

**Medaing v Ramu Nico Management (MCC) Ltd [2011]
PGNC 95; N4340 (26 July 2011)**

[N4340](#)

**PAPUA NEW GUINEA
IN THE NATIONAL COURT OF JUSTICE**

WS NO 1192 OF 2010

**LOUIS MEDAING
ON HIS OWN BEHALF AND ON BEHALF OF THE MEDAING FAMILIES OF THE
TONG CLAN AND THE SAWANG FAMILIES THAT MAKE UP THE ONGEG CLAN
AND THE FURTHER 272 PERSONS LISTED IN SCHEDULE 1 OF THE WRIT OF
SUMMONS
First Plaintiffs**

**TERRY KUNNING
ON HIS OWN BEHALF AND ON BEHALF OF THE FURTHER 152 PERSONS LISTED
IN SCHEDULE 2 OF THE WRIT OF SUMMONS
Second Plaintiffs**

**MARTIN D YAGAU
Third Plaintiff**

**PAUL KAMANG
ON HIS OWN BEHALF AND ON BEHALF OF THE FURTHER 17 PERSONS LISTED
IN SCHEDULE 3 OF THE WRIT OF SUMMONS
Fourth Plaintiffs**

**BILL KOI
Fifth Plaintiff**

**TAMLONG TAB
ON HIS OWN BEHALF AND ON BEHALF OF THE FURTHER 191 PERSONS LISTED
IN SCHEDULE 4 OF THE WRIT OF SUMMONS
Sixth Plaintiffs**

**KAMANANG NAMUR
ON HIS OWN BEHALF AND ON BEHALF OF THE FURTHER 20 PERSONS LISTED
IN SCHEDULE 5 OF THE WRIT OF SUMMONS
Seventh Plaintiffs**

**SIMON SIL
Eighth Plaintiff**

JAMES SUNGAI
ON HIS OWN BEHALF AND ON BEHALF OF THE FURTHER 323 PERSONS LISTED
IN SCHEDULE 6 OF THE WRIT OF SUMMONS
Ninth Plaintiffs

CASPER ANGUA
ON HIS OWN BEHALF AND ON BEHALF OF THE FURTHER 23 PERSONS LISTED
IN SCHEDULE 7 OF THE WRIT OF SUMMONS
Tenth Plaintiffs

V

RAMU NICO MANAGEMENT (MCC) LIMITED
First Defendant

THE INDEPENDENT STATE OF PAPUA NEW GUINEA
Second Defendant

DR WARI IAMO
IN HIS CAPACITY AS DIRECTOR OF ENVIRONMENT
Third Defendant

Madang: Cannings J

2011: 8, 9, 10, 14, 15, 16, 17, 18, 21, 22, 23 February,
2, 23 March, 15 April, 13 May, 26 July

TORTS – nuisance – whether action for common law tort of nuisance excluded by [Environment Act 2000](#) – standing of plaintiffs: whether sufficient connection with land – whether anticipated effect of first defendant's activity amounts to a nuisance – whether defence of statutory authorisation applies.

STATUTES – [Environment Act 2000](#) – whether first defendant's proposed activity would be unlawful under the Act – whether a person is entitled to carry out an activity under an approval granted under the repealed Environmental Planning Act Chapter No 370 if the activity was not being carried out before the coming into operation of the [Environment Act 2000](#) – [Environment Act 2000](#), Section 136.

CONSTITUTION – National Goals and Directive Principles – National Goal No 4 (natural resources and environment) – whether a claim that a defendant's proposed activity is contrary to National Goal No 4 is justiciable – whether National Court authorised to make orders regarding proposed activities that are contrary to a National Goal under Constitution Sections 23 (sanctions) or 25 (implementation of the National Goals and Directive Principles).

INJUNCTIONS – quia timet injunction – permanent injunction – considerations to take into

account in exercise of discretion whether to grant relief sought.

The plaintiffs, who claim to have an interest in customary land areas including seawaters affected by a nickel project constructed by the first defendant, commenced proceedings by writ of summons seeking a permanent injunction to restrain the first defendant from operating a deep-sea tailings placement (DSTP) system. The plaintiffs' claim for relief was based on three causes of action: (a) the common law tort of nuisance, (b) breach of the [Environment Act 2000](#) and (c) breach of National Goal No 4 of the *Constitution*. The defendants argued (a) as to the common law claim, that it was excluded by the [Environment Act 2000](#), which now provides a code for prosecution of alleged environmental harm, but if it is held that such a claim can be made, there was no environmental harm likely to occur and if it is held that such harm is likely, it is authorised by the approvals already given to the first defendant for operation of the DSTP, which provides a complete defence to an action in nuisance; (b) as to the alleged breach of the [Environment Act](#), that there was no breach in view of the approval given under the repealed Act, which is saved under Section 136 of the 2000 Act, and the amended permits granted since the coming into operation of the 2000 Act; (c) as to the constitutional claim, that it was baseless in view of *Constitution*, Section 25(1), which provides that the National Goals and Directive Principles are non-justiciable; and, generally, that the plaintiffs lacked standing to prosecute their grievances as some were not genuine landowners and that in the event that any one or more of their causes of action were sustained the court should decline to grant an injunction as they were guilty of undue delay and would suffer no substantial prejudice if an injunction were not granted whereas the first defendant and others whose livelihood depends on the mine commencing operation soon would be seriously and adversely affected.

Held:

(1) The [Environment Act](#) does not exclude common law actions for nuisance. Though difficult to predict with exactitude there is a high likelihood that serious environmental harm over and above that predicted and authorised by the environment permit granted to the first defendant will be caused by operation of the DSTP. The defence of statutory authorisation failed. The plaintiffs established a cause of action in private nuisance and in public nuisance.

(2) Operation of the DSTP will not be unlawful under the [Environment Act 2000](#) as that is an activity that is permitted to be done under the approval given under the repealed Act, which has been saved by the 2000 Act, and under conditions attached to permits that have been granted under the 2000 Act.

(3) The plaintiffs established to the satisfaction of the court that approval for and operation of the DSTP are actions that are contrary to National Goal No 4 of the *Constitution*.

(4) Each of the plaintiffs amply demonstrated that they are from coastal areas and have a genuine concern for the environmental effects of the DSTP. They all have standing to prosecute the action in nuisance.

(5) Despite the plaintiffs having established a cause of action in private nuisance and in public nuisance and that the proposed activity is contrary to National Goal No 4, the court declined to

grant the injunction sought as (a) there had been some delay by the plaintiffs in commencing the proceedings; (b) the first defendant had been led to believe by the conduct of the second and third defendants that it had approval to operate the DSTP and the prospects of it facing these sorts of proceedings would not have been reasonably foreseeable; (c) the interests of the first defendant and many people whose livelihood depends on imminent commencement of the DSTP and the mine could be adversely affected; (d) all defendants appeared to be making genuine efforts to put in place effective monitoring protocols to ensure that any problems with operation of the DSTP will be quickly remedied; and (e) if environmental harm of the type reasonably apprehended by the plaintiffs does actually occur they will be able to commence fresh proceedings at short notice and seek the type of relief being denied them in these proceedings.

(6) All other relief sought by the plaintiffs except for the requirement for consultation was refused. As to consultation, the court ordered that the plaintiffs must be consulted and kept informed on a three-monthly basis on tailings and waste disposal issues concerning the mine, for the life of the mine.

(7) The parties were ordered to pay their own costs.

Cases cited

The following cases are cited in the judgment:

Allen v Gulf Oil Refining [\[1981\] AC 1001](#)
Eddie Tarsie v Dr Wari Iamo (2010) [N4033](#)
Elema v MMI Insurance Ltd (2011) [SC1114](#)
Lakunda Plantation Pty Ltd v Ian Maluvil [\[1981\] PNGLR 252](#)
Manchester Corporation v Farnworth [\[1930\] AC 171](#)
Medaing v Ramu Nico Management (MCC) Ltd (2010) [N4127](#)
Medaing v Ramu Nico Management (MCC) Ltd (2010) [N4158](#)
Pastor Johnson Pyawa v Cr Andake Nunwa (2010) [N4143](#)
Pen Rumints v The State [\[1993\] PNGLR 94](#)
Ramu Nico Management (MCC) Ltd v Tarsie (2010) [SC1075](#)
Ronny Wabia v BP Exploration Co Ltd [\[1998\] PNGLR 8](#)
Tarsie v Ramu Nico Management (MCC) Ltd (2010) [N3960](#)
Tarsie v Ramu Nico Management (MCC) Ltd (2010) [N3987](#)
Tarsie v Ramu Nico Management (MCC) Ltd (2010) [N4005](#)
Tarsie v Ramu Nico Management (MCC) Ltd (2010) [N4097](#)
Tarsie v Ramu Nico Management (MCC) Ltd (2010) [N4141](#)
Tarsie v Ramu Nico Management (MCC) Ltd (2010) [N4142](#)
The State v Lohia Sisia [\[1987\] PNGLR 102](#)

Abbreviations

The following abbreviations appear in the judgment:

CSIRO – Commonwealth Scientific & Industrial Research Organisation
DEC – Department of Environment and Conservation
DSTP – Deep Sea Tailings Placement
EP – Environment Plan (or Permit)
EU – European Union
HPAL – High Pressure Acid Leaching
HPL – Highlands Pacific Limited
MCC – Ramu Nico Management (MCC) Ltd
MPI – Minerals Policy Institute
N – National Court judgment reference
OEMP – Operational Environment Management Plan
ROV – remote operation vehicle
SAMS – Scottish Association of Marine Scientists
SC – Supreme Court judgment reference
SCADA – supervisory control and data acquisition
TSF – tailings storage facility
USA – United States of America
UN – United Nations
WS – Writ of Summons

Terminology

The following legal and scientific or technical terms appear in the judgment:

Legal

Cause of action – a civil claim, the elements of which must be proven to be eligible for a remedy

Common law – judge-made law

Injunction – a court order prohibiting from doing something or requiring them to do something

National Goals and Directive Principles – five propositions set out in the Preamble to Papua New Guinea's Constitution that underlie the Constitution

Non-justiciable – cannot be heard or determined in a court

Nuisance – a tort, proven by unlawful interference in enjoyment or use of land

Quia timet – because he fears; a quia injunction is an injunction granted to restrain apprehended harm or wrongful acts that are threatened and imminent, but have not yet been commenced

Tort – a civil wrong (other than a breach of a contractual duty) recognised by the common law

Underlying law – the unwritten law of Papua New Guinea, consisting of custom and common law

Scientific & technical

Bathypelagic – of fish and other organisms inhabiting the deep sea (depths of more than 1,000 metres)

Benthos – the flora and fauna found on the bottom, or in the bottom sediments, of a sea or lake

Bioaccumulation – become concentrated inside the bodies of living things

Bioassay – measurement of the concentration or potency of a substance by its effect on living cells or tissues

Cobalt – hard silvery-white magnetic metal (symbol: Co); chiefly obtained as a by-product of

nickel and copper ores – used as a component of magnetic alloys
Diatom – a single-celled alga which has a cell wall of silica
Ecology – the branch of biology that deals with the relations of organisms to one another and to their physical surroundings
Ecotoxicology – the branch of science that deals with the nature, effects and interactions of substances that are harmful to the environment
Euphotic zone – the zone, approx 100 metres deep from the surface of the sea, in which enough light penetrates to allow active photosynthesis
Fauna – animals
Flora – plants
Geochemistry – the study of the chemical composition of the earth and its rocks and minerals
Geology – the science that deals with the physical structure and substance of the earth, their history and the process which act on them
Haematite – reddish-black mineral consisting of ferric oxide – important
Hydrology – the branch of science concerned with the properties of the earth's water and especially its movement in relation to land
Ichthyology – the branch of zoology that deals with fishes
Isobath – a line drawn on the chart of the seas, connecting all points having the same depth
Laterite – a reddish, clayey material, hard when dry, forming a topsoil in tropical regions – rich in iron and aluminium oxides, formed by weathering of igneous rocks in moist warm climates
Mixing zone – the body of sea water in which it is permissible for ambient water quality standards to be breached
Mollusc – an invertebrate of a large phylum which includes snails, slugs, mussels and octopuses
Monsoon – seasonal prevailing wind, bringing rain
Nickel – silvery-white metal (symbol: Ni), occurring naturally in various minerals
Oceanography – the branch of science that deals with the physical and biological properties and phenomena of the sea
Photosynthesis – the process by which green plants and some other organisms use sunlight to synthesise foods from carbon dioxide and water
Sea urchin – marine echinoderm which has a spherical or flattened shell covered in mobile spines
Sediment – particulate matter that is carried by water or wind and deposited on the surface of the land or the seabed
Sessile – an organism fixed in one place, immobile, attached directly by its base without a stalk, eg a barnacle
Slurry – a semi-liquid mixture
Tailings – the residue of any product, especially ore
Toxicology – the branch of science concerned with the nature, effects and detection of poisons
Trophic – of or relating to feeding and nutrition
Upwelling – upward movement through a water column of sediment or soluble particles

TRIAL

This was a trial in which the plaintiffs are seeking amongst other things a permanent injunction to restrain commission of alleged common law nuisance, unlawful environment harm and breaches of the National Goals and Directive Principles.

Counsel

T Nonggorr, for the plaintiffs

C Scerri QC, I Molloy, G Gileng & C Posman, for the first defendant

D M Steven, for the second and third defendants

26th July, 2011

1. **CANNINGS J:** The plaintiffs, who claim to have an interest in customary land areas including seawaters that will be affected by the Ramu Nickel Project, have commenced proceedings seeking a permanent injunction to stop the first defendant operating a deep-sea tailings placement (DSTP) system at Basamuk, Madang Province. The Project consists of:

- a mine at Kurumbukari (comprising a series of open-cut pits and a plant to produce ore slurry) in the high country in Usino-Bundi District of Madang Province;
- a 135-km slurry pipeline that takes the ore slurry to a refinery at Basamuk on the Rai Coast of Madang Province;
- the refinery and wharf facilities at Basamuk, from where refined products, principally nickel and cobalt will be exported; and
- the DSTP system, the method of tailings disposal approved by the Director of Environment.

2. The DSTP will transport the tailings through a sloping 400-metre pipeline to a depth of 150 metres. At the discharge point – 400 metres offshore at a depth of 150 metres – the tailings will be pumped, at a rate of 5 million tonnes and 58 million cubic metres per year, into the sea at Basamuk Bay. This process is planned to operate for the life of the project, estimated to be 20 years. The underwater area into which the tailings will be discharged is Basamuk Canyon. It is estimated to be 1100 metres deep. Basamuk Bay forms part of a larger indentation on the northern coast of Madang Province called Astrolabe Bay, the underwater area of which is called Vitiaz Basin.

3. The mine, the pipeline, the refinery and wharf were constructed from 2008 to 2010. Construction of the DSTP was due to commence in early 2010 but was restrained by an interim injunction granted by this court in March 2010 in proceedings, WS No 202 of 2010, commenced by a different group of plaintiffs to those involved in the present case. Those earlier proceedings were, following a series of rulings on interlocutory matters, discontinued in September 2010 on the eve of the due date for commencement of the trial (see *Ramu Nico Management (MCC) Ltd v Tarsie* (2010) [SC1075](#), *Tarsie v Ramu Nico Management (MCC) Ltd* (2010) [N3960](#), *Tarsie v Ramu Nico Management (MCC) Ltd* (2010) [N3987](#), *Tarsie v Ramu Nico Management (MCC) Ltd* (2010) [N4005](#), *Tarsie v Ramu Nico Management (MCC) Ltd* (2010) [N4097](#), *Tarsie v Ramu Nico Management (MCC) Ltd* (2010) [N4141](#) and *Tarsie v Ramu Nico Management (MCC) Ltd*

(2010) [N4142](#)).

4. Immediately after discontinuance of the *Tarsie* proceedings, the principal plaintiff, Louis Medaing, commenced the current proceedings. In October 2010 I granted an interim injunction to restrain the operation of the DSTP, but not its construction (*Medaing v Ramu Nico Management (MCC) Ltd* (2010) [N4127](#)). More plaintiffs have since joined the proceedings with the leave of the court (*Medaing v Ramu Nico Management (MCC) Ltd* (2010) [N4158](#)).

5. The DSTP system was constructed in November-December 2010. It was tested in January 2011 and is almost ready to be commissioned. The interim injunction is preventing its operation. No other tailings disposal facility has been built. Without the DSTP the mine cannot operate. Also preventing operation of the DSTP and the project is the need for approval by the Director of Environment of an Operational Environment Management Plan. Under the Environment Permit granted to the mine developer to construct and operate the project, nothing can happen until the OEMP is approved.

6. The defendants are:

- Ramu Nico Management (MCC) Ltd, known commonly as "MCC", the developer of the mine and the project, the first defendant;
- the State, second defendant;
- Dr Wari Iamo, in his capacity as Director of Environment, the office he holds and in which various powers, functions, duties and responsibilities are vested under the *Environment Act 2000*, the third defendant.

