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Appendix I: Porgera Riverine Disposal Case Study

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1 Introduction

The Porgera mine is an open pit mine located in the Enga Province of Papua New Guinea (PNG), approximately 600 km north-west of Port Moresby (see Figure I1). Porgera is PNG's second most important mine after Ok Tedi. It is one of the largest gold mines in PNG and Australasia, and was originally one of the world's major low-cost gold producers. As the mine has matured operating costs have increased.

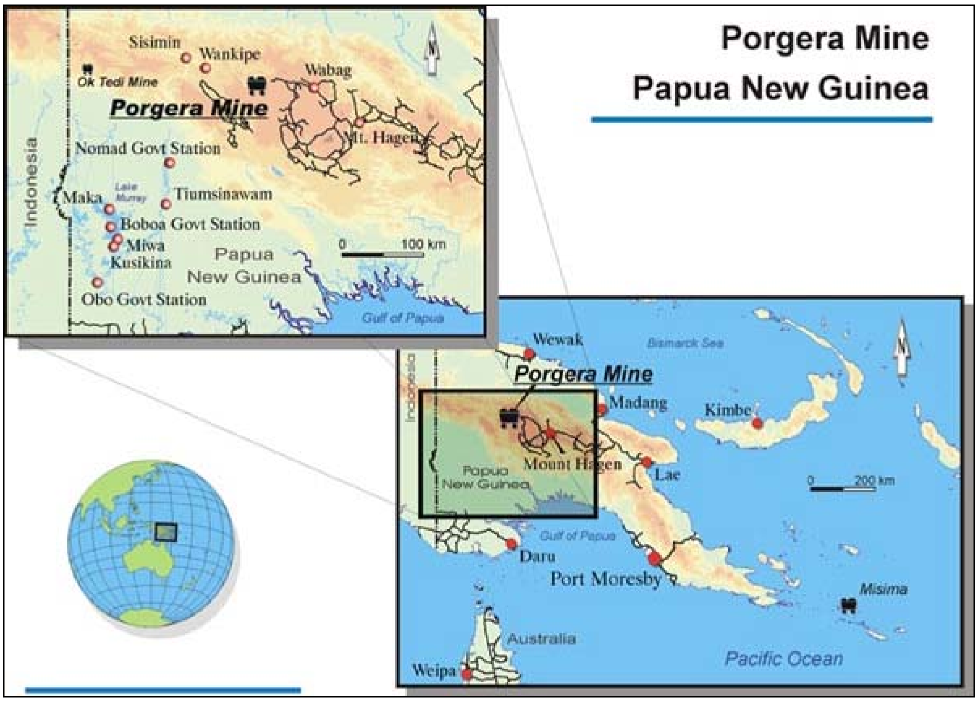


Figure I1. Location of the Porgera Mine

Mine waste from Porgera has been disposed of into the Porgera-Strickland River system since the beginning of operations in 1990. Tailings and incompetent waste rock are discharged in the upper tributaries of the Strickland River System. The Strickland River joins the Fly River, which then flows into the Gulf of Papua (Figure I2). Tailings and waste rock from the Ok Tedi mine are also discharged into the Fly River System, via the Ok Tedi.

During 1999, approximately 15,400 tonnes per day of ore was processed at the Porgera concentration plant and the tailings disposed of into the Strickland River System. Between 10 and 15 million tonnes of waste rock also enters the Strickland River System annually from erodible waste dumps.

2 Overview

The mine is operated by the Porgera Joint Venture (PJV), 50% owned by Placer Dome Asia Pacific, 25% by Goldfields Ltd. of Australia, 20% by Orogen Minerals Ltd (51% PNG

