitoring of heavy metal contamination in the original flue dust area shows levels less than acceptable limits.

These results have given the community and environmental regulators confidence in the capability of the project joint venturers, Maxe-tec and Western Pacific Gold Inc. A major exploration programme will commence in the Kilkivan area in early 2002.



Photo 1 – Installation of ELCOSEAL GCL on the upstream tailings dam face



Photo 2 – Placement of cushioning material on GCL



Photo 3 – Installation of Megaflo over-drainage on GCL



Photo 4 – Placement of waste rock & cover material



Photo 5 – Filling of containment cell



Photo 6 – Completed cell with leachate dam on RHS