7. The plaintiffs' claim for relief is based on three causes of action:

- First, the common law tort of nuisance. The plaintiffs argue that they have the right under the underlying law of PNG to sue for unlawful interference in the enjoyment of their land and sea and that operation of the DSTP will constitute a common law nuisance.
- Secondly, breach of the [Environment Act 2000](#). The plaintiffs argue that operation of the DSTP will cause serious environmental harm, which is not authorised by the statutory approvals that have been granted by the Director to MCC, and is therefore unlawful.
- Thirdly, breach of National Goal No 4 (*natural resources and environment*) of the *Constitution*, which is for "Papua New Guinea's natural resources and environment to be conserved and used for the collective benefit of us all, and be replenished for the benefit of future generations".

8. The defendants argue that the plaintiffs cannot prove any of their causes of action. As to the common law claim they say that the plaintiffs have not proven that operation of the DSTP will constitute a nuisance. If the court finds that a nuisance will occur, the plaintiffs' claim has been

excluded by the [Environment Act 2000](#), which now provides a code for prosecution of alleged environmental harm; and in any event the environmental harm is authorised by the approvals already given to MCC and this provides a complete defence to any action in nuisance. As to the alleged breach of the [Environment Act](#), the defendants say that there will be no breach in view of the approval given under the repealed *Environmental Planning Act* Chapter No 370, which is saved under Section 136 of the 2000 Act, and the amended permits granted since commencement of the 2000 Act. As to the constitutional claim, the defendants argue that it is baseless in view of *Constitution*, Section 25(1), which provides that the National Goals and Directive Principles are non-justiciable (ie cannot be heard or determined by a court).

9. The defendants also argue that the plaintiffs lack standing to prosecute their grievances as some are not genuine landowners. In the event that any of the plaintiffs' causes of action are sustained, the defendants say that the court nevertheless should decline to grant any injunction as the plaintiffs have been guilty of undue delay and would suffer no substantial prejudice if an injunction were not granted whereas MCC, which has invested heavily in the project, and others whose livelihood depends on the project commencing operation soon, would be seriously adversely affected.

10. This judgment provides reasons for the court's determination of each cause of action and the relief sought by the plaintiffs. Most of the relief sought is equitable, which means that if the plaintiffs establish one or more cause of action, they are not entitled as of right to an injunction or the other orders and declarations they seek. They must convince the court that it is in the interests of justice to grant relief and that the court should exercise its discretion in their favour.

11. At the centre of each cause of action is the plaintiffs' contention that operation of the DSTP will have a serious and adverse effect on the marine environment and their own land, environment, livelihood and quality of life. It is therefore necessary to first summarise the evidence and make findings of fact before determining whether any cause of action is established and, if it is, whether any form of relief should be granted in favour of the plaintiffs. The judgment is set out as follows.

PART A – THE EVIDENCE

PART B – FINDINGS OF FACT

PART C – THE COMMON LAW ACTION IN NUISANCE

PART D – THE ALLEGED BREACH OF THE [ENVIRONMENT ACT](#)

PART E – THE ALLEGED BREACH OF NATIONAL GOAL NO 4

PART F – REMEDIES

PART G – CONCLUSION

PART A: THE EVIDENCE

12. The plaintiffs called 17 witnesses to give oral evidence, most of whom had sworn affidavits and were cross-examined on them. Five of the plaintiffs' witnesses are scientists who were presented as expert witnesses, and much of their evidence is challenged by the defendants. Four affidavits by witnesses (one of whom is a scientist) who were not required for cross-examination by the defendants were admitted into evidence by consent. Forty-six exhibits (including affidavits) were tendered through witnesses called by the plaintiffs and admitted into evidence.

13. The defendants called 14 witnesses to give oral evidence most of whom had sworn affidavits and were cross-examined on them. As with the plaintiffs' witnesses, five of the defendants' witnesses are scientists, and much of their evidence is contentious. Six affidavits by witnesses who were not required for cross-examination by the plaintiffs were admitted into evidence by consent. Thirty exhibits were tendered through witnesses called by the defendants and admitted into evidence.

14. After the close of evidence and before submissions the court made a site visit to Kurumbukari and Basamuk. Though not evidence, as such, the observations made and information conveyed during the visit are summarised here as an adjunct to the summary of the evidence, which is set out as follows:

- 1 Evidence (oral and affidavit) of 17 witnesses called by the plaintiffs.
- 2 Affidavit evidence of the plaintiffs' witnesses not required for cross-examination.
- 3 Evidence (oral and affidavit) of 14 witnesses called by the defendants.
- 4 Affidavit evidence of the defendants' witnesses not required for cross-examination.
- 5 Site visit.

1 EVIDENCE OF 17 WITNESSES CALLED BY THE PLAINTIFFS

15. The following table lists witnesses in the order that they gave evidence, summarises their evidence (both oral and affidavit) and categorises it according to the findings of fact set out later in the judgment:

- (1) The nature of the plaintiffs' interests and concerns.
- (2) The nature of statutory approvals.
- (3) The environmental effect of operation of the DSTP.
- (4) Effect of an injunction.

TABLE 1: WITNESSES CALLED BY THE PLAINTIFFS

No	Witness	Description	Category
1	Tamlong Tab	Villager, 6th plaintiff	(1)
<p>Evidence: He is from Siar village, north of Madang town – concerned about the effect of DSTP on fish stocks in his local area – the people depend on the sea for their daily living – concerned that their reefs will die if covered by sediment – though his area seems to be a long way from Basamuk, he is concerned that the mine waste will be brought by the currents – the mine waste – unaware of awareness programs conducted in 1999.</p>			
2	Terry Kunning	Villager, 2nd plaintiff	(1)
<p>Evidence: He is from Mindire village, Basamuk – he estimates that 40% of his people's livelihood depends on the sea – they do not want to see their sea used as a toilet – they have already given up land for the project, but land disputes remain unresolved – they do not want to stop the project, but they want MCC to find other ways of disposing of mine waste – he knows about workshops conducted by DEC in 1999 but feels that people were bulldozed into supporting the project – local knowledge tells him and his people that upwelling will occur.</p>			
3	Casper Angua	Villager, 10th plaintiff	(1)
<p>Evidence: He is from the coastal area of Bogia District, Madang Province – a long way from Basamuk but the people at Bogia already see the adverse effects of sea pollution caused by the RD Tuna cannery near Madang town – they are concerned that the mine will further pollute the sea waters.</p>			
4	Martin D Yagau	Councillor, Astrolabe Bay LLG, 10th plaintiff	(1)
<p>Evidence: He represents five villages in the Ward 3 area, close to Basamuk – they are concerned that mine wastes will destroy marine life – he believes that the mine tailings will contain poison that will have a big effect on the 2,500 people in Ward 3 who depend on the sea for their livelihood.</p>			
5	James Sungai	Villager, 9th plaintiff	(1)
<p>Evidence: He is from Kananam village in the North Coast area of Madang Province – his local knowledge tells him that sea currents flow from Morobe and Basamuk in their direction – the sea is like a garden to the people in his area – their daily living depends on it.</p>			
6	Kamanang Namur	Villager, 7th plaintiff	(1)
<p>Evidence: He is from Bilbil village, a coastal village between Madang town and Basamuk – his people are very concerned 'that they are facing that pipe' – the current from Basamuk runs straight to their area.</p>			

7	Paul Kamang	Villager, 4th plaintiff	(1)
<p>Evidence: He is from Yabob village, near Madang town – people in his village are concerned about the chemicals that will be used when disposing of mine tailings.</p>			
8	Louis Medaing	Disputing claimant for land at Basamuk, 1st plaintiff	(1)
<p>Evidence: He comes from the Basamuk area, though he has been living in Madang town for a long time and is in dispute with other people who claim to be Basamuk customary landowners, including the 2nd plaintiff, Terry Kunning – the question of customary land ownership has not been dealt with properly – he has since 1999 been writing letters to the Government about these issues, without response – there has been little or no consultation on the part of the Government.</p> <p>He first came to know about the DSTP proposal in 2008 but did not initiate the current proceedings until September 2010 because he had commenced another court case in 2005 regarding customary land issues and it would have been hard for him to run two cases at once; also there were other landowners, including Eddie Tarsie, who commenced the earlier proceedings, so it only became necessary to start the present proceedings when Mr Tarsie withdrew his case and the court ordered that he (Mr Medaing) could not join those proceedings – MCC should use a land-based system for disposing of mine wastes.</p>			
9	Dr Phil Shearman	Ecologist-environmental scientist, UPNG, Port Moresby, PNG	(3)
<p>Evidence: He was the principal author of the MPI Report, prepared for the Lutheran Church in 1999, the purpose of which was to review the environmental plan for the Ramu Nickel Project prepared by NSR – he synthesised and brought together the work of scientific experts – he formed the view then, and maintains, that the case for a DSTP is fatally flawed and that alternatives to DSTP have never been thoroughly considered and that risks connected with DSTP have not been adequately assessed – his view, based largely on the work of Dr Luick, is that the tailings, once entering the sea, are likely to spread over a much wider area than predicted; calculation of the sediment budget of rivers flowing into Astrolabe Bay in the 1999 environmental plan was affected by undergraduate-style errors and thus significantly overestimated; however, in cross-examination he apologised for himself making an 'undergraduate error' in his calculations based on a scientific journal article – having reviewed the most recent scientific reports (eg <i>Hay & Co Report</i>) on the likely behaviour of the tailings, he considers that substantial uncertainty remains as to the fate of tailings, also known as the 'tailings footprint', and that wind-driven upwelling of tailings is likely, as is shoreward drift.</p> <p>He denied in cross-examination that he is an opponent of DSTP, his interest is in seeing that decisions are based on the best scientific information available – he regards the SAMS Report as a very good document, but it raises many issues that need to be investigated further.</p>			

10	Dr Gavin Mudd	Environmental engineer, Monash University, Melbourne, Australia	(3)
<p>Evidence: His opinion, as someone with expertise and interest in sustainable mining practices, particularly tailings management, is that it is far preferable for the Ramu project to have a conventional land-based TSF (tailings storage facility) – even in seismically active areas, contemporary engineering knowhow is well able to deal with associated risks; also tailings technology (eg using paste or thickened technology) has improved markedly in the last 10 years – land-based systems make tailings easy to monitor and manage.</p> <p>He sees no engineering or scientific reason to favour DSTP over land-based TSF; he presumes that DSTP has been proposed as a cost-saving measure; there has been no comprehensive assessment of relative costs and long-term environmental risks; the work done for the original environmental plan was extremely limited, based only on a conceptual desktop study – a land-based TSF at Basamuk is technically feasible and could be operated safely, efficiently and economically – a DSTP operation equivalent to what is proposed at Basamuk would be illegal in Australia and entirely inappropriate in view of the bathymetric (oceanographic) conditions – though the Ramu Nickel Project will produce 5 million tonnes of tailings per annum, there are projects in other countries, eg USA (the Bingham Canyon, Utah gold-copper mine operated by Rio Tinto) and even in seismically active areas such as Chile, which have tailings dams 50 times bigger than what would be needed for Ramu – the Ok Tedi tailings dam failed due to poor site planning and poor design and construction; the proposed Xstrata copper-gold mine at Frieda River is planning a land-based TSF, despite high rainfall and seismic issues and challenging topography.</p>			
11	Dr John Luick	Physical oceanographer, South Australia Research & Development Institute, Adelaide, Australia	(3)
<p>Evidence: He contributed to the MPI Report, which assessed the 1999 environmental plan – he has since had the opportunity to consider other material (<i>Dames & Moore study (1999)</i>, <i>Cardno Acil review (2007)</i>, <i>draft Hay Co report (2008)</i>).</p> <p>All the data and his knowledge of the local submarine conditions suggests that there will be strong and persistent upwelling, the precise extent of which is, however, difficult to predict – there are two distinct types of upwelling: (i) submarine canyon upwelling, a universally recognised phenomenon in canyons of the geometry of Basamuk Canyon, which is like a jet or sheet of water moving upward and shoreward, he predicts that it will move at a rate of 750 metres per day, at a depth of about 10 metres from the sea bed, which is apparent from the available current meter data; and (ii) wind-driven upwelling, which is very variable and dependent on seasonal, monsoonal weather patterns and associated with major wind events, and insufficient work has been done on the oceanographical phenomena in Basamuk Bay to say whether wind-driven upwelling will be a problem – the 1999 environmental plan suggested that wind-driven upwelling would not occur at a depth beyond 100 metres, but the data and assumptions on</p>			

which that estimate was based are extremely unreliable.

As to (i) submarine canyon upwelling, he has little doubt that it will bring up soluble parts of the tailings (those parts that are not deposited as sediment but are suspended in the sea water) in a submarine jet or sheet or a series of elliptical paths – the only issue is whether the jet-sheet will make it up into the mixing layer (or zone) and be delivered by onshore drift to the mainland – if it does, it would transport tailings liquor from the sea to the shore within half a day of the time of discharge – it remains a major concern, which was pointed out by *Dames & Moore* in 1999 and by himself in the *MPI Report* and also by *Cardno Acil* in 2007 – the further oceanographical studies required to rule out this major risk have never been done.

As to (ii) wind-driven upwelling, it cannot be ruled out that this will not occur, especially due to major wind events, and if it does occur the consequences would be serious.

The tailings footprint predicted by the 1999 environmental plan is unreliable for another reason: clear potential exists for the phenomenon of plume shearing, whereby plumes will shear off the back of the tailings and be swept up by the prevailing currents, make their way along the coasts past Madang town, at substantially high levels of contamination. He is not impressed by the SAMS proposal advocated by Dr Shimmield (defendant witness No 7, table 3) to simply let the DSTP operate for a year and monitor it: that is an outrageous suggestion – why not go back to Scotland and do it there or at least try and get a permit to do it there? – he is also unimpressed with the technology and equipment that SAMS proposes to deploy, which he thinks amounts to "green wash" – all predictions he has seen of the fate of the tailings are based on incomplete information: the optimum minimum depth of the tailings outfall cannot be properly assessed from the existing data.

12	Dr Amanda Reicheldt-Brushett	Eco-toxicologist, Southern Cross University, Lismore, Australia	(3)
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Evidence: She contributed to the MPI Report, which was based on the 1999 environmental plan – she has considered the eco-toxicological tests conducted then, plus further tests conducted in 2007 and 2008 – none of the tests has been adequate, in that in the 1999 test the species of fish and other organisms against which the tailings were tested are not endemic to the Madang area, no sediment-toxicity tests were completed (so no tests have been done on how coral will react to the overlay of tailings sediment), the test organised by CSIRO, Australia, states that there is only a 50% confidence of protecting 95% of the species, the effect of the tailings on coral species has not been quantified, no long-term studies on bio-accumulation have been completed, so the effect of exposure to tailings for more than 96 hours is not known and the ecological interaction between species is unknown.

Despite the inadequacy of the tests, they show that the tailings will be toxic, especially when account is taken of the change in chemical composition and organic load that will be created by sewerage treatment – the waters in the Madang area are home to some of the most diverse coral reef

communities in the world – she has not examined any dilution modelling but dilution is not always the solution to pollution – though her area of expertise is in shallow-water coral ecosystems, there are definitely corals in the deep sea areas of Astrolabe Bay – depositing 14,000 tonnes of tailings per day into that area is going to have an impact – corals will be affected not only by metals in the tailings but also by build-up of tailings sediment, which causes reduced light penetration and inhibited photosynthesis of the symbiotic zooxanthellae and a reduction in resilience of corals (as they have to work hard to reduce sediment) – coral reef ecosystems provide habitats for an enormous population and diversity of fish species and invertebrates – of the 604 coral species recorded in the world, 514 occur in the Bismarck Sea – the Coral Triangle (of which Astrolabe Bay forms part) is a hotspot of phenomenal biodiversity – the deep sea is a largely unexplored part of the planet – corals exist in vulnerable ecosystems, which are under threat from climate change and other stress sources, eg pollution and sedimentation.

13	Dr Gregg Brunskill	Marine bio-geochemist, Australian Institute of Marine Science (retired 2006)	(3)
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Evidence: He contributed to the MPI Report, which was based on the 1999 environmental plan – he bases his opinions on 45 years experience in coastal oceanography and how sediment moves along the continental shelf and continental slopes, mainly in Canada and Australia, but also in PNG, eg coastal oceanographic research into the Sepik River dispersal area in the Bismarck Sea, which provides an example of how liquid mud flows down a submarine canyon – useful to have that knowledge to consider what might happen with the Basamuk submarine canyon and waste from the Ramu Nickel Project.

It is unlikely that the tailings will behave as described in the 1999 environmental plan – it is more likely that they will accumulate in the near-shore canyons and inter-canyon platforms and be transported in a turbid mass in the PNG coastal current and the PNG undercurrent at a rate of 0.5 to 1 metre per second – the available evidence is that sedimentation rates at Basamuk Bay are low, which suggests that sediment is being transported by deep currents away from the Bay.