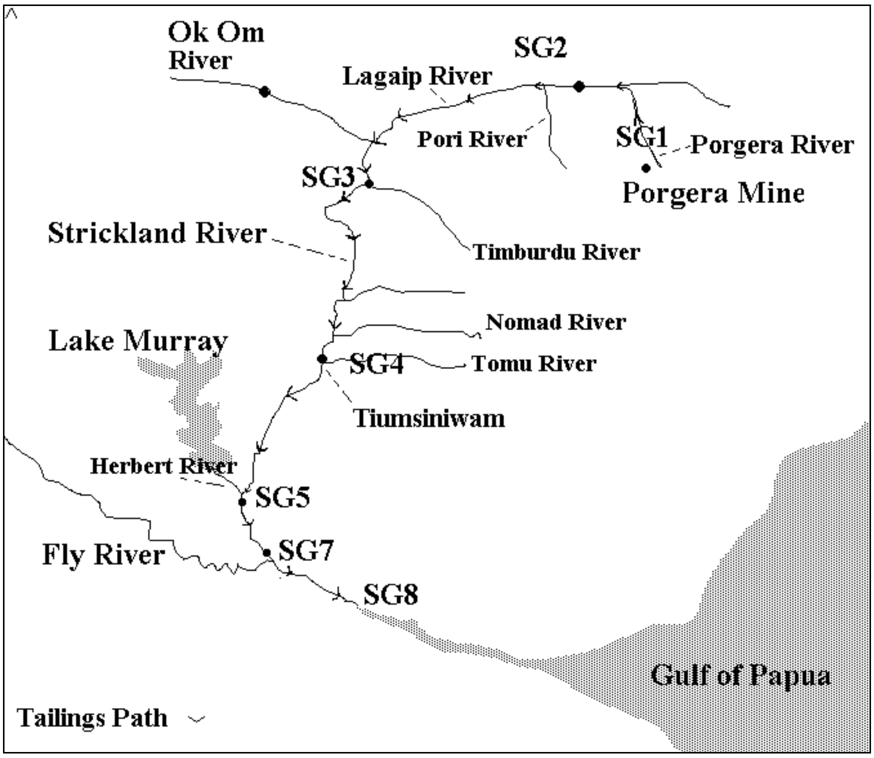


Figure I2. The Porgera Mine area and Strickland River System

Government owned) and 5% by Mineral Resources Enga Pty Ltd (50% Enga Provincial Government and 50% Special Mining Lease landowners). In 2000, gold reserves at the Porgera mine were estimated to be 78.5 million tonnes of proved and probable reserves, with an average grade of 3.3 grams per tonne. Reserves are estimated to contain approximately 8.3 million ounces of gold.[1]

The original approvals for the Porgera mine were granted on the basis of an ore processing rate of 8,500 tonnes per day and the disposal of 64,000 tonnes per day waste rock, the majority of which would be contained in stable dumps. In 1993, the company applied for and was granted a variation to the permit, which allowed for an increase in the ore processing rate to 15,400 tonnes per day with a corresponding increase in the discharge of tailings. In 1995, PJV submitted a request for an additional variation to the discharge permit, which allows for an increase in the ore processing rate to 17,700 tonnes per day and the discharge of waste rock to 210,000 tonnes per day. Approximately half of the waste rock would be stored in a stable facility and the remainder disposed of into two erodible dumps. The increased throughput has lowered operating costs and lead to lower cut-off grades and increased metal recovery grades. Plans are to continue disposing of the tailings and incompetent waste into the river; however, studies are exploring the possibility of the co-disposal of the tailings into the stable waste dumps.

[1] See Porgera Environmental Advisory Komiti (PEAK) website at http://www.peak-pjv.com (accessed 2001).

2.1 Physical Setting

Porgera mine is located in the PNG highlands, about 130 km north-west of Mount Hagen, at an altitude of 2,800 m. The area is subject to seismic activity, landslides and high rainfall. The terrain is covered in rain forest (CSIRO, 1996). Figure I2 shows the position of the mine within the Strickland River System.

Precipitation averages 3,650 mm per year, occurring over 300 days in the year. Temperatures range from 10–25 °C. The area is prone to landslides and a high rate of erosion, caused by the abundant rainfall and very soft, easily erodible mudstone. This is further aggravated by frequent seismic activity. These factors result in naturally high sediment loads in the Strickland River System.

The tailings and incompetent waste rock enter the Porgera River, which joins the Lagaip River and then merges with the Ok Om and becomes the Strickland River. The Strickland River then joins the Fly River and flows out into the Gulf of Papua. The distance from Porgera to the Gulf is approximately 1,000 km. Lake Murray is connected to the Strickland River via the Herbert River which can exhibit reverse flow.

This River System (referred to as the Strickland River System in the rest of the text) flows across steep terrain in the upper reaches. The waters are turbulent and fast flowing in this section of the River System. After the confluence of the Herbert River, in the lower reaches of the River System, the terrain is flat and the flow is relatively slower.

