SIRF Industrial Maintenance Roundtable in South Australia
9 February 2005
Reliability and Maintenance Excellence for Asset Utilisation

Peter Short, Area Manager for Northern and Western Region of the Department of Transport Energy, and Infrastructure spoke on *Applying Asset Management in Remote Areas*. (Presentation not available)

The Northern and Western Regional office manages State roads for 75% of the land area of South Australia. The region has 10,000 kilometres of unsealed roads and 4,000 kilometres of sealed State roads with a replacement value of $430 million. The office provides operations, planning and business support to 12 patrol gangs and 2 re-sheeting gangs consisting of 45 people and 220 plant items. They work 7am to 5pm in shifts covering 360 days per year on the basis of ten days on and ten days off. Attracting and retaining contractors and staff is very difficult.

The purpose of these assets is to provide safe, efficient access for mineral exploration and remote communities with equity and sustainability. About two thirds of South Australia's export comes from this region, including tourism, mining, mineral processing, aquaculture, agriculture and livestock. The roads of the region are subject to prolonged dry periods and occasional flooding rains causing rapid pavement deterioration as particles are removed.

Patrol gangs are self-contained with trailer accommodation and equipment. They grade and patch roads according to planned maintenance and respond to events in their area. They have HF radios and satellite telephones as well as UHF and Royal Flying Doctor Services for emergency and health assistance.

Road conditions are monitored by 24 volunteer assessors who also maintain 35 warning signs providing travellers with information on the roads ahead. Reports on road condition are gathered by regional area superintendents who spend about half their time travelling, visiting volunteer assessors, confirming and reporting road conditions. Road maintenance priorities depend upon a road hierarchy reflecting the role and movements supported by the road.

Raymond Bentley-Comins, Asset Manager, Zinifex Port Pirie Smelter spoke on *Life extension strategies – When is end of Life*. (Presentation not available)

The Port Pirie Smelter has excess capacity, faces a shortage of concentrates, is protected against new entrants by the cost of new building and has run longer and at higher rates than the designers expected. There is room to update the technology but the case is not yet made.

The sinter plant has been continuously upgraded since 1912 and now runs at 293 tonnes per hour, rather than the design rate of 185 tonnes per hour. How is end of life to be determined?

Sandy Dunn (www.maintenanceresources.com) provides three definitions of plant life. Useful life is the time up to a rapid increase in failure modes. Economic life is period until it becomes cheaper to replace than to maintain. Average life is the mean

time for which a plant is maintained. These definitions are difficult to apply to an old plant.

An alternative approach to end of life is to address risks. End of life arises when risks exceed tolerable levels. End of life can arise from:

- Safety risks – the plant cannot be made safe
- Obsolescence – parts are not available or too costly
- Fatigue – structural failure of irreplaceable components
- Operability – no longer meets operating requirements for quality, cost etc
- Economics – operating and maintenance costs are too high

A risk based approach focuses on the probability and consequences of significant events affecting safety, obsolescence, operations or operating costs. The outcomes from a risk analysis should be confirmed by a discounted cash flow analysis of revenues and costs over the life cycle of the intervention required to sustain operations.

The asset management team look at reasons for downtime. A detailed analysis using RCA is carried out on all breakdowns that result in lost production greater than 30 minutes. Amuliti disciplinary team including tradesmen and operators participate in the analysis.

The strategy is based on improving mean time between failure (MTBF) by improving the reliability of the components that fail and reduce the MTBF. Emphasis is placed on increasing the plant's uptime by improving the ability to change over plant that breaks down.

Special efforts have been made to improve the relationship between operators and maintainers.

Operations plus maintenance equals production.

Maintenance is responsible for the capital expenditure budget. It is set on the basis of "what do you need to do to achieve the output that the company requires to achieve its corporate goals".

Applying a risk assessment to determining life recognises maintenance as an operational function which, when combined with operations, produces output. Maintenance and operations should share the same budget because they share the same goal of production at economic cost with tolerable risk. Where maintenance is free to operations, operations is never satisfied.

The risk analysis is all condition based and flows through to maintenance planning. Risks determine criticality, maintenance treatment and equipment selection. Operator skills and condition monitoring assist in the assessment of probability and the allocation of risk. Simple procedures and checklists manage risk and sustain reliability.

Sylvester Spigiel, Chief Engineer Primary Operations, OneSteel Whyalla Steelworks spoke on *Designing for Reliability and Maintainability* (Presentation available)

Sylvester provided an outline of the OneSteel mining and manufacturing operations on Eyre Peninsula and at Whyalla. OneSteel secures sand, dolomite and 3 million tonnes per annum of iron ore from mines in the region and uses about 2 million tonnes per annum of iron ore to produce 1.2 to 1.3 million tonnes per annum of steel. This is a fully integrated steelworks producing coke, pellets, basic iron and steel in structural sections and slabs.

The presentation covers reliability and risk assessment through design, purchase, installation, start up, operation, maintenance and spares. OneSteel seek reliability for the whole system as well as the individual components. This approach has proved to be successful as the previous blast furnace operated for 25 years without a major problem.

The design discipline is to produce the lowest life-cycle cost based on the logic that reliability results in lower operating costs and this means lower costs per tonne. This requires the design to meet up-time targets and requires the application of operations and maintenance knowledge in the design, commissioning and post installation review process. Adequate time must be allowed for the operators to thoroughly review designs especially when they are done by external consultants who may be unfamiliar with the plant.

Inspection is the core of the reliability program. The program also emphasises the need to do the simple things at the right time all the time and the PDCA cycle. Where there are problems you need to go back and look at what needs to be redesigned.

Design discipline requires a culture which values education and training, takes ownership of plant and sets operating rules to eliminate root causes of problems.

When new plant is being commissioned top management needs to ensure that:

- Operating manuals are available;
- Operators have received adequate training;
- The equipment has been installed correctly; and
- The commissioning procedures are appropriate.

Our thanks to our speakers and participants.