The claim in the 1999 environmental plan that 80 million tonnes per year of natural sediment flows into Astrolabe Bay is a ludicrous, preposterous overestimate, as that is the same amount of sediment generated annually by the Sepik River, which has a catchment area of 79,000 square km, whereas Astrolabe Bay has a catchment area of approx 1,000 km – the 80 million tonnes figure is inherently unreliable for another reason: it is not based on any actual measurements, it is based merely on extrapolations – a far more relevant and accurate figure is the amount of natural sediment that flows per year into the Basamuk Canyon (the anticipated destination of the tailings) which he estimates, based on real data from hydrological stations at the Upper Ramu and Gogol Rivers is, at most, 2 million tonnes per year.

He estimates that the amount of sediment from the DSTP will double or triple the amount of sediment coming into Basamuk Canyon from natural sources – the inevitable consequence of dumping tailings on

the sea floor, based on what has happened at Lihir and Misima (60 square km of the sea floor has been smothered, resulting in altered and degraded seafloor ecology around each island) is a large reduction in biological diversity, particularly decreases in benthic animals.

The claim that there is a high natural river sediment input into the Basamuk Canyon, which will dilute and bury the refinery waste after mine closure, is incorrect and unsupported by any actual measurements of water and sediment discharges – there are no large rivers flowing into Basamuk Canyon – accurate measurements could easily be obtained at moderate cost but would have to be made over several years and take account of El Nino and La Nina cycles – this was pointed out in the MPI Report and he is surprised that the work has not been done; possibly because proponents of the project do not want people to know that the mine is going to double or triple the amount of sediment going down the Basamuk Canyon.

His motivation for giving evidence is to stop dumping of mine waste into the sea – he disagrees with the SAMS proposal to let dumping proceed for a year and monitor it, which he labelled a "suck it and see" approach – you do not need to dump in Basamuk Canyon – just go to Lihir or Misima and see what happens when you dump deep sea tailings placement on the sea floor: it causes large reductions in biological diversity; it reduces abundance of benthic animals and it smothers everything.

14	Dr Wari Iamo	Director of Environment, 3rd defendant (summoned, upon application by plaintiffs, to give evidence)	(2)
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Evidence: He has been head of DEC and/or Director of Environment since 1999 and is aware of statutory approvals that have been given for the Ramu Nickel Project – the original 1999 environmental plan has been subject to exhaustive peer review, particularly by Dames & Moore, Cardno Acil and, most recently, SAMS.

Based on the Dames & Moore review, it appears that there will be no upwelling and the depth of the outflow point of 150 metres is sufficient; there remains a risk of upwelling but that will be accommodated by further oceanographic studies, which are proposed to be undertaken over a 12-month period – commencement of operation of DSTP is still subject to his approval of the OEMP – DEC has no technical expertise in the scientific fields required to review the environmental plan as it is a policy department and therefore must outsource such work.

15	Johanes Anitango	Villager, Frenski village, Basamuk area	(1)
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Evidence: He is from Frenski village in the Basamuk area – he is concerned that the mine waste will destroy him and his people and their welfare and spirituality – he and his people and the Lutheran Church expressed these concerns to the Government but the Government decided that the mine waste should be dumped in the sea.

16	Udil Lapiu	Councillor, Sumkar LLG,	(1)
Evidence: He lives on and represents the people of Bagabag Island – they are not customary landowners for the Ramu Nickel Project and will not get any benefit from the mine but are concerned that the waste from the mine will be poisonous and if it is dumped in the sea it will affect them – there have been no public awareness sessions on Bagabag Island and he has not attended any in Madang town.			
17	Bager Wamm	President, Karkar Island LLG	(1)
Evidence: He is concerned that the tailings will be brought by the sea currents from Basamuk to Karkar Island and that they will destroy his people because of the chemicals in the tailings – his people are sea people; the sea is their forest.			

2 AFFIDAVIT EVIDENCE OF PLAINTIFFS' WITNESSES NOT REQUIRED FOR CROSS-EXAMINATION

Their evidence is summarised in the following table.

TABLE 2: AFFIDAVIT EVIDENCE OF PLAINTIFFS' WITNESSES NOT REQUIRED FOR CROSS-EXAMINATION

No	Name	Description	Category
1	Mark Arongo	Village chief	(1)
Evidence: He is from Dangale village, Manam Island – the people of Manam Island (those still living on the island plus those who have moved to care centres on the mainland, following the 2004 volcanic eruption) depend on the sea for their livelihood – they fully support the principal plaintiff, Louis Medaing and object to the DSTP as it will destroy their sea environment.			
2	Simon Sil	Councillor, Ambenob LLG	(1)
Evidence: He represents Riwo, Malmal and Nagada villages, in the North Coast area of Madang District – his people object to the DSTP as they depend on the sea for their livelihood and they consider that the sea will bring the mine waste to their sea and lagoons, destroy marine life and bring in sickness and disease.			
3	Bill Koi	Councillor, Ambenob LLG, 5th plaintiff	(1)
Evidence: He represents Kranget, Bilia and Pinitubun islands and villages – the sea is the livelihood of the people and must not be contaminated by manmade poisonous mine waste, which will destroy the			

environment and the people.

4	Dr Richard Pyle	Marine biologist, Chief Science Officer, Association for Marine Exploration & Associate Zoologist, Bishop Museum, Hawaii, USA	(3)
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Evidence: He is an ichthyologist, specialising in exploration and documentation of tropical coral-reef habitats at depths of 50 to 150 metres throughout the tropical Indo-Pacific region – has been investigating biodiversity inhabiting tropical coral reefs for more than 20 years, including off the northern coast of PNG: the marine life inhabiting such reefs (eg hundreds of fish species, and sessile invertebrates, eg corals, sponges, molluscs) is amongst the richest and most diverse of any comparable habitat he has seen anywhere in the Indo-Pacific region – in addition to being rich and diverse, many of the communities of fish and other organisms occur nowhere on Earth other than PNG.

3 EVIDENCE OF 14 WITNESSES CALLED BY THE DEFENDANTS

16. Their evidence is summarised and categorised in the same way as for the plaintiffs' witnesses.

TABLE 3: WITNESSES CALLED BY THE DEFENDANTS

No	Witness	Description	Category
1	Ian Hargreaves	Consulting marine scientist, hydrologist	(3)

Evidence: He was the project manager for the 1999 environmental plan, prepared by NSR Environmental Consultants – in his opinion there will be little or no vertical movement of tailings once deposited on the sea floor of Basamuk Canyon as there is an extremely low shoreward current – he disputes the evidence of Dr Luick regarding the shoreward jet or sheet – the Basamuk Canyon is very protected and there is no evidence in the measured current-meter records that the current would have the strength to transport the tailings to anywhere other than the floor of Basamuk Canyon.

He also disputes the evidence of Dr Brunskill about the amount of natural sediment flowing annually into Basamuk Canyon: although the catchment area of the two small rivers (Yaganon and Gowar) that flow into it is much less than the catchment area of the Sepik River, calculation of the sediment load is based on non-linear equations, and this makes the sort of estimates made by Dr Brunskill (maximum of 2 million tonnes) unreasonable; he (Mr Hargreaves) estimates that the natural sediment load is 12 million tonnes, which will blend with the tailings load of 5 million tonnes of solids and 58 million cubic metres of liquid per annum; and the heavy natural sediment load will aid in the rehabilitation of the seabed – in his opinion Dr Brunskill has failed to take into account that the tailings will enter the sea at a

depth of 150 metres, which is below the surface-mix layer, which means they will be mixing with water of a higher density, and not be prone to upwelling – he clarified that the figure of 78.5 million tonnes used in the environmental plan is the annual amount flowing into the wider area of Astrolabe Bay, the sub-surface area of which is Vitiaz Basin; he maintains that that figure is correct and is the result of calculations he made, which are based on formulae published by eminent geographer John D Milliman.

The tailings will have a relatively high specific gravity of 3.5 (heavier than natural sediment of approx 2 to 2.5) – he does not believe that the DSTP will have any shallow water impacts – the environmental impact will be restricted to deep water: the smothering by tailings solids of the seafloor of Basamuk Canyon of approx 160 square km, which represents the 'tailings footprint' – benthic organisms, which already live in a very high natural sedimentation zone, may not be able to cope with an increased rate of sedimentation – as to the biological impact, DSTP is designed to protect the euphotic zone where 90% of marine animals live; however, no complete baseline surveys have been done of biological communities on the seafloor at Basamuk Canyon.

2	Dr Philip Towler	Marine chemist, Coffey Environment Systems	(3)
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Evidence: As to the toxicological tests that have been undertaken by CSIRO on the tailings: these are standard tests – despite the tests not being on species found in the area where the DSTP is, and despite the apparent statistical uncertainty referred to in Dr Reicheldt-Brushett's evidence – the tailings are "inert" chemically as they will be neutralised to remove acid.

He is the leader of the team who has prepared the OEMP for MCC, which has been presented to DEC – there are no eco-toxicological tests in the OEMP, but as for benthic organisms, they will be regularly monitored under the OEMP according to abundance and diversity – he does not know the effect of bioaccumulation of nickel and manganese – information provided to him suggests that the grain size of the tailings will be homogenous – he agrees with Dr Shimmield's opinion that DSTP can have a major impact on deep sea sediments and their biological communities.

3	Dr George Shou	Civil engineer	(3)
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Evidence: He was project manager for construction of the DSTP pipeline, constructed from 6 November to 8 December 2010: the pipe will take tailings from the shore at Basamuk to the discharge point, 400 metres off-shore at a depth of 160 metres, 10 metres deeper than planned – the DSTP will automatically shut down in the event of pipe breakage or leakage.

He was involved in construction of the submarine tailings disposal pipeline at Minihasa, Indonesia, which had two pipeline breakages – he was not involved with the submarine tailings disposal pipeline at Misima, PNG, which also had two pipeline breakages – the Basamuk DSTP pipe has already been tested and he is very confident that there will be no breaks or leakages in view of lessons learned from Minihasa and Misima, eg the Minihasa pipeline was much longer (3.5 km) and narrower than the

Basamuk pipeline (0.4 km long and 65 cm diameter, plus a 'wall' of 8 cm), so the pressure within the pipe at Basamuk is much lower; also the slurry at Minihasa was much coarser than the fine slurry at Basamuk, so there will be less wear on the Basamuk pipe – further, he has put concrete ballast on the Basamuk pipe, which accommodates the risk of earthquakes and shifting slopes – hence the Basamuk pipeline will be much safer than the Minihasa or Misima pipelines.

4	Stuart Jones	Geologist-geographer	(3)
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Evidence: He was the project manager for the 1999 environmental plan, prepared by NSR Environmental Consultants, in which a multi-disciplinary approach was taken, involving input from 80 people; he regards himself as a scientist and an expert in environmental and social impact assessment.

In his opinion the projections of Dr Luick re upwelling and onshore drift are speculative and incorrect and based on a flawed assumption about the slope of the sea bed at the discharge point: Dr Luick based his calculations on a slope of 16 degrees but the correct gradient is 30 degrees – the 1999 environmental plan predicts no shallow water environmental damage or impacts arising from DSTP operation at Basamuk and he expects there to be none – plankton and invertebrates and deep-slope fish may be affected by sub-surface turbidity plumes but they will be only exposed to relatively low concentrations of suspended solids and potential contaminants in the water column.

He is confident that the mixing zone (the water column with a radius of 1 km extending from the discharge point, at a depth of 150 metres, to the sea floor) will be more than sufficient to neutralise the toxicity of the tailings: the quality of water outside the mixing zone will meet the ambient water quality criteria for PNG, as permitted and required by the environment permit – the toxicity tests show that only 56 dilutions are needed in order to protect 95% of marine species, with a 50% degree of confidence: this is very good compared to Misima, which required 10,000 dilutions in order to reach ambient water quality standards.

The impact of the DSTP on fish stocks will be small and localised, as most fish will swim away and move to canyons adjoining Basamuk Canyon: there will be no effect on commercial or subsistence fishing anywhere along the north coast – he expects that the sea floor will be smothered by the tailings, thus whatever is there will be obliterated – he agrees that the 2007 Cardno Acil review of the 1999 environmental plan, prepared for DEC, suggested that some things could have been done better but pointed to the Cardno Acil conclusion, which was that there were no matters sufficiently serious to prevent the DSTP and the project proceeding.

The baseline information available for the Basamuk DSTP is much more extensive than it ever was for Misima – Basamuk has been subject to six independent reviews, many more than Misima – though it is technically feasible, he does not regard a land-based system of tailings disposal as suitable for the Ramu project because of the seismically active and high rainfall nature of the area – the tailing deposits will eventually be buried by natural sedimentation, but it cannot be predicted how long this will take.

5	John Trudinger	Geologist	(3)
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Evidence: He was a member of the Dames & Moore team that reviewed the 1999 environmental plan – he was involved in the environmental impact assessment for the Minihasa project: he does not agree that pipeline accidents led to mercury poisoning in the local people as the mercury poisoning was caused by local, artisanal miners, not the disposal of tailings.

He estimates that of the 78.5 million tonnes of natural sediment per year deposited into Astrolabe Bay, approx 11.6 million tonnes go to Basamuk Bay.

He does not agree with Dr Luick's projection of the behaviour of the tailings: upwelling is very unlikely, instead the tailings will behave like a stream, flowing down the slope of the canyon and sliding along the sea floor; further, the tailings are denser than natural sediment, they will settle more quickly and are less subject to re-suspension.

He is sceptical of Dr Pyle's evidence that the sea where the tailings will be deposited has abundant, endemic fish species.

He regards DSTP as a very viable method of tailings disposal, given the deep sea canyon at Basamuk Bay – DSTP (defined as disposal at a depth of 100 metres or more) is to be distinguished from submarine tailings disposal (discharge into the sea at a depth less than 100 metres, eg Lihir, Misima, Minihasa) and is now a well established means of tailings disposal and offers many advantages over land based tailings disposal – he agrees that under the environment permit for the Ramu project, MCC is not allowed to affect shallow-water fish species (depths above 150 metres), however, within the mixing zone the ambient PNG water quality standards do not have to be met.

Though within the footprint of the DSTP there will be near total destruction of sedentary benthic organisms, he does not expect bioaccumulation or biomagnification to be a problem – toxicological tests show that the tailings are very benign: at 56 dilutions there was a 50% confidence that 95% of the species will not be adversely affected.

The prospect of a pipeline rupture similar to what has occurred at Minihasa and Misima is very unlikely as there are no joins in the pipe, it is continuously welded.

6	Sun Yan	Acting Chief Financial Officer, Ramu Nico Management (MCC) Ltd	(4)
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Evidence: The total development cost of the project to December 2010 was K3.28 billion – interest repayments are approx US\$140,000.00 per day – the parent company of Ramu Nico Management (MCC) Ltd is MCC China, which is listed on the Hong Kong and Shanghai Stock Exchanges.

7	Dr Tracy Shimmield	Marine geochemist, team leader, SAMS projects	(3)
<p>Evidence: She was the project manager and leader of the SAMS team engaged in 2008 by the PNG Government through the EU to carry out a general investigation into DSTP in PNG, how it was happening and how to minimise environmental risk, including an environmental baseline report on Basamuk Bay. The SAMS Report was presented to the DEC in May 2010.</p> <p>More recently SAMS has been engaged to undertake four specific tasks: (1) look at instances of upwelling along the Basamuk coast; (2) see how the tailings at Basamuk behave in reality; (3) review the OEMP for Ramu; (4) write specific guidelines for Ramu (to be completed by July 2011) and Lihir – the OEMP is very important as it must contain emergency response plans, including a plan B to deal with any upwelling event, to minimise environmental harm – the specific guidelines provide a framework in which the OEMP, which is a living document, can be developed – specialised equipment (eg moorings, pressure and salinity recorders) necessary to investigate upwelling will be deployed in April 2011 and removed every three months to download data: to be managed by a team of oceanographers – an important object of the SAMS team will be to increase the PNG capacity to regularly monitor upwelling and behaviour of tailings.</p> <p>Existing data is insufficient to conclude that wind-driven upwelling will occur once the tailings are deposited: the first SAMS Report, dated May 2010, did not conclude that upwelling was likely – the only way to properly investigate how the tailings will behave is to study their actual behaviour over a 12-month period, which must incorporate the period of the north-west monsoon from December 2011 to April 2012 – compared to other areas, there is very little information in the scientific literature about the deep sea environment around PNG, this includes Misima: there was very little data regarding Misima before SAMS studied it as part of their report; there was much more data regarding Lihir.</p> <p>She acknowledges that where it is incorrectly designed or badly managed, DSTP can cause serious damage to coastal resources and potentially communities.</p>			
8	Dr James Wang	Chief Operations Officer, Ramu Nickel Project, MCC	(2), (3), (4)
<p>Evidence: He has a PhD in chemistry but his professional career has been as a metallurgist – the earliest that operation of the DSTP could commence, due to construction work still being undertaken at Basamuk, is April 2011 – the maximum amount of tailings that is expected to be discharged in 2011 is 1 million tonnes.</p> <p>The slurry pipeline, which has already been constructed, will bring the ore from the mine site at Kurumbukari to the refinery at Basamuk, where the tailings are treated and neutralised, then discharged through the DSTP – there will be some residue metals in the tailings, mostly iron in the form of haematite, which will be very stable in the sea – they have no monitoring equipment at the discharge point yet but an ROV (remote operation vehicle) has been procured from overseas and will soon be on</p>			

site – he acknowledges that tailings treatment and disposal have been of immense local and public concern since 1999 – MCC has conducted awareness programs from 2007 to 2009 – MCC engaged Hay & Co to investigate the projected fate of the tailings from the DSTP but he has seen no further report from them since their preliminary report of November 2008 – a successful commissioning test was conducted in January 2011.