Fish populations appear to be naturally small in the high altitude rivers near the mine site, (CSIRO, 1996). Dominant species in the Lagaip River and the Ok Om are mountain tandans (*Neosilurus equinus*), and freshwater prawns (*Macrobrachium*). In the lower Strickland River, fish populations are larger. Sharp-snouted catfish (*Arius macrorhynchus*) and fork-tailed catfish (*Cinetodus crassilabris*) are the most abundant species. Lake Murray's most abundant aquatic species is the barramundi (*Lates calcarifer*) (PJV, 1999a).

Other animals in the area used as food sources include pigs, possums, tree kangaroos and pythons. Agricultural food sources include sweet potatoes, bananas, taro, sago, and tapioca (CSIRO, 1996).

2.2 Socio-Economic Setting

Today, approximately twelve thousand people, belonging to seven different tribes, live in the area around the Porgera Mine. The main communities are the Paiela, the Paiam, the Karik and the Tipininni. Over 2000 people live in the villages on the River System downstream of the mine. (CSIRO, 1996)

Villages potentially affected by riverine disposal of tailings and waste rock include: Wankipe, Sisimin, Waiki, Yokona, Tinahae, Omami, and Komagato in the upper River System, Kusikina, and Miwa in the Lake Murray vicinity, and Dwale (Igibera), Udugumbi, and Ugaiumbu (Tiumsinawam) in the lower River System (CSIRO, 1996).

In the upper region of the Strickland River System, the general health of the population is poor. Common diseases (not related to the mine) include hyperendemic malaria and filariasis. Skin infections, childhood malnutrition (<5 years old) and infant mortality are also widespread. Many of the same ailments are found in the communities of the lower regions of the River System. (CSIRO, 1996)

3 Mining Operations

Exploitation of the underground mine at Porgera ceased in 1998 and ore is now extracted using conventional open pit mining techniques. In 1999, approximately 69.2 million tonnes of ore and waste were mined from the pit (189,700 tonnes per day). Of this amount, approximately 5.6 million tonnes of ore (15,400 tonnes per day) was processed at the plant with an average head grade of 5.4 grams per tonne. The stripping ratio was therefore 11:1.[2] The geology at Porgera is described in Box I1.

To extract the gold, the ore is crushed and ground, then treated by flotation for sulphide extraction. The sulphide concentrate is then subjected to high pressure oxidation and conventional carbon-in-pulp (CIP) cyanide leaching.[3] In 1999 gold production totalled 754,754 ounces at a cost of US$295 per ounce.[4] Total gold production from the mine since 1990 is in excess of 10 million ounces.

Box I1. Geology at Porgera

Mineralization is associated with intrusive boundaries, native and sulphide associated gold. "*The middle Miocene Porgera intrusive system, which was derived from melting of thickened crust, was emplaced within Late Cretaceous sediments on the northern margin of the Papuan platform, about 25 km south of the Central orogenic belt. Mineralization is associated with several medium to fine-grained, high-level, porphyritic intrusions of diorite composition with alteration assemblages of calcite, dolomite, chlorite, and sericite plus subordinate clays and quartz. Most of the gold mineralization is hosted by sulfides, in particular pyrite and arsenical pyrite*." (Fleming *et al.*, 1986). The mineralisation contains high concentrations of lead, zinc, iron, sulphur and traces of mercury, cadmium, arsenic and copper.

3.1 Waste Disposal

In the mine area the terrain is unstable, precipitation levels are high and seismic activity is a regular occurrence. "*In such conditions, constructing a tailing impoundment and containing waste was very difficult. The risk of a tailing dam failure was high. Therefore, on a risk basis, the PNG Government approved the PJV preferred option of riverine disposal as the most appropriate method of*

[2] Porgera Environmental Advisory Komiti (PEAK) website http://www.peak-pjv.com. Accessed 2001.

[3] See http://www.peak-pjv.com/aboutpo/mining.htm

[4] Including royalties. Total costs not including royalties were US$ 224/oz and cash costs were US$175/oz. See http://www.placerdome.com/properties/content/sites/porgera.html

disposing the mine's waste material".[5] A tailings storage facility would have also taken up valuable subsistence farming land, which is in short supply in the valley.

