

Mining and vineyards coexisting at Glencore's Beltana mine

GLENCORE

When exploration licences were applied for in the Bulga area in the 1990's local residents were concerned mining would damage the 40 vineyards included in the exploration area. With extensive community participation, groundbreaking research, good planning and monitoring, the Beltana Mine No 1 (Beltana) was developed in the area, with only minimal impacts on the vineyards which continue to operate above the mine.

About Beltana

Beltana No 1 Mine (Beltana) was approved in 2004. The underground mine at Bulga currently employs 300 people and has approval to mine until 2031. The mine contributes significantly, both directly and indirectly to the local economy, the economy of the broader Hunter Valley and to the NSW economy.

Beltana is situated near the villages of Broke and Bulga in the Hunter Valley. The area has a population of approximately 1000 people and mining coexists with winemaking and tourism, beef and dairy production, olive and orange growing in the area.

Exploration, trials and consultation

Aware of the community and landholder concerns, the company began a program of community consultation during the exploration phase, setting up an exploration Community Liaison Committee to act as a conduit between the company and the community. Underground mining at nearby South Bulga provided useful information and experience on the impacts of mine subsidence on features including public infrastructure, the ground surface and ground water.



Engaging with landholders

1998 trellis trial

In order to investigate the community's concerns about the impacts of undermining the vineyards, a unique experiment was undertaken, developing a vineyard trellis and irrigation system over the South Bulga mine.

The experiment was carried out in consultation with local vignerons. Open days with the community were held to show the results of the trials, including:

- Little effect on the drip line
- Foliage wires decreased in tension
- Little or no effect on end assemblies
- No wires breaks
- No damage to irrigation, PVC and polypipe
- A maximum movement on the trellis post of 147 mm.

Landholder and community engagement

Engagement with the local community, landholders, and government, prior to work beginning on the environment assessment gave Glencore a good understanding of the potential impacts. Glencore held over 100 individual meetings during the preparation of the environmental assessment, prepared individual property impact assessment booklets, as well as more general fact sheets and brochures and held field days. The process assisted both Glencore and landholders through the sharing of information and by raising issues at an early stage in the development process.

Environmental Assessment

There was no precedent for mining under vineyards in Australia and no known precedent elsewhere. The 1998 trellis trials provided practical experience of impacts on vineyard improvements. Glencore engaged Dr Richard Smart, an international viticulture expert to carry out the assessment of impacts on viticulture.

Dr Smart found that the impacts of undermining would be minimal and manageable: cracking due to subsidence would be limited mainly to surface cracking similar to what naturally occurs with soil swelling and shrinkage; minimal but easily repairable impacts on trellises; no impact on irrigation systems; no increased potential for frost impact; and no significant increase in ponding of water. Dr Smart developed a monitoring program to assess the impacts and assist in adapting management and assessing compensation for any loss resulting.

Management and monitoring

Management plans were developed for each property. The plans identified strategies to manage the potential impacts, pre, during and post mining. Management strategies for each property were refined through many hours of consultation with property owners. Development of the management plans included identification of the possible losses that might occur, how these would be quantified and a mechanism to appoint an independent consultant to decide compensation.

A Technical Review Committee, whose members included affected vignerons, academics, relevant government agencies and consultants were given responsibility to review the monitoring program and the results, and provide refinement to the monitoring program. The University of New England came on board to carry out the monitoring program in 2003.

The monitoring program was refined and added to over the years and include -

- A set of monitoring of vines located transversely across the mining area, subjected to a full range of subsidence impacts
- The capture of Quickbird satellite imagery to identify vine vigour across all vineyards. This also allowed a comparison against the monitoring results obtained for the target vines.
- The use of a yield monitor and GPS to produce detailed yield maps of the vineyards to detect variations.
- Monitoring soil characteristics using a GPS mounted electromagnetic soil survey equipment.
- The installation of soil moisture probes.
- Point sampling of over one thousand vines to obtain Brix (sugar content) and pH mapping of vineyards to assist with detecting variations in quality.
- Measurements of trellis tension during and after mining using tensiometers to assess the impacts of subsidence on trellis wires.
- Differential GPS topography surveys of the surface to quantify the level of subsidence and assist with identifying potential surface drainage issues.
- Assessments of the flow rates and physical condition of the vineyard irrigation systems.
- Physical inspections of the vineyards prior to, during and after mining to assess the level of surface cracking and physical impact on the vineyards.



Assessing the results

Results

The results of the monitoring are presented annually to the Technical Review Committee. The monitoring has shown:

- Some minor surface cracking
- Very occasional sinkholes
- Minor trellis and irrigation damage
- No obvious impacts on health of the vines, including no dead vines as a result of subsidence and only one observed occurrence of a wilting vines due to subsidence
- Three vignerons have received compensation for reduced yields (but not impact on fruit quality). The vineyard with the most substantial claim produced a record yield the following year.



Conclusion

There have been seven vintages since the first vineyard was undermined by Beltana in 2005. There have been only minor short term impacts, which were able to be remediated or compensated, but no long term impacts on the vineyards.

The next vineyards will be undermined in 2017 and until that time Beltana is continuing to monitor the vineyards in consultation with the vignerons with the assistance of viticultural and soil moisture experts.

With careful planning, the early involvement of vignerons, a comprehensive management and monitoring program, it is possible to design a mine to mine under vineyards, with only limited, short term impacts

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