Under the amended environment permit dated 10 August 2009 MCC was to submit an environment monitoring plan to the Director of Environment within three months; MCC submitted a draft OEMP in March 2010 and then a final OEMP in December 2010 – he acknowledges that that condition of the permit was breached – but MCC received no show cause notice.

9	Kevin Murray	Chairman, Raibus Ltd	(4)
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Evidence: Raibus Ltd is the unifying landowner company of four subsidiary umbrella companies representing landowners in the four areas of the Ramu Nickel Project: Basamuk, Coastal Pipeline, Inland Pipeline and Kurumbukari – the net worth of the company at the end of 2010 was approx K2 million – it relies largely on spin-off activities from the project – Raibus Ltd went through a difficult period in 2010 as MCC pulled back on spin-off activities because of the court proceedings.

He has an intimate knowledge of the people of Rai Coast and estimates that 95% of them are in favour of the project and are not concerned about the DSTP and do not think that the DSTP should prevent the project going ahead.

10	Boge William	Clan Leader, Ongeg Clan	(1)
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Evidence: The principal plaintiff Louis Medaing purportedly representing the Ongeg Clan in this proceeding does not have any authority from the members of the clan – there have been no meetings by members of the Ongeg Clan – Mr Medaing is not even from the Ongeg Clan although his mother comes from the clan – the consent and authority given by William Sawang of the Ongeg Clan was only for Mr Medaing to assist the clan in all matters relating to customary land issues concerning Portions 109 and 110, Milinch Pommern, Fourmil Madang; not in instituting this proceeding – he and other members of the Ongeg Clan want Mr Medaing to remove their clan name from this proceeding – he is in favour of the project as it will bring much needed development to his people and the people of Rai Coast.

11	Dubam Awam	Village Court Magistrate, Ward 28, Saidor LLG, Clan Leader of Tong Clan	(1)
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Evidence: Mr Awam's evidence was presented in two affidavits. In the first affidavit, Awam says that the principal plaintiff Louis Medaing purportedly representing the Tong Clan in this proceeding does not have any authority from the members of the clan. There has not been any meetings by members of the

Tong Clan facilitated by its clan leaders authorising Mr Medaing to involve the clan in this proceeding. On 24 September 2010 after learning of their clan name being a party to this proceeding, they attempted to have a meeting with Mr Medaing to remove Tong Clan from this proceeding but he refused to meet the clan leaders. Mr Medaing is not even from the Tong Clan, he comes from the Mebu Tribe.

The previous consent and authority given by the Tong Clan was for Mr Medaing to assist the clan in all matters relating to customary land issues concerning Portions 109 and 110, Milinch Pommern, Fourmil Madang; not in instituting this proceeding. No meeting was ever held by Mr Medaing with leaders and members of the Tong Clan to decide on the issue of commencing this court proceeding. He and other members of the Tong Clan want Mr Medaing to remove their clan name from this proceeding. He is in favour of the project as it will bring much needed development to his people and the people of Rai Coast.

In the second affidavit Awam says that none of the persons listed in Annexure "LS1" of Mr Medaing's affidavit dated 28.09.10 are members of the Tong Clan. The clan's previous consent for Mr Medaing to act on their behalf did not extend to issues concerning the DSTP. The clan members and leaders met on 29.09.10 and have revoked the appointment of Mr Medaing as their representative. A letter to that effect has already been delivered to the brother of Mr Medaing. Awam says Mr Medaing has misrepresented the Tong Clan in the DSTP matter as the clan does not own any land or part of the coast where the DSTP will be constructed and the affluent disposed – the Tong Clan owns land inland. On 05.10.10 the clan met and made a resolution that Mr Medaing was no longer their official representative in relation to customary land issues.

12	Gabin Asuk	Clan Leader, Tong Clan	(1)
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Evidence: Mr Asuk's first affidavit evidence is similar to the evidence in the first affidavit of Dubam Awam.

In his second affidavit evidence Asuk deposed this as an ordinary villager and a member of the Tong Clan; not as clan leader as he had done in his first affidavit. It is in this affidavit that Asuk portrays his lifestyle as an ordinary villager and subsistence farmer and the chores that he has to perform and difficulties that he faces in making a living. He explains the seasonal activities that he has to perform to cultivate or plant crops in his gardens. He says during the gardening season, he and his family spends all days at the garden from 6 am to 5 pm. Taro and yam are the primary food crops cultivated and these are harvested in March and May respectively. To supplement his family's diet with protein, Asuk also goes fishing or hunting for wild pigs. In fishing, they paddle out to the edge of the reef and does his fishing, he does not venture out to the deep sea to fish – the main fishing locations being near Simbil Creek and within the general area of Basamuk Bay. The depths that he catches fish sometimes are 10 to 30 and 50 to 60 meters deep to catch tuna, barracuda and other larger fish. He also does engage in spear fishing at the coral reefs in Basamuk Bay. Surplus catches of fish have been sold to employees of MCC since the

construction of the (MCC) refinery at Basamuk. As most of the villagers in and around Basamuk are subsistence farmers, very little time is spent in fishing if there is time available.

13	Michael Wau	Acting Executive Director, Environment Protection Wing, DEC	(2)
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Evidence: He is a senior DEC officer and a delegate of the Director of Environment and is familiar with the environmental permit approval process for the Ramu Nickel Project.

Key events in the statutory approval process are:

- July 1997, Highlands Pacific Ltd submitted an environmental plan inception report;
- February 1999, HPL submitted the Ramu Nickel environmental plan, including baseline environmental data studies, showing DSTP as preferred method of tailings disposal;
- 8 October 1999, Dames & Moore, having been engaged to prepare a peer review of the DSTP proposal, submitted their final report to DEC;
- 11-16 October 1999, environmental plan presentation meetings were conducted at Kurumbukari, along the pipeline route, at Basamuk and Madang town;
- 21 March 2000, Minister for Environment approved the Ramu Nickel environmental plan under the *Environmental Planning Act* (Chapter No 370), including the DSTP, subject to approval of design and engineering parameters of DSTP;
- 23 October 2006, transfer of environment permit from HPL to MCC approved;
- 2007 and 2008, Cardno Acil, having been engaged by DEC, prepared an independent review of DSTP, recommending a marine baseline study of Basamuk Bay;
- November 2007, approval given for amended environment permit;
- 10 August 2009, further amended environment permit granted.

Under the environment permit, MCC cannot operate the DSTP until the OEMP has been approved by DEC – the OEMP has not yet been approved – the approval process for the OEMP will take into account the precautionary principle under the UN Charter on Biological Diversity, to which PNG is a signatory: in the absence of scientific knowledge the developer must ensure that risk abatement measures are put in place: emergency response mechanisms must be able to deal immediately with any emergency or disaster.

4 AFFIDAVIT EVIDENCE OF DEFENDANTS' WITNESSES NOT REQUIRED FOR CROSS-EXAMINATION

17. Their evidence is summarised in the following table.

TABLE 4: AFFIDAVIT EVIDENCE OF DEFENDANTS' WITNESSES NOT REQUIRED FOR CROSS-EXAMINATION

No	Name	Description	Category
1	Devi Sama	Village Court Magistrate, Ward 30, Saidor LLG, member of Mebu Tribe	(1)
<p>Evidence: Mr Medaing who purportedly represents Tong and Ongeg clans is from Sitapa Clan and comes from the Mebu tribe. He, Devi Sama, is in favour of the project as it will bring much needed development to his people and the people of Rai Coast.</p>			
2	Dongembu Dugae	Councillor, Ward 30, Saidor LLG, member of Mebu Tribe	(1)
<p>Evidence: His evidence is similar to Devi Sama's above.</p>			
3	Kuai Dup	Clan Leader, Tong Clan	(1)
<p>Evidence: His evidence is similar to the evidence of Dubam Awam in Table 3, No 11 above, particularly the first affidavit evidence.</p>			
4	Gul Saufa	Subsistence farmer, member, Wateng Clan, Mindere Village, Basamuk	(1)
<p>Evidence: He gives evidence about the difficulties that he faces as a subsistence farmer with eight children. He describes the seasonal changes and the crops that he grows including the fishing and hunting he does to sustain his family. He says the DSTP will not affect where he fishes. He says he is now able to sell any surplus fish that he catches to the employees of MCC. This is evidence similar to the evidence of Dubam Awam in Table 3, No 11 above, particularly the second affidavit evidence.</p>			
5	Utei Udid	Subsistence farmer, Ganglau village, Basamuk, member of Baleng clan	(1)
<p>Evidence: His evidence is similar to Gul Saufa's (table 4, No 4) above and Dubam Awam's in Table 3, No 11, particularly the second affidavit evidence.</p>			

6	Shadrach Himata	Acting Secretary, Department of Mineral Policy & Geohazards Management, formerly Department of Mining	(2)
<p>Evidence: His Department is responsible for development of mineral policies and mining legislation governing the mining industry including geohazards management – the Mineral Resources Authority is responsible for implementation of policies and legislation – his Department is currently reviewing mineral policy and legislation governing the mining industry to be compatible with best practice in the industry – confirms the SAMS report which will also be used in reviewing policy – officers from his Department and the DEC were involved in peer review of the SAMS report – Ramu Nickel Project will benefit people of Madang and the whole nation – prerogative of the State to ensure that our resources are developed in a sustainable and environmentally and socially responsible manner.</p>			

5 SITE VISIT

18. It was made after the close of the evidence and before submissions on Wednesday 2 March 2011. The court party consisted of the Judge and Mr Associate, Mr Scerri and Mr Steven (counsel for the defendants), Mrs Nonggorr and an assistant (for the plaintiffs) and Mr Woo (an MCC employee). Observations I made and information conveyed during the site visit are not evidence, as such, but are matters of which judicial notice has been taken.

19. The court party left Madang Airport at 9.00 am and flew to the Kurumbukari mine site by helicopter. At the mine site, after a safety induction, Dr James Wang (defendant witness No 8, table 3) gave an update on the project. The court party then viewed: the de-agglomeration plant, which is used for slurry preparation and rock recovery and includes a settling pond; the trial rehabilitation area; the beneficiation plant, where chromite is removed and recovered from the ore; the slurry pump station; the power station; the permanent camp, including accommodation, dining, sporting and recreation facilities; the central control room, which monitors the operation of the mine, the pipeline and facilities at Basamuk. It was observed that most of the facilities at the mine were fully constructed and ready for commissioning and operation.

20. After lunch at Kurumbukari the court party flew by helicopter, along the slurry pipeline route, to Basamuk. The pipeline is partly buried and partly above the surface. Also observed was the bridge over the Ramu River built by MCC.

21. At Basamuk the court party, after a safety induction, received a presentation on the DSTP by Dr George Shou (defendant witness No 3, table 3). The court party then viewed the water tank area and the acid plant, power station and lime plant, the HPAL (High Pressure Acid Leaching) plant, the wharf and mobile cranes, the many storage tanks, the slurry choke station, the DSTP head tank and mixing tank, the central control room, including real-time monitoring systems for the HPAL plant and DSTP system and the emergency response overflow storage ponds for the DSTP system. The court party observed various workers at the HPAL plant proceeding with commissioning of the equipment. At the DSTP mixing plant a 12-metre long sample unit of the DSTP pipe was observed, as well as samples of the concrete weights that are used as ballast to

anchor the DSTP pipeline. Upon Dr Shou indicating the route taken by the pipeline, members of the court party gazed seaward 400 metres, visualising the point on the sea surface 150-160 metres immediately above the DSTP discharge point. It was observed that most of the DSTP system was complete but some parts were still in the course of construction: one emergency response overflow pond had been fully excavated while the other one was partly excavated.

22. The court party then flew back to Madang Airport along the Rai Coast, observing on the way plumes of sediment entering the sea from several rivers, arriving at 4.00 pm.

PART B: FINDINGS OF FACT

23. I find that the following facts have been established on the balance of probabilities.

1 NATURE OF THE PLAINTIFFS' INTERESTS AND CONCERNS

24. I am satisfied that the plaintiffs and the people that they represent have a close physical connection with the coastline of Madang Province. The defendants assert that not all of them are customary landowners and that this impairs their legal standing to obtain the orders and declarations they seek. That question of law will be addressed later in the judgment. For present purposes, it is indisputable that the plaintiffs have a genuine interest in the subject matter of these proceedings – operation of the DSTP system – and they have a genuine concern as to the environmental effect of operation of the DSTP, which is borne out by the sentiments expressed in the evidence of the plaintiff witnesses (table 1, Nos 1 to 8 and Nos 15 to 17, and table 2, Nos 1 to 3). The plaintiffs and the people they represent are concerned that the tailings will contain chemicals or poisons, that this will affect fish stocks and other marine resources and that the tailings will be washed by sea currents towards their fishing grounds and villages. The plaintiffs assert local knowledge that currents move from the Rai Coast in a westerly as well as northerly direction and follow the north coast of the province.

25. I find no evidence of improper motive or bad faith on the part of the plaintiffs; not that it has been seriously suggested by the defendants that there was any. I also find as a fact that as a group the plaintiffs are not motivated by a desire to see the Ramu Nickel Project stopped. Many testified that they 'do not want to stop the project'; they just want 'to stop the DSTP'.

26. I am unable to conclude what proportion of people living along the Madang coastline share these interests and concerns or what proportion of people at Basamuk Bay or along the Rai Coast share them. It is clear from the evidence of the defendants' villager witnesses (see table 3, Nos 10 to 12 and table 4, Nos 1 to 6) that not everybody thinks the same way. Many coastal people appear to accept that the DSTP does not present a real risk to their marine resources or land, and that adequate steps have been taken to guard against those risks. Gabun Asik, Gul Saufu and Utei Udid, for example, deposed (table 3, No 12 and table 4, Nos 4 and 5) that no one fishes around the Basamuk area at a depth below 60 metres, so they do not think their food sources or livelihood are at risk. Defendant witness No 9, table 3, Kevin Murray, testified that in his view 95% of Rai Coast people are not concerned about the DSTP. That opinion is not supported by any evidence and has no probative value. It is an interesting observation nonetheless and reflects the fact, that I can confidently find, that the DSTP is a burning local issue. There is neither

universal opposition to the DSTP nor universal support of it at Basamuk, on the Rai Coast or along the Madang coastline.

2 STATUTORY APPROVALS

27. The facts surrounding granting of statutory approvals for construction and operation of the DSTP system are largely uncontested. It is the legal effect of the approvals which is contentious and that issue will be addressed later in the judgment. The train of events set out in affidavits of the Acting Director of the DEC's Environment Protection Wing, Michael Wau and MCC's Chief Operating Officer, Dr James Wang (table 3, Nos 13 and 8) forms the basis of the following findings of fact.

(a) 1997 to 2009

28. In July 1997 Highlands Pacific Ltd submitted an environmental plan inception report as required under the then *Environmental Planning Act*. In February 1999 HPL submitted the Ramu Nickel environmental plan, including baseline environmental data studies, showing DSTP as the preferred method of tailings disposal. On 8 October 1999, Dames & Moore, having been engaged by the DEC to prepare a peer review of the DSTP proposal, submitted their final report to the DEC. From 11 to 16 October 1999 environmental plan presentation meetings were conducted at Kurumbukari, along the pipeline route, at Basamuk and Madang town. On 21 March 2000 the Minister for Environment approved the Ramu Nickel environmental plan, including the DSTP, subject to approval of design and engineering parameters of DSTP. On 1 January 2004 the [Environment Act 2000](#) commenced operation.

29. On 23 October 2006 the environment permit was transferred from HPL to MCC. In 2007 and 2008 Cardno Acil, having been engaged by DEC, prepared an independent review of the DSTP system, recommending amongst other things a marine baseline study of Basamuk Bay. In November 2007 the Director of Environment granted an amended environment permit.

(b) The 2009 permit

30. On 10 August 2009 the Director granted a further amended environment permit. This 12-page document is a consolidated permit, incorporating all terms and conditions to which the permit is subject. The opening page states that the permit is issued to MCC under Section 65 of the [Environment Act 2000](#) and authorises it:

(a) to carry out works within discrete areas described as "premises" in Usino Bundi and Rai Coast Districts of Madang Province; and

(b) "to discharge wastes into the environment from the premises while carrying out a Level 3 ... activity associated with the construction and operational phases of mining activity".