Tailings from the concentration process are neutralised and discharged into the Maiapam River, a tributary of the Porgera River. The neutralisation process involves the conversion of free cyanide to stable ferric and ferro-cyanide[6], mixing with Na_2S to precipitate mercury and addition of lime to precipitate trace metals as hydroxides. Metals are mostly removed by adsorption/co-precipitation with iron oxyhydroxides (CSIRO, 1996). Of the ore treated, almost all of it is discarded as tailings making the daily discharge approximately 15,400 tonnes per day, or 5.6 million tonnes a year.

Tailings are discharged at an average pH of 7.2. If the pH falls to 5.8 or lower, tailings discharge is stopped. All of the tailings are finer than 100 µm, and 65% are finer than 75 µm (PJV, 1999a). Tables I1 and I2 summarise some characteristics of the tailings discharge.

Table I1. Characteristics of tailings discharge 1999 (PJV, 1999a)

	Concentration (µg/l)	
	Dissolved	Total
Arsenic	10	50,000
Cadmium	8	1,300
Chromium	5	2,700
Copper	1,200	14,000
Iron	5,500	4,975,000
Lead	3	68,000
Mercury	0.3	300
Nickel	1,300	5,100
Silver	4	900
Zinc	2,200	192,000
Cyanide CAC*	800	(Total cyanide)
WAD**	2,300	3,300
Thiocyanate	5,500	
Total suspended sediments	–	2,100,000 (21%)
pH	–	7.2

* CAC – Cyanide amenable to chlorination
**WAD – Weak acid dissociable cyanide

[5] See: http://www.peak-pjv.com/pdfs/Downstream%20flyer.pdf page 2. Accessed April 2002.
[6] "*Free cyanide reacts with dissolved iron in the acid wash effluent to form a stable ferric ferrocyanide complex ($Fe_4(Fe(CN)_6)_3$, commonly know as Prussian Blue. The ferrocyanide and ferricyanide ions form insoluble metal complexes with iron, copper, nickel, manganese, lead, zinc, cadmium and silver*" (PJV, 1999a).

Table I2. Mine waste discharged in the Porgera River (PJV, 1999a)

	Tailings	Erodible waste rock
Amount discharged in river in 1999	5.6 Mt	10–15 Mt
Size of material	100% <0.1 mm	53% <0.075 mm (silt and clay)
		26% < 4.8 mm (sand)
		21% >4.8 mm (gravel)

These concentrations have varied over the life of the mine. Dissolved lead and mercury concentrations have decreased since 1991, but dissolved nickel and zinc concentrations have increased. Total copper, lead and zinc concentrations have increased since 1991, but total mercury concentrations have decreased (PJV, 1999a).

Waste rock is placed into three waste dumps. Geotechnically competent waste is placed in the Kogai dump and incompetent waste is placed in two erodible waste dumps, Anawe and Anjolek. They respectively erode into the Pongema and Kaiya Rivers, which both flow into the Porgera River. The erodible waste consists of 50% black sediments (colluvium material) and 50% mudstone (CSIRO, 1996). Total mine derived loading in the Porgera River from the erodible waste dumps is estimated to be between 10–15 million tonnes per year (PJV, 1999a).

Compliance to the PNG water quality regulations is monitored at a point known as SG3, at the confluence of the Tumbudu and Strickland Rivers (see Figure I2). The first 140 km of the Porgera River below the mine has no legal limit on water quality.

4 Environmental Impacts

The environmental impacts associated with the riverine disposal of tailings at Porgera are discussed below.

