3.2 Air Quality

3.2.1 Construction

The EIS identified annoyance dust as a manageable impact associated with the construction phase of the project. Impacts from dust are a common potential issue associated with major earthworks projects. The impact from dust from such projects is normally that of an annoyance rather than health issue. Control is normally associated with maintaining adequate moisture levels with water trucks. As a guideline, if dust is visible, then the normal criteria are being exceeded, and this is the prompt for foremen to arrange for more watering. This method of control is normally adequate, however during periods of high wind (summer) and/or dry conditions (winter), water trucks may not be able to maintain adequate soil moisture. At these times options include shutting-down work areas, or using chemical binders.

The significant earthworks component on this project associated with cut-to-fill operations meant that the potential for dust impacts was high. It was tempered by sensitive receivers being distant from the alignment for much of its length, however significant earthworks were performed immediately south-east of Billinudgel, the direction of the prevailing wind.

Dust control methods included:

- site inductions;
- water carts, using water from sediment basins for dust suppression;
- stopping work during high winds;
- regular use of street-sweepers;
- filters on batch plant;
- checklists;
- prompt stabilisation of access roads and working areas;
- progressive revegetation;
- requirement that all trucks be covered;
- long-term stockpiles stabilised with vegetation or chemical binders;
- dust monitoring at 12 locations, with several added voluntarily to monitor sensitive locations;
- rumble grids to limit tracking of dirt onto roads; and
- no burning

A combination of dry windy conditions, and intense movements of soil created issues for the project in the earlier stages, particularly in the section immediately south of Billinudgel. The issue was managed with extra water carts, voluntarily shutting-down work areas until the weather conditions eased, and applying base-courses with a high percentage of coarse gravel, as soon as possible.

In all there were 48 complaints regarding dust from 23 complainants over the life of the project. Thirteen of these were one-off, and presumably, addressed through the use of water carts. In some cases complaints were not related specifically to the project but to other developments. Secondary impacts included street-sweeping using water to assist with extracting the clay fines from the pavement. The incomplete removal of fines, and the consequent wet surface created a mud hazard/impact.

Sanctum, a manufacturer of skin-care products in Billinudgel, was recognised as a particularly sensitive location. Prior to construction in the area, Abigroup carried out an inspection of the operation, and at its expense, sealed the large gaps around the edges of roller-doors adjacent to the works. The relevant foreman's contact details were also provided so that any dust concerns could be addressed promptly, rather than going via the main office. Long-term stockpiles were grassed and some stockpiles close to Billinudgel were treated with a chemical sealer. Mid to long-term measure were to effect progressive revegetation. Most of these methods proved highly effective at reducing dust emissions, as evident from the monitoring results. However they did not address all of the complainant's concerns.

Photograph 3.3 Major earthworks being undertaken close-to Billinudgel with associated high dust risk.

3.2.2 Operation

The original EIS stated that with respect to operational air quality that:

- *the EPA's carbon monoxide 1–hour goals would not be expected to be exceeded during the operation of the proposal due to the present emission controls on motor vehicles and the projected traffic conditions for 2002 and 2012;*
- *the PM_{10} annual and 24–hour maximum air quality goals would not be likely to be exceeded at any nearby residences. This was also considered to be the case for the 90-day lead goal which would not even be exceeded in the short–term;*
- *the predicted increases in concentration of nitrogen dioxide indicated that the EPA's interim goal would not be exceeded at any distance from the proposal; and*

- *predicted concentrations of benzene (and other pollutants) were not at levels likely to pose health effects (although it was recognised that there may be no safe level for exposure to benzene).*

It further noted that the introduction of catalytic converters had resulted in a substantial reduction in CO, NOx (oxides of nitrogen) and hydrocarbon emissions from motor vehicles. It was also noted that the EPA had targeted heavy-duty diesel vehicles for emission control in its Air Quality Management Plan, outlined in Action for Air as these were identified as major emitters of NOx and fine particulate matter. The increased speed on upgraded roads resulted in increased nitrogen oxide emissions that had offset to some extent gains from the improved technology. Nevertheless, the proposal was predicted to result in nitrogen dioxide levels that were substantially below the air quality goal.

No actual monitoring has been performed to confirm these predictions.

3.2.3 Learnings

3.2.3.1 Dust monitoring

The monitoring methods used on this project were dust deposition gauges which consisted of a funnel inserted in a bottle that collects dust falling out over a period of a month (the guidelines normally refer to a limit of 4g/m^2/month), and observations of visible dust. Dust deposition gauges are a useful method for monitoring long-term impacts from chronic dust sources such as a factory or quarry, however they fail to capture the acute (hourly or daily issues) dust emissions which emanate from major earthworks projects, particularly for receivers close to the source. For example, if 4g/m^2 of dust was created on one day, and then nothing for the rest of the month, and the contractor would be in compliance, but the receiver would have been significantly affected.

Real-time monitoring is much more useful in these instances, using instruments which utilise a laser to provide instantaneous data:

- Results are available instantaneously;
- Data is recorded in real-time, which allows a better interpretation of cause and effect;
- Provides the ability to determine the size and timing of an event;
- Complaints handling can normally be addressed on the same day;
- Can be linked to an alarm or telemetry to provide immediate notification of exceedances.
- Data for wind speed and direction can be simultaneously logged;
- Not intrusive upon residents; and
- Can be operated during rain.

This equipment has been the *de facto* standard for major construction projects in Queensland for more than ten years, and provides better management for the contractor, and potentially reduced impacts for the outcomes community, than relying on dust gauges alone.

3.2.3.2 Dust control

The methods utilised during the project were generally pro-active within the constraints of monitoring *i.e.* reactive to complaints and/or visual assessment of dust. This was particularly so

around Billinudgel. The use of water carts and site shut-down during dry, windy weather are standard industry controls to minimise impacts. The latter was utilised on several occasions. The use of chemical stabilisers by Abigroup is at the forefront of Best Practice. The successful utilisation of these practices is evident by the low number of monthly dust exceedances at the project boundary at Billinudgel.

There is an expectation within the construction industry that dust will result from such a large-scale earthworks project in spite of Best Practice Environmental Management, and that sensitive receptors may have to also change some of their practices to allow for this likelihood. It is considered that it was often this expectation of some impact, versus the lack of recognition that sometimes the receiver may need to account for this potential that lead to some of the ongoing complaints.

The monitoring methods utilised did not allow an assessment of acute verus chronic occurrences. As a result assessing and dealing with dust became problematic over the life of the works in this area.