31. The permit states that "the activity shall be carried out in accordance with the terms and conditions of this permit". Its term is 50 years. The date of issue is 21 March 2000. The date of transfer is 23 October 2006. Dates of amendment are 23 October 2006, 7 November 2007 and 10 August 2009.

32. An interpretation clause occupies pages 2 to 4. It defines various terms used in the permit. "Discharge point (10)" is an important term as it refers to the point in the sea at which the tailings will be discharged from the pipeline. It is defined as:

The location where the mill tailings effluent from the Basamuk Process Plant Facility is discharged into Bismarck Sea through the tailings outfall at a depth of 150 metres below the mean sea level at Basamuk Bay. This discharge point is also the location where the wastewater from the thickener process (High Pressure Acid Leach Plant), other treated wastewater from the plant operations and treated domestic wastewater from the main Accommodation camp and the Process Plant facilities is discharged into Bismarck Sea through the tailings outfall at the same depth. The discharge point is specified on PNG Topographic Map Series, T601 at grid reference 404530E, 9388006N.

33. A number of witnesses referred in their evidence to the "mixing zone", the body of sea water in which it is permissible for ambient water quality standards to be breached. It is defined as:

A discrete body of water into which the waste is discharged and where the prescribed water quality criteria may not be met and the protection of marine quality life may not be guaranteed. For the purpose of this permit, the mixing zone is defined as the body of water within the Bismarck Sea at Basamuk Bay contiguous to Discharge Point (10), with a dimension of 150 metres depth below the sea level and 1,000 metres radius of the discharge point (including the depth to the natural sea floor) into which mill tailings and wastewater from the slurry thickener process (High Pressure Acid Leach Plant) and domestic wastewater is discharged.

34. "Water quality criteria" means:

The criteria for water quality as specified in Schedule 1 of the [Environment \(Water Quality Criteria\) Regulation 2002](#) and those that are prescribed as a condition of this permit.

35. The terms and conditions of the permit are set out at pages 5 to 12. The first matter dealt with is "annual charges". In the construction phase it is K18,503.00 and in the operation phase K601,404.00. There then follows 52 conditions, arranged in the following categories:

- *General*: condition Nos 1 to 4: cross-reference to the environment permit application; inconsistencies between environment permit application and conditions of the permit; baseline marine quality data; cultural sites.

- *Works*: condition Nos 5 to 13: buffer zones; erosion control; bunds; tailings disposal facility; septic tanks; landfill; oil-water separators; sedimentation ponds; drainage system.
- *Operation*: condition Nos 14 to 23: waste treatment facilities; domestic wastewater effluent; erosion control; landform rehabilitation; vegetation rehabilitation; mine rehabilitation plan; PNG Mine Closure Policy; storage of hazardous substances; workshop & fuel storage; landfill.
- *Waste management*: condition Nos 24 to 36: waste management plan; air emissions; chemical discharge specifications; air quality criteria; offensive odours; dust suppressants; noise; solid waste; surface water; oil-water separators; waste oil; oil films.
- *Waste discharge*: condition Nos 37 to 47: domestic wastewater treatment; channelling to tailings line; rates of domestic water discharge; mineralised storm runoff; mill tailings; rate of discharge of mill tailings; quality of mill tailings effluent; marine water quality; rainfall runoff; surface water quality; rainfall runoff at Kurumbukari.
- *Monitoring*: condition Nos 48 to 50: monitoring of waste discharges; environmental monitoring plan; matters that must be included in plan.
- *Reporting*: condition Nos 51 and 52: quarterly environmental performance report; duty to notify Director of significant environmental incidents.

36. Some of them are very important for the purposes of the present case. Condition No 1 obliges the permit holder to operate the project in accordance with the 1999 environmental plan. It states:

The permit holder shall carry out works associated with construction and operational phases of the mining activity in accordance with the plans and specifications in the environment permit application [defined as the EP submitted on 12 February 1999, approved on 21 March 2000 and subsequently being the subject of this environment permit] unless specified otherwise through a condition of this permit.

37. Condition No 8 deals with the 'tailings disposal facility' and states:

The permit holder shall construct the tailings disposal facility in accordance with the plans and specifications in the environment permit application using the best available engineering and environmental standards.

38. Condition Nos 41 to 44 deal with mill tailings, in particular the method of disposal (41), the annual rate of discharge (42), the quality of the tailings (43) and their permitted effect on marine water quality (44). It is worthwhile setting out these conditions in full:

41 The Permit Holder shall ensure that mill tailings effluent from the process plant facilities are directed to the tailings disposal facilities referred to in condition 10 [sic] for disposal into Bismarck Sea at Basamuk Bay at Discharge Point (10).

42 The discharge of mine tailings at Discharge Point (10) shall occur at the rate specified in Table 2, below.

Table 2 – Permitted Discharge Rate for Mill Tailings Effluent.

Discharge Point (10)	Thickener wastewater from High Pressure Acid Leach Plant and other treated process wastewater	875,000	24	365	7,665,000m3/yr.
	Mill Tailings Effluent	5,853,100	24	365	51,273,156 m3/yr
	Total Annual Discharge Volume				58,938,156 m3/yr

43 The quality of the mill tailings effluent at the de-aeration tank, based on a 24 hours composite sample taken at six (6) hourly intervals, shall not exceed to the effluent quality criteria in Table 3 below before it is discharged at Discharge Point (10).

Table 3 – Mill Tailings Effluent Quality Criteria.

Parameters	Effluent Quality Criteria
<i>Physio-chemical</i>	
Oil & Grease	None noticeable as visible film or detectable by odour.
<i>Metals</i>	
Arsenic (As)	400 µg/l
Cadmium (Cd)	40 µg/l
Chromium IV (Cr6+)	50 µg/l
Copper (Cu)	5,000 µg/l

Lead (Pb)	50 µg/l
Manganese (Mn)	500,000 µg/l
Mercury (Hg)	48 µg/l
Nickel (Ni)	8,000 µg/l
Cobalt (Co)	5,000 µg/l
Selenium (Se)	80 µg/l
Silver (Ag)	50 µg/l
Zinc (Zn)	50,000 µg/l

NOTE: The metal criteria are for dissolved concentration (passing through a nominal 0.45µm millipore medium).

44 The discharge of mine tailings at Discharge Point (10) shall not cause the marine water quality at the boundary of the mixing zone to exceed the marine water quality criteria in Table 4, below.

Table 4 – Marine Water Quality Criteria.

<i>Physio-chemical</i>	
Dissolve Oxygen	>6.0mg/L (>80-90% saturation)
Total Suspended Solids	<10% change from background mean seasonal values (refer to footnote below)
Oil & Grease	None noticeable as visible film or detectable by odour.
pH	6.5-9.0 pH units
<i>Metals</i>	
Arsenic (As)	50.0 µg/l
Cadmium (Cd)	1.0 ug/l

Chromium IV (Cr6+)	10.0 µg/l
Cobalt (Co)	0.9 µg/l
Copper (Cu)	30.0 µg/l
Lead (Pb)	4.0 µg/l
Manganese (Mn)	2,000.0 µg/l
Mercury (Hg)	0.2 µg/l
Nickel (Ni)	1,000.0 µg/l
Selenium (Se)	10.0 µg/l
Silver (Ag)	50.0 µg/l
Zinc (Zn)	5,000.0 µg/l

NOTE: The metal criteria are for dissolved concentration (passing through a nominal 0.45µm millipore medium). Total Suspended Solids criteria "10% change from background mean seasonal values" does not include the density current.

39. Condition Nos 48 to 52 deal with monitoring and reporting, in particular the duty of MCC to monitor wastes (48), the duty to submit an environment monitoring plan, known commonly as the OEMP (49), the contents of the OEMP (50), the duty to submit a quarterly environmental performance report (51) and the duty to notify the Director of any significant environmental incidents (52). These conditions state:

48 The Permit Holder shall undertake monitoring of the wastes that are discharged during the construction and operational phases of the mining activity. The monitoring shall assess the level of impacts of works on the environmental quality (water, air and soil) including noise emission and the measures taken to minimise these impacts.

49 The Permit Holder shall submit an Environment Monitoring Plan for the construction and operational phases of the mining activity to the Director for approval within three months from the date of amendment of this permit.

50 The monitoring plan referred to in Condition 49 shall include but not [is] not limited to the following:

(a) stream flows, tide and current patterns (sediment dispersal),

- (b) meteorology,**
- (c) fresh and marine water quality,**
- (d) biological tissue (metal content) – shallow, reef and deep water fishes, shell fish, sea grass,**
- (e) near-shore sedimentation rates,**
- (f) coral reef (sediment cover),**
- (g) ocean floor sediments (metal and particle size distribution),**
- (h) ground level concentration of air emission levels,**
- (i) noise levels,**
- (j) control and sampling sites,**
- (k) sampling protocols (quality control/quality assurance),**
- (l) sampling frequency,**
- (m) etc.**

51 The Permit Holder shall submit a quarterly Environmental Performance Report to the Director at the end of March, June, September and December in each calendar year. The report shall include but [is] not limited to –

- (a) raw data (analysis by certified laboratories) from the environmental monitoring programs,**
- (b) interpretation of raw data,**
- (c) incidence of non-compliance and reasons,**
- (d) status of compliance with the Waste Management Plan and other conditions of this permit, and**
- (e) records of environmental monitoring programs.**

52 The Permit Holder shall notify the Director on any significant environmental incident that occurs in relation to carrying out of works or the discharge of wastes from the premises during the construction and operational phases of the mining activity.

(c) The OEMP

40. Under condition No 49 of the environment permit the OEMP was to be submitted to the Director for approval within three months from the date of amendment of the permit, 10 August 2009. It should have been submitted by 10 October 2009. In fact a draft OEMP was not submitted until March 2010, then an updated version was submitted in December 2010.

41. Dr Towler, defendant witness No 2, is the team leader responsible for preparation of the OEMP. The OEMP is a detailed document of more than 200 pages consisting of a main report and 17 sub-plans. It sets out the framework for managing environmental issues during operations. Monitoring of the DSTP is addressed in the tailing discharge, biological resources and water resources sub-plans. Monitoring will cover: the pH of neutralised tailings, seawater extraction volume, chemical characterisation of waste streams prior to discharge, tailing discharge volume, an inventory of process chemicals and tailing discharge pipeline integrity. The OEMP states that the DSTP system will be monitored and controlled by a supervisory control and data acquisition (SCADA) system.

42. The OEMP has been reviewed by Dr Shimmiel who has given recommendations regarding it to the DEC for consideration. At the time of the trial it was awaiting approval.

3 ENVIRONMENTAL EFFECT OF OPERATION OF THE DSTP SYSTEM

43. It is necessary to make findings on the environmental effect of the DSTP as proof by the plaintiffs that the effect will be adverse is essential to successful prosecution of any of their three causes of action. For nuisance they need to prove amongst other things that the DSTP will interfere with *enjoyment* of their land. As to the alleged breach of the [Environment Act](#) they must prove that the DSTP will cause *environmental harm*. As to the constitutional claim, to have any chance of success they must prove that approval of the DSTP has been and its operation will be in *violation* of National Goal No 4: *conservation and use for collective benefit* of PNG's natural resources and environment.

44. It is very difficult to predict with certainty what the environmental effect of the DSTP will be. Both sides of the case agree on that but disagree as to the nature of the *likely* environmental effect. The plaintiffs argue that three adverse effects are likely to occur:

- there will be a smothering of benthic organisms over a wide area (at least 150 square km) and this will dramatically alter the ecology of Astrolabe Bay;
- the toxicity of the tailings will interfere with the food chain and also disturb the ecology of the Bay;
- the tailings will not behave as predicted but instead will spread over a much wider area than predicted and be subject to upwelling of two types (submarine canyon upwelling and wind-driven upwelling) and the phenomenon of plume shearing, which will transport them both shoreward and up the coast in the direction of Madang town, Karkar Island, the North Coast and Bogia.

45. If the court does not make a finding that those effects are a likely occurrence, the plaintiffs argue, in the alternative it seems, that the court should find that the risk that those will be the consequences of operation of the DSTP cannot be ruled out; and that those consequences are seriously adverse and will cause irreparable damage to the natural environment.

46. The defendants assert the opposite. They refer to the significant amount of work, including

oceanographic modelling, that went into the 1999 environmental plan and numerous marine resource studies (documented in the evidence of Mr Trudinger) subsequently undertaken and the expert scientific evidence that was presented on their behalf. They confidently say that:

- though there will be to a large extent a smothering by the tailings of the sea floor at Basamuk Canyon not all benthic organisms will be destroyed, as many will be able to swim away, and the degree of biodiversity on the sea floor is not nearly as great as in the euphotic zone, which will be unaffected by the tailings, so there will be no significant adverse effect on the ecology of Astrolabe Bay;
- the tailings are substantially benign, having been heavily neutralised prior to discharge, and will be quickly diluted and rendered non-toxic to marine organisms;
- the tailings will because of their physical properties and the high sediment budget of Vitiaz Basin and Basamuk Bay behave in an orderly and predictable way and fall over a series of gradual slopes to the sea floor at Basamuk Canyon, which is ideally suited as the destination point for a DSTP system, being deep, close to shore and, being in a bay, well away from strong ocean currents.

My findings follow.

(a) Effect on the benthos

47. Benthos refers to any organisms, flora or fauna, which live on the sea floor. The defendants concede that if the tailings behave as predicted in the 1999 environmental plan 150 square kilometres of the sea floor in and around Basamuk Canyon will over the life of the project be smothered by about 100 million tonnes of tailings; or as some defendant witnesses preferred to describe it the tailings will 'blend' with the natural sediment. The consequences for those organisms that cannot swim away (eg sessile invertebrates, including corals, molluscs) will be fatal. This does not represent a major problem, the defendants argue, as not all of the benthos will be eliminated (there will be organisms, including deep-sea fish, that will be able to move to areas unaffected by the tailings) and in any event the evidence suggests that the quantity and diversity of organisms in the deep-sea is quite low compared to the euphotic zone. Thus, while the ecology of the canyon may be altered, there is no evidence that it will be an adverse effect or if it is adverse that it will be substantially so.

48. The plaintiffs presented no direct evidence to defeat those propositions. Evidence that the deep-sea canyons on the northern coast of the New Guinea mainland are hotspots of biodiversity came principally through the affidavit of Dr Richard Pyle (table 2, No 4). But his evidence related to tropical coral-reef habitats at depths of 50 to 150 metres, not at depths below the DSTP discharge point (150 to 1100 metres). Dr Pyle states that reefs in the 50 to 150-metre isobaths are amongst the richest and most diverse of any comparable habitat he has seen anywhere in the Indo-Pacific region. Many of the communities and fish and other organisms in this zone are endemic to PNG. There was also evidence that PNG is a member of a coalition of independent states that have signed the Coral Triangle Initiative and that the sea-waters along the northern coast of the New Guinea mainland are generally regarded by marine biologists as having the

highest diversity of corals, fishes, crustaceans, molluscs and marine plant species in the world.

49. That evidence was not challenged by the defendants, no doubt because their position is that nothing in the 50 to 150-metre water column will be adversely affected by the tailings as no upwelling will occur. The fate of the tailings is addressed below but working on the presumption that they behave as planned and are deposited on the sea floor, what finding of fact can be made as to the fate of the benthos?

50. Though the court heard no detailed evidence as to the nature and extent of the benthos at Basamuk Bay (other than the plaintiffs' claim that no proper study has ever been done) I take into account the opinions expressed by the plaintiff witnesses Dr Reicheldt-Brushett and Dr Brunskill (table 1, Nos 12 and 13) that submarine canyons are widely regarded as hotspots of poorly known biodiversity and biomass. It can reasonably be presumed therefore, in light of the evidence of Dr Pyle concerning the reef systems in the 50 to 150-metre range, that the effect of the DSTP on the benthos at Basamuk Canyon will be significant and adverse. As Dr Reicheldt-Brushett stated in evidence, seafloor ecosystems do not operate in isolation from other parts of the marine environment. Interactions such as nutrient cycling take place between deep-sea and shallow-water environments which form a continuum of ecosystems. I conclude that it is very likely that there will be serious and adverse effects on other parts of the ecology of Basamuk Canyon and consequently Basamuk Bay and Astrolabe Bay.

(b) Toxicity of tailings

51. I reject the defendants' submission that the tailings will be 'benign'. That is a non-scientific term, but it is a useful one as it encapsulates the evidence of the defendants' scientific witnesses (Mr Hargreaves, Mr Jones, Mr Trudinger, Dr Towler, Dr Wang), which was that the tailings will be rendered harmless soon after entering the sea at the discharge point. They will not be harmful to marine organisms, such as fish, and should not be regarded as poisonous (that being the fear of a number of the plaintiffs).

52. The principal witness for the plaintiffs on the toxicity issue was Dr Reicheldt-Brushett. The defendants submitted that she gave no evidence that the tailings would be toxic or will have any toxic effects. That is not how I interpreted her evidence. She referred in her oral testimony to three standard eco-toxicity tests (on a bacteria, a diatom and a sea urchin) completed in 2007, which gave EC50 and LC50 readings. That means that the tailings had a 50% effect on the test organisms and a 50% lethal effect (causing death) on the test organisms. This showed toxicity.