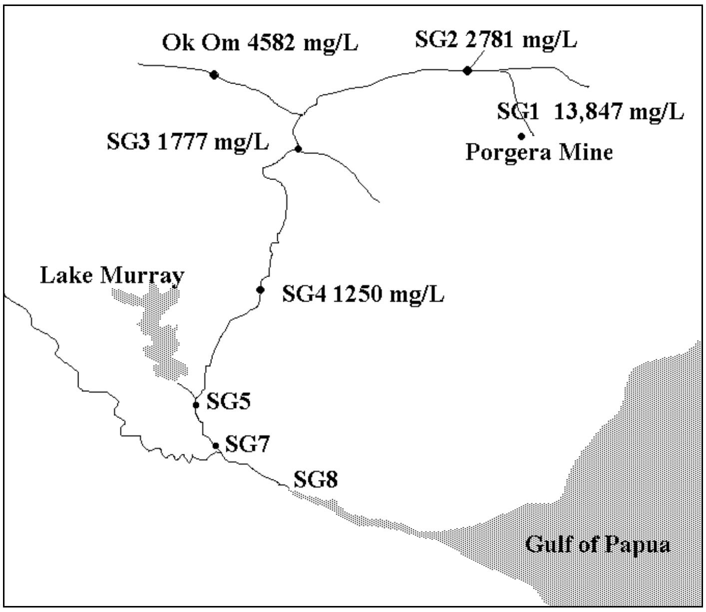
4.1 Sedimentation

The Strickland River System has a high natural sediment load. In the catchments of the mainstream and tributaries of the River System, slope and valley wall failures contribute to the sediment load (CSIRO, 1996).

Only a small portion of the coarse rock, eroded from the Anawe and Anjolek waste dumps, deposits in the upper zone of the River System. The waters in this area are fast flowing and transport most of the material through to the lower River System (PJV, 1999a).

In 1999, the total sediment load (suspended material as well as bed material) was estimated to be 63 Mt at the compliance point (SG3). Between 25% and 33% of this total is estimated to be mine-derived (PJV, 1999a).

Mine derived suspended sediment levels are diluted with increasing distance from the mine. Figure I3 presents the total suspended sediment load in the River System (natural and mine derived) at the main monitoring points. At SG2, sediment levels are significantly lower compared to SG1 and also lower than the natural sediment levels in the Ok Om. Total suspended sediment levels continue to decrease further downriver, at SG3 and SG4.



Source: PJV (1999a)

Figure I3. Total suspended sediments in the Porgera/Strickland River System (mg/l)

The river distances of the main monitoring stations from the Porgera mine are: SG1 8 km, SG2 42 km, SG3 165 km and SG4 360 km.

In the upper reaches of the River System, variations of approximately 2–3 m are reported to occur in river bed levels along the Porgera, Pongema and Kaiya Rivers. Analysis indicates that "*aggradation clearly occurred in the Porgera and Pongema Rivers during the 1989–1990 period, which was followed by a period of variable levels*" (PJV, 1999a). Much of the material that deposits on the river bed appears to be abraded and scoured into finer material by the force of the water and then transported downstream (PJV, 1999a).

The possibility of over-bank and off-river deposition[7] of mine-derived sediment in the Lake Murray vicinity (after SG4) "*could amount to 0.5 million tonnes per year based on historical estimates of similar deposition from the Fly River*" (CSIRO, 1996). However, the PJV states that "*the effect of waste dumping on river aggradation in the Lower Strickland River is expected to be negligible, particularly in the context of background sediment loads*" (PJV, 1999a).

Claims have been made that river bed aggradation has been significant. A 1995 NGO report on the impacts of riverine disposal at Porgera maintains that "*the villagers believe the river has*

[7] 'Off river' refers to water bodies that are in the floodplain such as oxbow lakes.

become shallower and faster as a result of sediment deposit" and it is therefore more difficult to travel by boat. In addition, the report claims that many river bank gardens are covered by sediment, from 0.30 to 1 m deep. It also states that "*it is possible that sediment from waste rock deposited in the deposition zone of the lower Strickland River could be up to six feet deep, with higher levels in some areas*" (Mineral Policy Institute, 1995).

4.2 Water quality

The mean pH level of the water throughout the River System indicates that neutral conditions prevail. Water quality analyses from different monitoring points are shown in Table I3. Only mean concentrations are given. Most of the elements listed have significantly higher dissolved and total concentrations at SG1 and SG2 than at the Ok Om sampling point (which is unaffected by mining), apart from dissolved iron. At SG4, about 50% of the readings are comparable to those at the Ok Om sampling point.

Table I3. Mean trace elements concentrations (μg/l) and pH at different monitoring points along the Porgera/Strickland River System .

