

PEAK 2000 ANNUAL REPORT

Introduction

PEAK is an advisory group of people from a wide range of external stakeholder organisations including the Papua New Guinea Government, scientific and research organisations and Papua New Guinea and Australian NGO organisations as well as the representatives of the Porgera Joint venture (PJV) and Placer. Its main function is to help improve the understanding and provide transparency of Porgera's environmental (physical and social) issues with external stakeholders and to assist in its environmental performance and public accountability.

In 1996 CSIRO undertook an independent review on Porgera's riverine environmental impacts and, while the review recognised that Porgera's environmental performance was consistent with design predictions, it also made certain recommendations for improvement. PEAK was established to ensure that these recommendations are implemented. Also, PEAK will continue to review the annual environmental monitoring reports and general trends in the data and ensure that environmental issues raised by external stakeholders are considered by the PJV.

Summary of Achievements

In the year 2000 a number of significant achievements were made. Two meetings were held in 2000. During the year provincial public health officers, PJV clinic staff and PEAK members undertook a joint health patrol in the Upper Strickland River area. Their observations and recommendations were discussed with the PJV.

The Office of Environment & Conservation carried out independent water quality tests in the Lake Murray area. The results were consistent with the results obtained by PJV and were released to the community. During the year PEAK was also briefed on the draft environmental bill, the environmental code of practice and the draft mine closure policy by relevant government agencies.

The PJV submitted various reports to PEAK.

Reports

PEAK reviewed several reports during the year. Among others, the following relevant reports were submitted to the committee.

- *Lake Murray Dietary Study*

A field survey was conducted over a period of 5 weeks, with households in five different villages surveyed. A typical pattern of meals is two meals a day, breakfast and dinner. The diet of the people of Lake Murray is reasonable. The

study confirmed that fish and sago form a significant part of the diet of the People. Fish provides the dominant source of protein. Although not conclusive, iron deficiency did not appear to be very common, even though little green vegetables were observed in meals.

Cooking and drinking water was obtained from rainwater tanks and the lake water was used for bathing.

- *Strickland and Mamboi Hydraulic Connection*

In response to community concerns that the overflow of Strickland River into Lake Murray was caused by discharges from the Porgera mine, PJV initiated a study to identify the cause of the overflow. The study showed that the hydraulic connection between the Strickland River and the Mamboi River, which eventually over-flowed into the Lake Murray, was a natural process. The recent hydraulic connection was due to extremely high floods observed in the Strickland River during the first six months of 1998, as it has done in previous times even before the Porgera operations began.

With the recommendation of PEAK, an information pamphlet explaining this phenomenon was prepared by the PJV and distributed to the community.

- *Study of Metal Uptake by Aquatic Organisms*

The report discussed the potential for metal uptake by organisms in the Lake Murray and Lagaip River where the study was carried out. The report explained that there were two processes through which concentration of trace metals could occur. The first is through bioaccumulation in which organisms take up and store trace metals in their bodies from their surrounding environment. The second is through a process called biomagnification in which an increase in trace metals occurs in organisms through the food chain. This occurs when one organism eats another already affected with trace metals and hence increases its own level of trace metals in its body. In other words, a trace metal such as methylmercury can be biomagnified through successive levels of the food chain, the highest concentrations being at the top of the food chain.

The study found for Lagaip River that there is a tendency for increased bioaccumulation of trace metals in prawn head in recent years. This trend was also observed for cadmium in both prawn tail and mountain tandan flesh. Cadmium and lead were in excess of ANZFA standard (1996) in prawn heads and copper was in excess of the standard in prawn tails.

For Lake Murray there was no consistent trend for increased bioaccumulation of metals for both barramundi and herrings. Cadmium and mercury were in excess of ANZFA standard (1996) in barramundi flesh.

- *Mercury Cycling in Lake Murray*

The study was carried in order to assist PEAK to increase its understanding of the potential of mercury bioaccumulation and to acquire more information on the reported high concentrations of mercury in fish as well as in hair of local (fish eating) inhabitants of Lake Murray.

It was noted that the causes of high mercury accumulation were unknown and there are no accurate data on mercury species concentrations in waters and sediments.

Mercury is of concern because it is a highly toxic metal. Inorganic mercury can be naturally converted into methylmercury, which is dangerous to mammals and humans. In Lake Murray the major source of methylmercury to humans is the consumption of fish.

For Lake Murray, the study noted the following;

1. Mercury is present in waters and sediments of Lake Murray,
2. Organisms in the Lake Murray food chain can bioaccumulate mercury very efficiently, and
3. Lake Murray's long food chain allows for a higher biomagnification.

The study concluded the following;

1. For Lake Murray there have been no identified high mercury inputs or anomalously high natural sources of mercury.
2. Relatively high concentrations of mercury in fish are the result of a long food chain based on phytoplankton.
3. This is a natural phenomenon.
4. Methylmercury is generally low in Lake Murray and also present naturally in local rivers.

Certain key issues were articulated by the study for the PJV to consider.

Membership

There have been several changes in membership during 2000. Dr. Max Finlayson resigned and has been replaced by Dr. Bob Pidgeon of the Environmental Research Institute of the Supervising Scientist (Australia). Dr. Michael Rynkiewich of Melanesian Institute for Pastoral and socio-economic Service replaced Dr. Roland Seib. Pete Neilans, as the representative of the Porgera Joint Venture, has replaced Evert van den Brand. Ms Ani Topurua resigned and

in her place Patricia Pepena of the Department of Mining has been appointed. All other members remain the same.

Major Issues

PEAK will continue to focus on rock waste discharge, tailings disposal and sediment behaviour in the river system. The relationship between mine derived sediments and methylmercury will be an important environmental issue to monitor during the next few years.

Progress Against CSIRO Recommendations

Highlights

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- A high level of data recovery continued at PJV hydrometric monitoring stations throughout the downstream hydrology network during 2000.
- Ongoing monitoring at SG4 on the Strickland floodplain enabled the collection of reliable flow data. An additional cross-sectional monitoring station for establishing bed level changes was established about 80km downstream of SG4 on the Strickland River.
- Remote sensing of the lower Strickland River region using high altitude aircraft was conducted during 2000 by NASA working with CSIRO. The results will be available during 2001 and will assist in determining whether or not environmental effects from the Porgera mine in the lower Strickland floodplain are evident.
- During 2000, CSIRO determined that silver and lead are signature metals that originate only from the Porgera mine. They will be used in various downstream studies by differentiating between natural metal-bearing sediments and those originating from the mine.
- A hydraulic connection between the Strickland River and Lake Murray via the Mamboi River was investigated. At the recommendation of PEAK, an information pamphlet was prepared and distributed to the effected community.
- The dietary study carried out in 1999 Lake Murray was extended to Tomu on the Lower Strickland River and Wankipe on the Lagaip River in 2000. A report will be provided to PEAK in early 2001.
- Analysis of sago samples collected from the Lake Murray and Lower Strickland River areas showed metal levels which were very low, or below the level of analytical detection limit. This information was presented to the people of Lake Murray in last quarter of 2000.

Future Plans

PEAK will continue to advise and encourage PJV to improve its environmental performance by responding to its stakeholders' social and environmental concerns and by improving its environmental management procedures, processes and systems. Ultimately PEAK would like to see PJV to continue to minimise its impact on the environment.