53. The defendants also submitted that Dr Reicheldt-Brushett's criticism of the eco-toxicology testing (irrelevant species were used, the tests were only over a short time frame) was unwarranted as eminent scientists from the CSIRO were involved and the tests were standard ones and it would be inefficient and it is unnecessary to design a site-specific testing regime. The defendants argued that her evidence, such as it is, should be treated with caution as her speciality is coral reefs and eco-toxicology. She claims no expertise on the benthos. She did not adequately address the chemical composition of the tailings, nor did she take into account that their chemical composition will have changed significantly for the better from the predictions in the 1999

environmental plan.

54. I am not persuaded by any of the defendants' submissions that the evidence of Dr Reicheldt-Brushett should be discounted. She was presented as an expert witness in the field of ecotoxicology in coral marine environments. Her evidence was clear: the testing so far shows that the tailings will be toxic to marine organisms – not benign. Her evidence was corroborated by that of Dr Brunskill. It was not discredited through cross-examination and it was not undermined by any of the evidence of the defendants' scientific witnesses. The evidence of Messrs Hargreaves, Jones and Trudinger was useful and each of them gave generally impressive testimony. But none of them is sufficiently qualified and experienced to effectively challenge the evidence of an expert witness on eco-toxicological issues. Dr Towler, a geochemist, fits into the same category, as does Dr Wang, a chemist-metallurgist.

55. I accept the evidence of Dr Reicheldt-Brushett and find as a fact that it is very likely that the tailings will be toxic. The sea-waters in the Madang area are home to some of the most diverse coral reef communities in the world, and depositing 14,000 tonnes of tailings per day into a part of Astrolabe Bay will have an adverse impact on the ecology of the Bay. The toxicity of the tailings will interfere with the food chain and also disturb the ecology of the Bay.

(c) Behaviour of tailings

56. The plaintiffs assert that it is unlikely that the tailings will behave as predicted by the defendants, and that they will be subject to significant submarine canyon upwelling as well as wind-driven upwelling. The tailings may be moved into the upper 100 metres of the water column (outside the mixing zone) and from there they will be transported by strong currents shoreward and in the direction of Madang town and the north coast area of Madang Province.

57. The plaintiffs have proven that these concerns are well founded. I base this finding principally on the expert evidence of Dr Luick and Dr Brunskill. Dr Luick, an experienced and highly qualified professional, was the only oceanographer to give evidence at the trial. He carefully explained the differences between the two types of upwelling. Submarine canyon upwelling is certain to occur, at a rate, he predicts, of 750 metres per day. The only question is whether it reaches the upper zone. Wind-driven upwelling is more difficult to predict but the possibility of it occurring, especially at times of significant wind events, cannot be ruled out. The shortcomings in the oceanographical modelling that went into the 1999 environmental plan have been highlighted in a number of subsequent reviews but never addressed.

58. Dr Brunskill's evidence of critical errors in calculation of the sediment budget of Astrolabe Bay, Basamuk Bay and Basamuk Canyon for the 1999 environmental plan – which underpinned the prediction as the behaviour of the tailings and demarcation of the tailings footprint – is similarly convincing. While emphasising the danger of basing predictions on extrapolations of theoretical formulae rather than on real data, he did give an estimate based on real data with which he is familiar: that, at best, the annual sediment budget of Basamuk Canyon is 2 million tonnes. This contrasted with the estimate of the defendants' witness No 1, Mr Hargreaves, of 12 million tonnes. I prefer the evidence of Dr Brunskill. The defendants have submitted that the

value of Dr Brunskill's evidence should be discounted heavily on account of the fact that he was only familiar with the sedimentary regime of the Sepik River and how the sediment generated by the Sepik behaves when it enters the Bismarck Sea. The conditions at Basamuk Bay are very different and Dr Brunskill has not taken them into account in forming his opinion, it was submitted. I reject that submission. Dr Brunskill was an impressive witness. He acknowledged the defences in the geomorphology of the Sepik River Basin and Astrolabe Bay. Dr Brunskill was criticised for not explaining clearly the information on which he based his opinions, instead making broad and sweeping generalisations. His estimate of the natural sediment flow was argued to be vague and unsubstantiated. I reject that criticism outright.

59. Mr Scerri made detailed and helpful submissions that drew together the purported flaws in the bases of the opinions of Dr Luick and Dr Brunskill which was exposed, it is argued, by the evidence of Mr Hargreaves, Mr Trudinger and Mr Jones. I have carefully examined their evidence, which cannot be dismissed as ill-considered, outlandish or ignorant, but it is evidence of scientists who are generalists, not specialists. They are not as expert in the fields of oceanography and sedimentation and marine geochemistry as Dr Luick and Dr Brunskill are.

60. The defendants submitted that a number of studies and reviews since 1999 have confirmed the correctness of the fundamental oceanographical assumptions underlying the 1999 environmental plan. I reject that submission. I prefer the evidence of Dr Luick. What has been done is inadequate. Critical information has not been obtained.

61. Mr Scerri, for MCC, exposed a fundamental flaw in the evidence of Dr Shearman who was shown to have made ill-considered and 'undergraduate errors' in his attempt to discredit the figure of 78.5 million tonnes, which was said by the defendants to be the annual sediment budget of Astrolabe Bay and Vitiaz Basin. The probative value of Dr Shearman's opinion evidence was significantly diminished as a result. But I am not persuaded by the defendants' submissions or by the criticisms levelled at the evidence of Dr Luick and Dr Brunskill that their evidence should be disregarded. Their evidence is compelling. I reiterate that the court finds that there is a real danger that the tailings will not behave as predicted by the defendants. That they will not settle gradually and quickly to the floor of Basamuk Canyon. The real danger is that they will be subject to significant submarine canyon upwelling as well as wind-driven upwelling and that the phenomenon of plume-shearing will add potential for movement of the tailings into the upper 100 metres of the water column and from there they will be transported by strong currents shoreward and in the direction of Madang town and the north coast area of Madang Province.

4 EFFECT OF AN INJUNCTION

62. The defendants assert that if the DSTP is stopped the Ramu Nickel Project will be abandoned. 'If the DSTP is killed, the project will be killed' was how counsel for the first defendant put it in his opening address. I see no credible evidence in support of that proposition. If a permanent injunction is granted in the terms sought by the plaintiffs MCC will be required to find an alternative method of tailings disposal, a land-based facility, which the evidence suggests would be a technically feasible option, though much more expensive than the DSTP. I cannot believe that MCC would just walk away from the project, having invested K3.28 billion in it to date, according to the evidence of their Acting Chief Financial Officer, Mr Sun Yan.

63. What I can believe, however, and make findings of fact on, is that a permanent injunction would lead to an extensive delay in commissioning of the project. The extra cost involved for MCC would be considerable. The multiplier effect on the provincial and national economy of commencement of a project of this magnitude, would be delayed. Investor confidence in PNG would be impaired.

5 SUMMARY OF FINDINGS OF FACT

1 Nature of plaintiffs' interests and concerns: The plaintiffs and the people they represent are concerned that the tailings will contain chemicals or poisons, that this will affect fish stocks and other marine resources and that the tailings will be washed by sea currents towards their fishing grounds and villages. They are not motivated by a desire to stop the project. They just want to stop the DSTP.

2 Statutory approvals: The approval that currently authorises operation of the DSTP is the environment permit, originally granted in 2000 and most recently amended by the Director of Environment on 10 August 2009. The permit is subject to 52 conditions, one of which is that the OEMP be approved by the Director. At the time of trial, it had not been approved.

3 Environmental effect of operation of the DSTP: It is likely to be serious and adverse, in that:

(a) there will be a smothering of benthic organisms over a wide area (at least 150 square km) and this will inevitably alter the ecology of Astrolabe Bay, which is a hotspot of biodiversity;

(b) it is very likely that the tailings will be toxic to marine organisms. The sea-waters in the Madang area are home to some of the most diverse coral reef communities in the world, and depositing 14,000 tonnes of tailings per day into a part of Astrolabe Bay will have an adverse impact on the ecology of the Bay;

(c) there is a real danger that the tailings will not behave as predicted by the defendants but instead will be subject to significant submarine canyon upwelling as well as wind-driven upwelling and be subject to plume-shearing, and that substantial quantities of tailings liquor will enter the upper 100 metres of the water column and from there they will be transported by strong currents shoreward and in the direction of Madang town and the north coast area of Madang Province.

4 Effect of injunction: a permanent injunction will not mean an end to the project but would lead to an extensive delay in commissioning of the project. The extra cost involved for MCC would be considerable. The multiplier effect on the provincial and national economy of commencement of a project of this magnitude, would be delayed. Investor confidence in PNG would be impaired.

PART C: THE COMMON LAW ACTION IN NUISANCE

64. The common law of England as it existed immediately prior to 16 September 1975 has been

adopted as part of the underlying law of PNG. An important part of the common law is the law of torts, and an important part of the law of torts is the tort of nuisance. There are two types of nuisance: private nuisance and public nuisance. The plaintiffs' statement of claim pleads both.

65. There are very few PNG cases in which people who are concerned about the environmental effect of an activity have attempted to use the common law of nuisance to stop that activity. *Pen Rumints v The State* [1993] PNGLR 94 appears to be the only similar reported case, where a group of Western Highlands customary landowners unsuccessfully sought damages for private nuisance created by drainage works that affected the flow of river water to their land. It is necessary to see what courts in other jurisdictions have said about what has to be proven to establish a cause of action in either private nuisance or public nuisance. What are the elements of these torts? Discussion of the subject in *Halsbury's Laws of England* 4th edition, Volume 34, Butterworths © 1997 and the leading text *The Law of Torts*, John G Fleming, Law Book Company © 1977 demonstrates that the elements of private nuisance are that:

- the defendant's conduct will interfere with use and enjoyment of the plaintiff's land; and
- the conduct of the defendant is unlawful, unwarranted or unreasonable.

66. The elements of public nuisance are that:

- the conduct of the defendant causes inconvenience, damage or harm to the general public; and
- the plaintiff is a member of a class of persons who incurs some particular or special loss over and above the ordinary inconvenience and annoyance suffered by the general public; and
- the conduct of the defendant is unlawful, unwarranted or unreasonable.

67. The elements of private nuisance and public nuisance are similar but it is necessary to address each one in turn.

1 PRIVATE NUISANCE

68. Two issues arise:

- Will operation of the DSTP interfere with the plaintiffs' use and enjoyment of their land?
- Will operation of the DSTP be unlawful, unwarranted or unreasonable?

Will operation of the DSTP interfere with the plaintiffs' use and enjoyment of their land?

69. The plaintiffs have established to my satisfaction that they are owners of, or have a genuine interest in customary land, on the coastline of Madang Province. Ownership of that land gives them ownership of the areas of the sea adjoining their land. I am satisfied, having regard to the

findings of fact as to the likely adverse environmental effect of the DSTP, that operation of the DSTP will interfere with their use and enjoyment of customary land, including the sea. The first element of private nuisance is proven.

Will operation of the DSTP be unlawful, unwarranted or unreasonable?

70. The defendants argue that operation of the DSTP is lawful by virtue of the environment permit granted to MCC by the Director under the [Environment Act](#), which expressly authorises its operation. Provided that the DSTP is operated in accordance with the conditions of the permit, including the OEMP, its operation will remain lawful. Compliance with the conditions of a permit is a complete defence to an action in nuisance: the plaintiffs have no right to restrain an activity that is expressly permitted by law. The legislative intention is that a permitted activity is lawful and not subject to challenge in a court.

71. The defendants acknowledge that Section 129(4) of the Act may appear to allow an aggrieved person to commence proceedings aimed at restraining activities that cause environmental harm. It states:

Nothing in this Act shall affect the right which a person may have at law to restrain, or obtain damages in respect of, environmental harm.

72. However, they argue that Section 129(4) simply clarifies that if a permit holder acts outside the terms of a permit or acts negligently, an affected person may be able to sue for damages or even obtain an injunction to restrain the unlawful or negligent activity. It has no application here, they argue, as the DSTP has not yet commenced operation; and once it does commence operation, every indication is that it will be operated in accordance with the conditions of the permit and the OEMP.

73. The defendants also point to Section 44(3) of the Act which, they argue, confirms that a person who is concerned about environmental harm caused by an activity or, as in the present case, the prospect of environmental harm being caused by a proposed activity, cannot succeed in any common law action, if, as in the present case, the activity has been authorised to commence operation under an environment permit. Section 44(3) states:

An environmental permit confers on the holder the right to carry out the activities specified in the permit in accordance with the conditions imposed under the permit.

74. Those arguments must be assessed in the context of two propositions of law that I consider are critical to determination of the plaintiffs' common law claims. First the [Environment Act](#) does not extinguish the right of a person aggrieved by actual or apprehended environmental harm to bring a common law action aimed at preventing continuance of harm. There is no provision of the Act that expressly extinguishes common law or underlying law rights of action. And on its proper construction I detect nothing in the scheme of the Act that impliedly excludes common law actions. Secondly, under the law of nuisance it is not necessarily a defence for a defendant to

say 'I have a permit to do this, the law allows me to conduct this activity'. The law of nuisance says that statutory authorisation to conduct an activity that gives rise to a nuisance will provide the defendant with a defence only if the nuisance is the inevitable consequence of conducting that activity. Lord Dunedin stated the principle in *Manchester Corporation v Farnworth* [1930] AC 171, at 183:

When Parliament has authorised a certain thing to be made or done in a certain place, there can be no action for nuisance caused by the making or doing of that thing if the nuisance is the inevitable result of the making or doing so authorised.

75. That principle was cited with approval by the House of Lords in the leading case *Allen v Gulf Oil Refining* [1981] AC 1001 and there is no reason to conclude (and no argument to this effect was put before the court) that it is unsuitable to the current circumstances of PNG. It is properly regarded as part of the underlying law.

76. The question therefore becomes: is the nuisance that the plaintiffs are concerned about, the inevitable consequence of the activity, ie operation of the DSTP, as approved? Put another way: are the types of environmental harm or the types of interference in the use and enjoyment of their land and seawaters the inevitable consequence of operation of the DSTP, as it has been approved? The answer is no. Operation of the DSTP will cause three types of nuisance: (1) smothering of the benthos, (2) toxicity to marine organisms in Astrolabe Bay, with a resultant adverse impact on the ecology of the Bay and (3) movement of tailings, caused by upwelling, outside the mixing zone, on to the shore and along the coast to Madang town and perhaps beyond. Only the first type – to the extent that the benthos is smothered in the 150 square km tailings footprint identified in the 1999 environmental plan – can be regarded as the inevitable consequence of operation of the DSTP. The smothering of benthos outside the anticipated tailings footprint and the toxic effect of the tailings and the movement of the tailings outside the mixing zone are not the inevitable consequence of operation of the DSTP, as it has been approved. The environment permit was granted on the presumption, arising by virtue of condition No 1, that the only environmental harm caused by operation of the DSTP will be what was set out in the 1999 environmental plan, ie smothering of the benthos within the tailings footprint. That means the other types of environmental harm have not been authorised and cannot be regarded as the inevitable consequence of the approved activity. The defence of statutory authorisation does not apply. The second element of private nuisance is established.

Conclusion: private nuisance

77. Both elements of this tort have been established. The defence of statutory authorisation does not apply. The plaintiffs have therefore established a cause of action in private nuisance.

2 PUBLIC NUISANCE

78. Three issues arise:

- Will operation of the DSTP cause inconvenience, damage or harm to the general public?

- Do the plaintiffs belong to a class of persons who will incur some particular or special loss over and above the ordinary inconvenience and annoyance suffered by the general public?
- Will operation of the DSTP be unlawful, unwarranted or unreasonable?

Will operation of the DSTP cause inconvenience, damage or harm to the general public?

79. Yes, it is likely that serious environmental harm will be caused to Astrolabe Bay and other parts of the seawaters of Madang Province.

Do the plaintiffs belong to a class of persons who will incur some particular or special loss over and above the ordinary inconvenience and annoyance suffered by the general public?

80. Yes, the plaintiffs are coastal people who depend on the sea for maintenance of their livelihood and way of life.

Will operation of the DSTP be unlawful, unwarranted or unreasonable?

81. Yes, for the same reasons given above in relation to the private nuisance action.

Conclusion: public nuisance

82. All elements of this tort have been established. The defence of statutory authorisation does not apply. The plaintiffs have therefore established a cause of action in public nuisance.

3 CONCLUSION RE FIRST CAUSE OF ACTION

83. The plaintiffs have established causes of action in both private nuisance and public nuisance.

PART D: THE ALLEGED BREACH OF THE [ENVIRONMENT ACT](#)

84. The plaintiffs argue that operation of the DSTP will breach the [Environment Act](#) and be unlawful in that it will:

- undermine the objects of the [Environment Act](#) expressly prescribed by Section 4 and amplified by the long title to the Act and by Sections 5 and 6;
- put MCC in breach of the statutory duty of all persons and corporations in the country imposed by Section 7 (*general environmental duty*) of the [Environment Act](#), called 'the general environmental duty'; and
- cause unlawful environmental harm and be unlawful under Section 10 (*unlawful environmental harm*) of the [Environment Act](#); and

- cause serious environmental harm and constitute an offence under Section 11 (*causing serious environmental harm*) of the [Environment Act](#).