		SG1	SG2	SG3	SG4	Ok Om
Arenic	Dissolved	5	5	4	2	<2
	Total	3,740	348	82	19	14
Cadmium	Dissolved	2	0.4	0.2	0.2	0.3
	Total	116	8	3	5	0.5
Chromium	Dissolved	1	1	1	1	2
	Total	309	60	39	29	35
Copper	Dissolved	62	7	2	5	2
	Total	1,070	108	84	26	31
Iron	Dissolved	69	145	174	175	582
	Total	420,000	69,000	45,500	21,600	60,900
Lead	Dissolved	1.2	0.8	1.3	0.7	0.7
	Total	7,420	723	254	72	36
Mercury	Dissolved	0.2	0.2	<0.2	0.2	0.2
	Total	21	6	0.7	0.3	0.6
Nickel	Dissolved	57	4	4	2	3
	Total	459	64	52	29	42
Silver	Dissolved	0.7	0.4	0.8	0.3	0.4
	Total	87	8	2	1	1
Zinc	Dissolved	76	28	11	11	4
	Total	172,000	1,620	463	157	168
pH		7.9	7.8	7.7	7.4	7.9

Source: PJV (1999a).

A 1995 NGO report compares these results with Australian water quality standards and notes that lead levels are more than 2,300 times higher 1 km downstream from the discharge. Eighty kilometers downstream of discharge, lead concentrations are reportedly 32 times greater, zinc concentrations 10 times greater and mercury concentrations nine times greater (Mineral Policy Institute, 1995). PJV does not agree with these comparisons.

In the lower Strickland River and Lake Murray area, dissolved metal concentrations are very low and can only be measured reliably with trace-metal-clean techniques (CSIRO, 1996).

Compliance with PNG legislation for water quality is measured at SG3, a point downstream of the confluence of the Ok Om and Lagaip River (see Figure I2). Table I4 summarises water quality at this point and compares it to the compliance levels.

Table I4. Mean trace element concentrations at compliance point (SG3) as reported by the PJV (PJV, 1999a) and by the Mineral Policy Institute (1995)

	PJV ER			MPI	
	Dissolved (μg/l)	Total (μg/l)	Compliance value (dissolved μg/l)	Dissolved (μg/l)	Total (μg/l)
Arsenic	4	82	50	3	86.2
Cadmium	0.2	3	1	0	1.23
Chromium	1	39	10	–	–
Copper	2	84	10	1.4	43.78
Iron	174	45,500	No compliance	–	–
Lead	1.3	254	3	0	109.8
Mercury	0.2	0.7	No compliance	0	1.62
Nickel	4	52	50	–	–
Silver	0.8	2	4	–	–
Zinc	11	463	50	1.4	339.2
Ammonia (cyanide)	30		50	–	–
Sulphate	34,000	–	–	–	–
pH	7.7	–	7.0–9.0	–	–

Water quality is within compliance limits at SG3.[9] However, average dissolved concentrations are higher than pre-mine levels. The concentration of arsenic, zinc and lead have increased 7 to 10 fold since 1990 though water quality continues to be within compliance limits downstream of the compliance point (CSIRO, 1996).

Due to flow reversals of the Herbert River, mine derived sediments containing elevated levels of metals have also been detected in the southern end of Lake Murray. The waters of

[8] It is not known if compliance is always met since minimum and maximum values are unavailable.

the lake exhibit low concentrations of dissolved and trace metals, some being below the detection level (PJV, 1999a). Concentrations of arsenic, lead, and silver in the lake bed sediments showed higher concentrations near the Herbert River. It is estimated that approximately 150,000 t/year of mine-derived sediment are transported to the lake (CSIRO, 1996).[10]

The gold mineralisation at Porgera is associated with pyrite, arsenical pyrite and other sulphides with the potential for acid drainage developing in the waste material. Evidence indicates that some metal leaching from acid generation is occurring within one of the waste rock dumps (PJV, 1999a). However, according to the PJV, the natural carbonate rock combined with a waste rock management plan will prevent possible acid drainage and metal leaching problems in the future (PJV, 1999b).

4.3 Biodiversity

Fish populations appear to have been in decline since 1993 in the upper reaches of the River System (CSIRO, 1996). "*Increased sediment load and high turbidity reduces visibility and effective feeding habits, forcing aquatic organisms to migrate into the tributaries where there is clearer water and abundant food resources*" (PJV, 1999a). Some species appear to have adapted to the increased sediment load. Mountain tandan, the most abundant species in the Lagaip River and Ok Om, have maintained their populations within those of the baseline years, 1988 and 1990. However, freshwater prawn numbers appear to have declined since 1993 (PJV, 1999a).

Biological monitoring in the Strickland River System and Lake Murray indicates that the aquatic species diversity in the Strickland River at Tiumsinawam (SG4) has not changed since the baseline studies in 1989. The condition of sharp nosed and other fork-tailed catfish (most abundant species in this section of the river system) is comparable to baseline values (PJV, 1999a).

Tissue concentration analyses were undertaken for the aquatic species in the River System. Tissue analysis of prawn cephalothorax from the Lagaip River at Wankipe indicates higher metal concentrations than in the reference samples (from the Ok Om), particularly for arsenic, cadmium and lead. For cadmium, lead and copper these tissue samples exceeded the 1989 Australian National Health and Medical Research Council (NH&MRC) maximum residue limit (PJV, 1999a).

In the lower Strickland River, at Tiumsinawam, the NH&MRC limits are exceeded for zinc in the majority of catfish liver samples. Large-snouted catfish flesh samples indicated higher median copper concentrations in 1999 than in 1993. In addition, median arsenic concentration in large-snouted catfish liver for 1999 was significantly greater than for 1995, but all other metals were not significantly different. In the Lake Murray area, no consistent trend for higher levels of mercury or arsenic (the metals of greatest potential for mine derived impacts) has been identified (PJV, 1999a).

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[9] Ibid.

[10] This value is based on the 1995 production levels of 10,500 tonnes per day (CSIRO, 1996).

5 Impacts on Communities

The PJV estimates that approximately 2,000 people live in villages downstream of the mining operation. It has been estimated that, if you consider the mobility of inhabitants in the general downstream area, the number of people who come into contact with the waters is 7,000 (Mineral Policy Institute, 1995).[12] Villages along the Strickland River System do not use the river as a source of water. Those without access to clean nearby creeks or streams for drinking and washing use rain water tanks supplied by PJV.

In the upper reaches of the Strickland River System, there has been little sedimentation or overbank deposition of sediments. The pre-mine human uses of the river were limited. Waste related impacts in this area are less important than in the Lake Murray area and lower Strickland River System. Villagers in this area swim and fish in the mine-affected waters and cultivate sago on the river banks and lake side.

To measure possible health impacts from exposure to metals in the Strickland River system, motor nerve development of children below 24 months in all villages downriver to the mine was surveyed. This was done because the nervous system of infants and foetuses are more sensitive to heavy metal poisoning. No epidemiological evidence of heavy metal poisoning was observed (CSIRO, 1996).

In order to detect trace metal uptake, 120 sago samples were taken by the PJV from the Lake Murray and lower Strickland River areas. Results of the analyses indicate that concentrations of trace metals in processed sago from all sites were well below food guidelines. Consequently, there are not expected to be any health problems associated with trace metal sin sago in the Lake Murray and lower Strickland River areas.

The local economy is affected by the presence of the mine in many ways. Riverine disposal obviously impacts local economic activities that are associated with the river. Most villages downstream of the mine appear to engage in subsistence river-side activities. Only the Lake Murray villagers engage in trade; Barramundi is sold to the local co-operative and crocodile skins are sold to traders). People living in the upper areas of the Strickland and Lagaip Rivers have no means of earning any income locally (CSIRO, 1996).

Other sources have reported that "*access to fish resources has been severely reduced […] due to a drop in the number/availability of fish in the rivers, and partly due to fear of being poisoned by contaminated fish*". The death and disappearance of crocodiles has also reportedly reduced crocodile trade. Food availability is said to be reduced because of a decline in river bank gardening, and the fear of poisoning from contaminated animals has prevented landowners from hunting in some areas (Mineral Policy Institute, 1995).

5.1 Compensation

Direct payments by the PJV are made to compensate for impacts resulting from the mining activity. Down-river, environmental compensation includes a one-off payment for alluvial

[11] This figure has been contested by PJV, no reference for this figure was cited.
[12] Ibid.

gold loss and an ongoing annual payment for waste disposal. The one-off payment was distributed to the people living in the immediate region downstream of the mine (lower Porgera and Kaiya Rivers). In 1999, the ongoing payments amounted to US$324,783 (PJV Project Information, 1999).[13]

Since the opening of the mine environmental compensation payments have totalled US$3.99 million (PJV Project Information, 1999). Total compensation—including Mining Lease fees, general compensation for mine-related damage, relocation payments and donations since the beginning of the mine—amounts to US$60.76 million.[14]

5.2 Benefits

Employment at the mine represents one of the benefits to the population in the mining area. In 1999, the total number of people employed at the mine was 1,926. Approximately 87% were PNG nationals including; 990 Porgerans, 188 Engans (not including Porgerans), and 488 other PNG nationals (not including Engans). Salaries and wages amounted to US$70.41 million (PJV, 1999).