85. Each of these arguments must be separately addressed.

1 OBJECTS AND SPIRIT OF THE [ENVIRONMENT ACT](#)

86. The objects of the Act are expressly set out in Section 4 (*objects*), which states:

The objects of this Act are—

(a) to promote the wise management of Papua New Guinea natural resources for the collective benefit of the whole nation and ensure renewable resources are replenished for future generations; and

(b) to protect the environment while allowing for development in a way that improves the quality of life and maintains the ecological processes on which life depends; and

(c) to sustain the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations, and safeguard the life-supporting capacity of air, water, land and eco-systems; and

(d) to ensure that proper weight is given to both long-term and short-term social, economic, environmental and equity considerations in deciding all matters relating to environmental management, protection, restoration and enhancement; and

(e) to avoid, remedy or mitigate any adverse effects of activities on the environment by regulating in an integrated, cost-effective and systematic manner, activities, products, substances and services that cause environmental harm; and

(f) to require persons engaged in activities which have a harmful effect on the environment progressively to reduce or mitigate the impact of those effects as such reductions and mitigation become practicable through technology and economic developments; and

(g) to allocate the costs of environmental protection and restoration equitably and in a manner that encourages responsible use of, and reduced harm to, the environment; and

(h) to apply a precautionary approach to the assessment of risk of environmental harm and ensure that all aspects of environmental quality affected by environmental harm are considered in decisions relating to the environment; and

(i) to regulate activities which may have a harmful effect on the environment in an open and transparent manner and ensure that consultation occurs in relation to decisions under this Act with persons and bodies who are likely to be affected by them; and

(j) to provide a means for carrying into effect obligations under any international treaty or convention relating to the environment to which Papua New Guinea is a party.

87. A further indication of the Act's objects is provided by the long title, which states that it is:

An Act to provide for and give effect to the National Goals and Directive Principles and in particular—

(a) to provide for protection of the environment in accordance with the Fourth National Goal and Directive Principle (Natural Resources and Environment) of the Constitution; and

(b) to regulate the environmental impacts of development activities in order to promote sustainable development of the environment and the economic, social and physical well-being of people by safeguarding the life-supporting capacity of air, water, soil and ecosystems for present and future generations and avoiding, remedying and mitigating any adverse effects of activities on the environment; and

(c) to provide for the protection of the environment from environmental harm; and

(d) to provide for the management of national water resources and the responsibility for their management; and

(e) to repeal various Acts,

and for other related purposes.

88. Section 5 (*matters of national importance*) imposes duties on all persons exercising powers and functions under the Act. It states:

All persons exercising powers and functions under this Act shall recognise and provide for the following matters of national importance:—

(a) the preservation of Papua New Guinea traditional social structures; and

(b) the maintenance of sources of clean water and subsistence food sources to enable those Papua New Guineans who depend upon them to maintain their traditional lifestyles; and

(c) the protection of areas of significant biological diversity and the habitats of rare, unique or endangered species; and

(d) the recognition of the role of land-owners in decision-making about the development of the resources on their land; and

(e) responsible and sustainable economic development.

89. Section 6 (*how the object of this Act is to be achieved*) explains the approaches to be taken to fulfilling the objects of the Act:

(1) The protection of Papua New Guinea's environment is to be achieved by a process of setting environmental objectives and providing the means to encourage and ensure their observance.

(2) The process described in Subsection (1) is to be achieved by—

(a) determining environmental objectives by researching the state of the environment and identifying the beneficial values which are important to the community of Papua New Guinea and which require protection from environmental harm in the formulation of Environment Policies through a process of consultation; and

(b) applying the environmental objectives to level 1 activities by means of Environmental Codes of Practice, Environment Protection Orders, Clean-up Orders and Emergency Directions; and

(c) applying the environmental objectives to level 2 and level 3 activities by means of conditions in environment permits, and the negotiation of environmental improvement plans and environmental management programmes; and

(d) requiring proposed activities involving matters of national importance to undergo a process of public and detailed consideration of environmental implications through a process of environmental impact assessment; and

(e) enforcement of the protection of beneficial values through preventative measures described above as well as through prosecutions for the offences of causing environmental harm.

90. It is arguable, given the findings of fact that have been made as to the environmental effects of the DSTP, that its operation will not, amongst other things, promote the wise management of PNG's natural resources, maintain the ecological processes on which life depends, safeguard the life-supporting capacity of air, water, land and eco-systems or represent a precautionary approach to the assessment of risk of environmental harm, ie that operation of the DSTP will defeat the objects of the Act prescribed by Section 4. It is also arguable that operation of the DSTP will not provide for protection of the environment or for the responsible management of national water resources, contrary to the legislative aspirations conveyed by the long title to the [Environment Act](#). It is further arguable that by giving statutory approval of operation of the DSTP the Director of Environment has not sufficiently recognised and provided for the matters of national importance earmarked by Section 5, especially the maintenance of sources of clean water and subsistence food sources and the protection of areas of biological diversity. Further, that the state of the environment of Astrolabe Bay and its beneficial values has not been adequately researched, thereby not encouraging protection of Papua New Guinea's environment contrary to Section 6.

91. However, I cannot find in the [Environment Act](#) any indication that its objects or spirit are requirements the breach of which can give rise to a cause of action. As the defendants have asserted throughout this case, questions such as whether the DSTP is the best method of tailings disposal for the Ramu Nickel Project and whether the DSTP should be stopped on environmental grounds are not matters that the National Court can properly determine. This is not a judicial

review proceeding. The question is not whether the Director of Environment has properly considered the objects or spirit of the Act in granting statutory approval. I uphold those submissions. This part of the plaintiffs' statutory claim must be refused.

2 BREACH OF THE GENERAL ENVIRONMENTAL DUTY

92. The "general environmental duty" is imposed by Section 7(1):

A person shall not carry out an activity that causes or is likely to cause an environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the environmental harm.

93. The nature and extent of the general environmental duty is determined in accordance with Section 7(2):

In determining what measures are required under Subsection (1), regard shall be given to the following matters:—

(a) the nature of the harm or potential harm; and

(b) the sensitivity of the receiving environment; and

(c) the current state of technical knowledge for the activity; and

(d) the likelihood of successful application of the different measures that might be taken; and

(e) the financial implications of the different measures as they would relate to the type of activity.

94. The plaintiffs argue that, given the likelihood of serious environmental harm arising from operation of the DSTP, and the sensitivity of the 'receiving environment' at Basamuk Bay, Astrolabe Bay and the seawaters to the north and west of Madang Province, and taking into account the current state of technical knowledge of DSTP, the mistakes that have been made at Minihasa and Misima, the feasibility of alternative methods of tailings disposal and the financial implications of alternative methods of tailings disposal, operating the DSTP will put the defendants in breach of the general environmental duty. Specifically, it is contended that MCC, by operating the DSTP, will be in breach of the duty and that the Director has breached the duty by allowing it to happen without proper benthic, eco-toxicological and oceanographical studies being undertaken.

95. The plaintiffs further argue that the defendants cannot rely on the statutory approval of the DSTP operation that has been given. They acknowledge that a defence of statutory approval is available under Section 7(4), but argue that the defence does not apply here. Section 7(4) states:

Where in a proceeding it is alleged that a person failed to comply with the general environmental duty by causing environmental harm, it will be a defence if the harm is caused in the course of complying with an Environmental Code of Practice or authorized to be caused under—

(a) an Environment Policy; or

(b) a condition of an environment permit; or

(c) an approved environmental improvement plan; or

(d) an Environment Protection Order; or

(e) an Emergency Authorization.

96. The reason that the defence in Section 7(4) does not apply, the plaintiffs argue, is that much of the harm that will be caused by the DSTP is *not* authorised by the environment permit. This is an alluring argument. It makes sense if Section 7(4) is read in isolation. But that is not a proper approach to statutory interpretation. All the words and provisions of a statute must be read in context (*Elema v MMI Insurance Ltd* (2011) [SC1114](#)); and when Section 7(4) is read in the context of the immediately preceding Section 7(3), the import of Section 7(4) becomes very clear.

97. Section 7(3) states:

Failure to comply with the general environmental duty does not constitute an offence or give rise of itself to a right to civil remedy, but compliance with the duty may be enforced by—

(a) an Environment Protection Order; or

(b) a Clean-up Order; or

(c) an Emergency Direction. [Emphasis added.]

98. Breach of the general environmental duty cannot therefore be sustained as a discrete cause of action. It is clear that a plaintiff cannot obtain a civil remedy by just arguing or even proving a breach of the general environmental duty. It is equally clear, in my view, that the introductory words of Section 7(4) – "where in any proceeding it is alleged that a person failed to comply with the general environmental duty" – are providing a defence to the allegation that a person has failed to comply with the general environmental duty only in proceedings (civil or criminal) in which that allegation is raised as one of the elements of the cause of action or offence that is being prosecuted. The failure to comply with the general environmental duty cannot of itself give rise to liability. This part of the plaintiffs' statutory claim must be refused.

3 UNLAWFUL ENVIRONMENTAL HARM

99. The plaintiffs seek a declaration under Section 10(1) of the [Environment Act](#) that operation of the DSTP will be unlawful. Section 10(1) states:

An act or omission that causes, or is reasonably likely to cause, environmental harm, is unlawful unless it is caused in the course of complying with an Environmental Code of Practice or permitted to be done under—

(a) a condition of a permit; or

(b) an Environment Policy; or

(c) an Environment Protection Order; or

(d) a Clean-up Order; or

(e) an Emergency Direction; or

(f) an Emergency Authorization.

100. The plaintiffs argue that operation of the DSTP will cause environmental harm which is not excused by any of paragraphs (a) to (f) as much of the harm (smothering of the benthos outside the area predicted by the 1999 environmental plan, the toxic effects of the tailings and the shoreward and north-west movement of the tailings) is not authorised by the environment permit.

101. It has been established beyond reasonable doubt that operation of the DSTP will cause some "environmental harm" within the meaning of that term provided by Section 2 (*interpretation*) of the Act. It means:

any change to the environment, or any part of the environment, which has a detrimental effect on any beneficial value relating to the environment,

102. "Beneficial value" is also defined by Section 2. It means:

a quality or characteristic of the environment or any element or segment of the environment, which—

(a) is conducive to ecological health, public benefit, welfare, safety, health or aesthetic enjoyment and which requires protection from environmental harm; or

(b) is declared in an Environment Policy or permit to be a beneficial value.

103. "The environment" also has a definition provided by Section 2. It includes:

(a) ecosystems and their constituent parts including people and communities and including human-made or modified structures and areas; and

(b) all natural and physical resources; and

(c) amenity values; and

(d) the qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community; and

(e) the social, economic, aesthetic and cultural conditions which affect the matters stated in Paragraphs (a) to (d) of this definition or which are affected by those matters.

104. When I say that it is beyond reasonable doubt that environmental harm will be caused by the DSTP, I am stating something that, though it might sound contentious, is in fact uncontroversial. The defendants, as I understand their arguments, concede that the seafloor environment of Basamuk Canyon will be changed and this is likely to have a detrimental effect on an element of that environment – the benthos – which is conducive to ecological health. They hasten to qualify that concession by arguing that the harm is not extensive and is a small price to pay for an effective and safe means of tailings disposal. The defendants also argue that the harm caused is not unlawful as the harm, and the activity that causes it, are permitted under the conditions of the environment permit, ie that Section 10(1)(a) protects them against any declaration of unlawfulness.

105. The plaintiffs are eager to point out that all the environmental harm that will in fact be caused by the DSTP is not permitted to be done under the environment permit. I have already upheld their argument on that point when determining the common law claim. But does it apply with equal force here? I have concluded after careful examination of Section 10(1) that it does not. Section 10(1) is directed at acts or omissions that cause or are likely to cause environmental harm. Are those acts or omissions lawful or unlawful? That is the question. Or, putting it another way: will operation of the DSTP be unlawful? The answer is no, as operation of the DSTP is permitted to be done under the conditions of the environment permit. This part of the plaintiffs' statutory claim must be refused.

4 CAUSING SERIOUS ENVIRONMENTAL HARM

106. The plaintiffs seek a declaration under Section 11(1) (*causing serious environmental harm*) that operation of the DSTP will unlawfully cause serious environmental harm. Section 11 states:

(1) A person who unlawfully causes a serious environmental harm is guilty of an offence.

Penalty: Where the person convicted of an offence is—

(a) a Corporation—a fine not exceeding K250,000.00; and

(b) other than a Corporation—a fine not exceeding K125,000.00 or imprisonment for a term not exceeding five years, or both.

Default penalty: A fine not exceeding K15,000.00.

(2) In proceedings for an offence against Subsection (1), there is no requirement to prove that the person intended to cause the serious environmental harm.

107. There are two problems with this part of the plaintiffs' case. First, Section 11 is a criminal provision. It creates an offence. It is not appropriate in civil proceedings, which the current proceedings are, for the court to make a judicial determination (which is what the plaintiffs are doing by seeking a declaration) that a party has committed an offence. I did not hear argument on the point, but I consider that it amounts to an abuse of process to expect the court to make this sort of declaration in civil proceedings. Secondly, if I were not so reluctant to entertain the plaintiffs' argument about the alleged criminality of operation of the DSTP, and proposed to make a determination of the question of law raised by the argument, I consider that the first defendant could rely on the defences provided by Section 7(4) and Section 10(1)(c). Section 7(4)(b) would apply as the harm is "authorised to be caused" (for the purposes of an offence provision such as Section 11(1)) under conditions of the environment permit. Section 10(1)(a) would apply as operation of the DSTP is an act that is permitted to be done under the conditions of an environment permit. Either way, it would not be appropriate to make a declaration in the terms sought. This part of the plaintiffs' statutory claim must be refused.

5 RELEVANCE OF SECTION 136

108. Before completing determination of the plaintiffs' second cause of action I will deal with their arguments concerning the savings provisions in Section 136 (*approvals, permits, licences etc, to continue in force*). This is a complex section, consisting of seven sub-sections, but only two are relevant here: sub-sections (1) and (3).

109. Section 136(1) states:

Subject to this section—

(a) an approval granted under the Environmental Planning Act (repealed); and

(b) a permit and a licence granted under the Environmental Contaminants Act (repealed); and

(c) a permit (including a water investigation permit) issued under the Water Resources Act (repealed),

valid and in force immediately before the coming into operation of this Act, shall—

(d) continue, on that coming into operation, to have full force and effect for the term for which they were granted or until they sooner expire or are revoked according to law as if the Act under which they were granted had not been repealed; and

(e) be deemed to be corresponding permits for the purposes of this Act and may be dealt with in accordance with the provisions of this Act as if they had been issued under this Act.

110. Section 136(3) states:

Where, immediately before the coming into operation of this Act—

(a) a person was lawfully carrying on an activity pursuant to a permit, licence or approval under the repealed Acts which is deemed to be a permit by virtue of Subsection (1); and

(b) the activity would constitute an offence under this Act,

the person is entitled, subject to this section and to the permit, to carry on the activity and the carrying on of the activity does not constitute an offence.

111. The plaintiffs argue that the combined effect of these sub-sections is that an approval given under the repealed *Environmental Planning Act* will only authorise an activity that would constitute an offence under the [Environment Act](#) if a person was lawfully carrying on that activity pursuant to an approval under the repealed Act. Here, they say, operation of the DSTP will constitute an offence under the [Environment Act](#) and as that activity was not being carried on immediately before commencement of the *Environment Act* (its date of commencement was 1 January 2004) it cannot be authorised under the approval given under the repealed Act on 21 March 2000. The short and effective answer to this argument is that the approval for operation of the DSTP no longer depends solely on the approval given on 21 March 2000. That approval is deemed by Section 136(1)(c) to be an environment permit under Section 65 (*criteria for grant and conditions of permit*) of the [Environment Act 2000](#), and it has been amended on two occasions, on 7 November 2007 and 10 August 2009. The permit authorising operation of the DSTP is for all intents and purposes a permit granted under the [Environment Act 2000](#). The fact that the activity was not being carried on immediately before commencement of the Act is inconsequential. Section 136 therefore has no effect on determination of the plaintiffs' claims of unlawfulness under the [Environment Act](#).

6 CONCLUSION RE SECOND CAUSE OF ACTION

112. The plaintiffs have failed to establish that operation of the DSTP will give rise to breaches of the [Environment Act](#) in the manner alleged.

PART E: THE ALLEGED BREACH OF NATIONAL GOAL NO 4

1 THE PLAINTIFFS' ARGUMENTS

113. The plaintiffs argue that operation of the DSTP will be contrary to National Goal No 4 (*natural resources and environment*) of the *Constitution* and its accompanying Directive Principles, which state:

We declare our fourth goal to be for Papua New Guinea's natural resources and environment to be conserved and used for the collective benefit of us all, and be replenished for the benefit of future generations.