Royalties to different government bodies, landowners and the Porgera Development Authority[15] totalled US$4.54 million in 1999 and US$47.52 million since the opening of the mine (see Table I5). Total taxes and duties totalled approximately US$28.88 million in 1999 and US$487.06 million since the opening of the mine. In 1999, dividends to the landowners and Provincial Government respectively amounted to US$0.47 million each (PJV, 1999).

Table I5. Compensation and royalty payments (PJV, 1999)

Payment	Amount (million US$)	
	1999	Total
Down-River environmental compensation	0.325	3.99
Total compensation	2.37	60.76
Royalties to Enga Provincial Government	2.27	30.56
Royalties to Porgera Development Authority	0.23	2.38
Royalties to SML Landowners	0.68	5.36
Royalties to Porgera Landowners	0.55	2.69
Total royalties[16]	4.54	47.53
Total taxes and duties paid	28.88	487.06

[13] For this calculation, exchange rates were used ranging from K1=US$1.05 in 1991 to K1=US$0.39 in 1999.

[14] Including down-river environmental compensation

[15] The PDA is a government body created to develop the Porgera Valley with funds from the National and Provincial Governments.

[16] Including a Children's Trust and Young Adults Fund.

Other PJV projects aimed at increasing local benefits include a community affairs department with a business development section and a women's business development section. Both aim to provide assistance in local economic projects to develop agriculture and other local businesses (PJV, 1999b).

6 Governance

Prior to the PNG Government granting a Special Mining Lease, PJV completed a baseline study and submitted an Environmental Plan and an Environmental Management and Monitoring Program (EMMP). The Environmental Plan, including the riverine disposal of mining wastes, and the EMMP, were approved by the PNG Department (now Office) of Environment and Conservation (OEC). The EMMP included monitoring for the local mine site area and for the River System impacted by tailings disposal, downstream of SG3. Monitoring data is reported to the DEC in the form of quarterly summary reports and an annual Environmental Report.

To address concerns about the environmental and social impact of the mine, Porgera Environmental Advisory Komiti (PEAK), an independent advisory group, was established in 1996.[18] A multi-stakeholder approach was used and members of PEAK include a Chairperson, three technical specialists, two PNG Government representatives (Department of Mineral Resources and Office of Environment and Conservation), two NGO representatives, 1 Placer and 1 PJV representative and four other individuals to be nominated.

This committee was set up to oversee implementation of the recommendations from an independent environmental review of the Porgera Mine (CSIRO, 1996), to review annual environmental monitoring reports and to review environmental issues raised by external sources. "PEAK's primary function is to enhance understanding and provide transparency of Porgera's environmental, physical and social issues" (PJV, 1999b).

Recently, the effectiveness of PEAK has been questioned. In the last few months, the Chairperson of PEAK resigned stating that the CSIRO recommendations were not being implemented (MiningWatch Canada, 2001).

In addition to PEAK, national, provincial and local government as well as landowners, community representatives and the PJV meet quarterly to discuss mine related issues. PJV then manages community issues through the Community Affairs Department and the Community Issues Committee, which meets monthly.

References

See separate References for the Main Report and Appendices.

[17] See http://www.peak-pjv.com/aboutpe/peakindex.htm

[18] See PEAK website at http://www.peak-pjv.com/aboutpe/peakindex.htm

Acronyms

CSIRO	–	Commonwealth Scientific and Industrial Research Organisation
OEC	–	Office of Environment and Conservation of Papua New Guinea
EFIC	–	Export Finance and Insurance Corporation of Australia
EMMP	–	Environmental Management and Monitoring Program
ICRAF	–	The International and Community Rights Advocacy Forum
MPI	–	Mineral Policy Institute
NH&MRC	–	Australian National Health and Medical Research Council
PDA	–	Porgera District Authority
PDSP	–	Porgera District Sustainability Plan
PEAK	–	Porgera Environmental Advisory Komiti
PJV	–	Porgera Joint Venture
PNG	–	Papua New Guinea
WHO	–	World Health Organisation