WE ACCORDINGLY CALL FOR—

(1) wise use to be made of our natural resources and the environment in and on the land or seabed, in the sea, under the land, and in the air, in the interests of our development and in trust for future generations; and

(2) the conservation and replenishment, for the benefit of ourselves and posterity, of the environment and its sacred, scenic, and historical qualities; and

(3) all necessary steps to be taken to give adequate protection to our valued birds, animals, fish, insects, plants and trees.

114. The plaintiffs argue that the disposal of waste by MCC into Basamuk Bay and Astrolabe Bay and consequently the 1999 environmental plan and all permits which allow such disposal are contrary to National Goal No 4 in that they do not promote sustainable development of the environment and the economic, social and physical well-being of people by safeguarding the life-supporting capacity of air, water, soil and eco-systems for present and future generations, and do not mitigate adverse effects of the activity. They argue that those activities ought to be restrained pursuant to Sections 25 and 23 of the *Constitution*.

115. Section 25 (*implementation of the National Goals and Directive Principles*) states:

(1) Except to the extent provided in Subsections (3) and (4), the National Goals and Directive Principles are non-justiciable.

(2) Nevertheless, it is the duty of all governmental bodies to apply and give effect to them as far as lies within their respective powers.

(3) Where any law, or any power conferred by any law (whether the power be of a legislative, judicial, executive, administrative or other kind), can reasonably be understood, applied, exercised or enforced, without failing to give effect to the intention of the Parliament or to this Constitution, in such a way as to give effect to the National Goals and Directive Principles, or at least not to derogate them, it is to be understood, applied or exercised, and shall be enforced, in that way.

(4) Subsection (1) does not apply to the jurisdiction of the Ombudsman Commission or of any other body prescribed for the purposes of Division III.2 (leadership code), which shall take the National Goals and Directive Principles fully into account in all cases as appropriate.

116. Section 23 (*sanctions*) states:

(1) Where any provision of a Constitutional Law prohibits or restricts an act, or imposes a duty, then unless a Constitutional Law or an Act of the Parliament provides for the enforcement of that provision the National Court may—

(a) impose a sentence of imprisonment for a period not exceeding 10 years or a fine not exceeding K10 000.00; or

(b) in the absence of any other equally effective remedy under the laws of Papua New Guinea, order the making of compensation by a person (including a governmental body) who is in default,

or both, for a breach of the prohibition, restriction or duty, and may make such further order in the circumstances as it thinks proper.

(2) Where a provision of a Constitutional Law prohibits or restricts an act or imposes a duty, the National Court may, if it thinks it proper to do so, make any order that it thinks proper for preventing or remedying a breach of the prohibition, restriction or duty, and Subsection (1) applies to a failure to comply with the order as if it were a breach of a provision of this Constitution.

(3) Where the National Court considers it proper to do so, it may include in an order under Subsection (2) an anticipatory order under Subsection (1).

2 ARE THE NATIONAL GOALS AND DIRECTIVE PRINCIPLES JUSTICIABLE?

117. I agree that it is arguable, in view of findings of fact already made in this case about the likely environmental effect of the DSTP, that approval and operation of the DSTP will be contrary to National Goal No 4. But is it open to the court to consider making a determination to that effect, or even to express an opinion on the issue, in light of Section 25(1) of the *Constitution*, which provides that the National Goals and Directive Principles are non-justiciable?

118. The term "non-justiciable" (pronounced jus'tisheehuhuhl) is defined by Schedule 1.7 (*non-justiciable*) of the *Constitution* in these terms:

Where a Constitutional Law declares a question to be non-justiciable, the question may not be heard or determined by any court or tribunal, but nothing in this section limits the jurisdiction of the Ombudsman Commission or of any other tribunal established for the purposes of Division III.2 (leadership code).

119. This would appear to mean that the question whether any activity is contrary to any of the National Goals and Directive Principles cannot be heard or determined by a court. This is the approach advanced by the defendants. They argue that I should decline to even consider whether the approval or operation of the DSTP breaches the National Goals and Directive Principles. To hear, let alone, determine such a question would offend against Section 25(1), and the court would be exceeding its jurisdiction.

120. That, on the face of it, would be a reasonable approach to take. If a law states that a question is non-justiciable the normal meaning of that term would suggest that the question should not be determined by the court: argument about whether the question should be answered one way or the other ought not be allowed. However, as Mrs Nonggorr, for the plaintiffs, has been at pains to point out since commencement of these proceedings, Section 25(1) does not exclude the jurisdiction of the courts entirely. Section 25(1) is subject to an exception. It is prefaced by the words "Except to the extent provided by Subsections (3) and (4)". Subsection (4) concerns the jurisdiction of the Ombudsman Commission and is not relevant for present purposes. But Subsection (3) is very relevant, or at least the parts of it that I paraphrase as follows:

- Where any judicial power can reasonably be exercised in such a way as to give effect to the National Goals and Directive Principles, and without failing to give effect to the intention of the Parliament or to this *Constitution*, it is to be exercised and shall be enforced in that way.

3 DUTY TO EXPRESS OPINION

121. I am in these proceedings exercising the judicial powers of the People of Papua New Guinea. Section 25(3) is enjoining me, as a Judge, to give effect to the National Goals and Directive Principles. Neither the *Constitution* – through which the judicial power of the People is conferred on Judges – nor the Parliament – which has expressed its intentions through legislation such as the [Environment Act](#) – has indicated that the question of whether the DSTP will be contrary to the National Goals and Directive Principles is beyond the jurisdiction of the National Court. I therefore feel that I am justified, indeed I am obliged, especially in light of the extensive evidence that has been brought before the court and the nature of the findings of fact that I have made, to exercise my judicial powers in such a way as to give effect to the National Goals and Directive Principles; and the best and most appropriate way of doing that is by expressing an opinion on the proposition that the plaintiffs have advanced.

122. The National Goals and Directive Principles are in the Preamble to the *Constitution*. They underlie the *Constitution*. They are the proclaimed aims of the People. Core values. All persons and bodies are directed by the *Constitution* to be guided by them and the Directive Principles in pursuing and achieving the aims of the People. They cannot be ignored.

123. I therefore feel obliged to state that my considered opinion as a Judge, having heard extensive evidence on the likely environmental effect of the DSTP and made findings of fact on that subject, is that the approval of the DSTP and its operation has been and will be contrary to National Goal No 4. It amounts to an abuse and depletion of Papua New Guinea's natural resources and environment – not their conservation – for the collective benefit of the People of Papua New Guinea and for the benefit of future generations, to discharge into a near-pristine sea (a widely recognised hotspot of biodiversity), mine tailings at a rate of 5 million tonnes of solids and 58.9 million cubic metres of tailings liquor per year. It constitutes unwise use of our natural resources and environment, particularly in and on the seabed and in the sea. It amounts to a breach of our duty of trust for future generations for this to happen. It is a course of action that shows deafness to the call of the People through Directive Principle 4(2) to conserve and replenish our sacred and scenic marine environment in Astrolabe Bay. It puts other coastal

waters of Madang Province at risk. Inadequate protection has been given to our valued fish and other marine organisms.

124. Having expressed that opinion, I do not consider that Section 25(3) requires that I proceed to make orders under Section 23 of the *Constitution* to enforce that opinion; and I decline to do so.

4 CONCLUSION RE THIRD CAUSE OF ACTION

125. The plaintiffs have established to the satisfaction of the court that approval for and operation of the DSTP are actions that are contrary to National Goal No 4 of the *Constitution*.

PART F: REMEDIES

126. Before addressing the question of remedies I will recap what has so far been decided on the plaintiffs' three causes of action:

1 both private nuisance and public nuisance have been proven;

2 breaches of the [Environment Act](#) have not been established;

3 breaches of National Goal No 4 have been established.

127. As they have succeeded with two of their three causes of action the plaintiffs are eligible to be granted the relief they are seeking. The word eligible is used advisedly. The plaintiffs have no entitlement to relief. They need to persuade the court that it is just, fair and appropriate to grant relief and that the court should, in the interests of justice, exercise its discretion in their favour. The principal relief they seek is a permanent *quia timet* injunction to restrain the first defendant, MCC, from committing nuisance and interfering with the plaintiffs' use and enjoyment of their customary land and water rights and from discharging tailings into the sea at Basamuk Bay using the DSTP system. The other relief sought that remains open for consideration following determination of the causes of action is a declaration that the plaintiffs be consulted and informed on all matters concerning tailings and waste disposal concerning the Ramu Nickel Project. Each matter will be addressed separately.

1 INJUNCTION TO STOP DSTP

128. The question is whether an injunction should be granted restraining MCC from operating the DSTP. In exercising the discretion whether to grant such an injunction there are a number of matters that I consider should be taken into account:

(a) Do the plaintiffs have standing to be granted such relief?

(b) Has there been an unreasonable delay in seeking an injunction?

(c) Is operating the DSTP an unlawful activity?

(d) What is the likelihood of the environmental harm actually occurring and how extensive is it likely to be?

(e) What will be the consequences of granting an injunction?

(f) Will the National Goals and Directive Principles be advanced by granting an injunction?

(g) Have the parties acted in good faith?

Each will be addressed in turn.

(a) Do the plaintiffs have standing to be granted such relief?

129. The defendants argue that the court should not consider granting an injunction to any of the plaintiffs who have not established ownership of land. As their principal cause of action is nuisance, which is a tort intended to protect a person's interest in land, the plaintiffs need to establish that it is actually *their* land that is under imminent threat of damage. They point out that two of the plaintiffs, Louis Medaing (first plaintiff) and Terry Kunning (second plaintiff) are actually in dispute over the same portion of land at Basamuk. They suggest that Mr Medaing has misled the court as to his clan of origin and he is not a genuine customary landowner in the Basamuk area. They assert that I cannot determine the land claims of Mr Medaing and Mr Kunning as the National Court has no jurisdiction to determine questions of ownership of customary land.

130. The correctness of the last-mentioned proposition is not in question. It is a well-established principle of land law in Papua New Guinea that the National Court has no jurisdiction to determine disputes about ownership of customary land (*The State v Lohia Sisia* [1987] PNGLR 102, *Ronny Wabia v BP Exploration Co Ltd* [1998] PNGLR 8). I do not think I am in danger of offending against it and I fail to see its relevance to the question of whether an injunction should be granted in the terms sought. I have already found as a fact that the plaintiffs have a genuine interest in the subject matter of these proceedings. They are concerned that the tailings will contain chemicals or poisons, that this will affect fish stocks and other marine resources and that the tailings will be washed by sea currents towards their fishing grounds and villages. They have a sufficient legal interest. They have standing to be granted an injunction.

(b) Has there been an unreasonable delay in seeking an injunction?

131. Delay on the part of a plaintiff in seeking an injunction is always a relevant factor for the court to take into account. A delay is suggestive of acquiescence in the defendant's conduct and can cause the defendant to conduct its affairs in the belief that the plaintiff has accepted the status quo (*Lakunda Plantation Pty Ltd v Ian Maluvil* [1981] PNGLR 252). Here, there has been a substantial delay on the part of the plaintiffs. There is evidence that the plan to construct a DSTP system was communicated to villagers on the Rai Coast in 1999 and that it has been no secret that that was always the preferred method of tailings disposal. As I said in *Eddie Tarsie v Dr Wari Iamo* (2010) N4033 the people who are now (with some justification) concerned about the environmental effect of the DSTP should have been more diligent earlier in voicing their

concerns. They have to some extent acquiesced in the DSTP by not commencing these proceedings much sooner. In the meantime, the developers of the project, originally Highlands Pacific Ltd and more recently, and in particular, MCC, have been left to make their plans and investments on the reasonable assumption that there would be no objection to the DSTP of the type that they have been confronted with in the current proceedings and in the earlier *Tarsie* proceedings. The issue of delays weighs against the plaintiffs.

(c) Is operating the DSTP an unlawful activity?

132. No. The arguments about the DSTP being unlawful under the [Environment Act](#) have been rejected.

(d) What is the likelihood of the environmental harm actually occurring and how extensive is it likely to be?

133. There are two factors to take into account here: the probability of harm and the nature and extent of the harm (*Pastor Johnson Pyawa v Cr Andake Nunwa* (2010) [N4143](#)). The more likely the harm is to occur and the greater its extent and seriousness if it does occur, the stronger is the case for an injunction to restrain the activity that will cause harm.

134. Here there is a reasonable probability of harm and if it does occur in the manner that the plaintiffs are concerned about – if the benthos is destroyed over a wider area than contemplated, the tailings have a toxic effect on marine organisms, upwelling causes the tailings to move shoreward and up the coasts – the environmental consequences may be catastrophic, causing irreparable damage to the ecology of Astrolabe Bay and other coastal waters, and seriously harming the lives and future of the plaintiffs and thousands of other coastal people in Madang Province.

135. However, it is also relevant that all defendants appear to be making genuine efforts to put in place effective monitoring protocols to ensure that any problems with operation of the DSTP will be quickly remedied. The engagement of SAMS, though criticised as 'green wash' by Dr Luick, is a positive step towards prevention and mitigation of excessive harm. If environmental harm of the type reasonably apprehended by the plaintiffs does actually occur the plaintiffs will be able to commence fresh proceedings at short notice and seek the type of relief being sought in these proceedings.

(e) What will be the consequences of granting an injunction?

136. The defendants urge the court to take into account the great prejudice and inconvenience an injunction will cause. I agree that this is a weighty consideration. As I have already found, a permanent injunction will not mean an end to the project but would lead to an extensive delay in its commissioning. The extra cost involved for MCC would be considerable. An alternative method of tailings disposal would have to be decided on and then constructed. The multiplier effect on the provincial and national economy of commencement of a project of this magnitude would be delayed. Investor confidence in PNG would be impaired. In economic terms the consequences would be disastrous.

(f) Will the National Goals and Directive Principles be advanced by granting an injunction?

137. Yes. I have determined that in my opinion operating the DSTP will be contrary to National Goal No 4. It follows that the National Goals and Directive Principles will be advanced by granting an injunction. This factor weighs in favour of the case for an injunction.

(g) Have the parties acted in good faith?

138. I have made a finding that the plaintiffs have acted in good faith, and I draw the same conclusion regarding the conduct of the three defendants. I reject the plaintiffs' submissions that the defendants have not acted bona fides.

2 CONCLUSION RE PERMANENT INJUNCTION

139. Of the seven factors identified, three (standing, likelihood and extent of environmental harm, National Goal No 4) favour a permanent injunction. Three do not (delay by plaintiffs, lawfulness of DSTP, economic consequences). One (good faith of parties) is equally balanced. I have decided that the substantial factors favouring an injunction are outweighed by the opposing factors. This is a borderline case. The plaintiffs have marshalled a compelling body of scientific evidence that the Director of Environment has approved operation of a very risky activity that could have catastrophic consequences for the plaintiffs and the coastal people of Madang Province. But I am satisfied that he has made that decision in good faith. If an injunction were to be granted at this late stage the economic consequences would for MCC and for the People of Madang Province be very damaging. Needless to say, if these proceedings had been commenced much earlier, the result may well have been different. My conclusion therefore is that the application for an injunction is refused.

3 CONSULTATION

140. The plaintiffs seek a declaration that, whatever the outcome of their application for an injunction, they must be consulted in the future about tailings disposal issues. This is a straightforward question to determine. I see no good reason why they should not be consulted. I will grant relief generally in the terms sought, except that I consider that it will be a more effective remedy if, rather than being put in the form of a declaration, the requirement for consultation be made the subject of an order.

PART G: CONCLUSION

141. The plaintiffs have succeeded on two of the three causes of action which they prosecuted. They have failed to achieve their principal objective, which was to obtain a permanent injunction restraining operation of the DSTP. In these circumstances it is appropriate that the parties bear their own costs.

ORDER

(1) It is declared that:

(a) the plaintiffs have established a cause of action in private nuisance and public nuisance in respect of the operation of the deep-sea tailings placement system;

(b) operation of the DSTP will not be unlawful under the *Environment Act 2000*;

(c) operation of the DSTP will be contrary to National Goal No 4 (*natural resources and environment*) of the *Constitution*.

(2) It is ordered that the plaintiffs must be consulted and kept informed by the defendants, at least every three-months, on tailings and waste disposal issues concerning the mine, and this order shall continue for the life of the mine unless and until amended or set aside by the court.

(3) All other relief sought in the statement of claim is refused.

(4) The injunction granted on 22 October 2010 restraining operation of the DSTP system is dissolved.

(5) The parties shall bear their own costs.

(6) Time for entry of this order is abridged to the date of settlement by the Registrar which shall take place forthwith.

Ruling accordingly.

Nonggorr William Lawyers: *Lawyers for the Plaintiff*
Posman Kua Aisi Lawyers: *Lawyers for the First Defendant*
Stevens Lawyers: *Lawyers for the Second and Third Defendants*