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**Submission from Mrs Liz Penfold Member for Flinders regarding the
desalination plant, power supply and Port Bonython issues.**

BHP Billiton (BHP)- Draft EIS for a major expansion of the Olympic Dam mine and minerals processing operation in northern South Australia and to develop associated infrastructure. (Containing Volume 1 Volume 2 and 51 Appendices)

Introduction

The precautionary principle, *'where we see a serious threat to the environment, a lack of scientific certainty shouldn't prevent us taking precautions,'* must be adopted when considering the BHP-EIS.

We cannot afford to leave a legacy of environmental destruction to future generations, nor production inefficiency for other mining companies, for the short term gain of one very large and influential company.

Because BHP is so large and powerful it has a special duty of care, that it not use this power in a manner that could be detrimental to the people and environment of the State of South Australia.

These minerals belong to the people of South Australia and by granting BHP the right to extract them, they as owners, are entitled to a significant share of the net benefits.

I believe BHP has a responsibility to actually assist wherever it can, particularly as it

has the advantage of the current Indenture Agreement with the associated benefits of free water and low royalties, now and into the future, benefits that will not be provided to other companies or individuals that follow it.

I was pleased to note in the preface to the EIS that the *'future plans for Olympic Dam are based on continuing its sustainable development'* while *'ensuring our business remains viable and contributes lasting benefits to society through the consideration of social, environmental, cultural and economic aspects in all that that we do.'*

However the people of South Australia and its current government must take a much wider and longer term view than that of just one company. BHP must fit into the sustainable development of the whole State, and also other companies and communities that want to develop in this remote region, so as to optimise the benefits for everyone, including BHP for the long term.

I concur with their assessment that, *'Environmental and social performance is a critical success factor for us. We are well aware of the costs of getting it wrong. As importantly, we recognise the value that can be created by getting it right.'*

This is equally true for all the other mining companies, local communities and the State as a whole. The value of having BHP mining in South Australia must be maximised so that its legacy lives on, long after mining is finished and that it is a positive one, particularly for the communities it will leave behind.

The EIS is massive and there are three issues that concern me most,

- the desalination plant,
- the power supply, and
- the port

that I want to comment on directly. Relevant references to these issues are scattered through the two reports and the 51 appendices.

I, like most people, do not want to stop the BHP expansion from going ahead but we want safer and better solutions to some of the issues than those proposed in the EIS.

I will attempt to explain within the context of the documents where and how I think these better solutions can be achieved.

The desalination plant at Point Lowly.

The location of the desalination plant at Point Lowly is the priority concern for me and many others in our community. My concern is not just for environmental reasons but also because it takes no account of the current and future needs of the many other mining developments in the proximity, nor the Spencer Gulf cities which currently rely on the unsustainable River Murray water.

I quote from an e-mail sent to me from a qualified professional marine biologist with local relevant experience that sums up our environmental problems with the desalination plant. *“This entire thing comes down to a risk assessment. The problem is that the risk is being taken with one of the most sensitive areas in the Gulf (its upper reaches). The guts of the problem in my view is that we are embarking on a large scale and essentially permanent experiment in a highly sensitive area (that’s the risk part) and while there are alternatives they have not been given any serious consideration by BHP. I believe that they should be made to give due consideration to alternative locations that present lower levels of risk of environmental degradation. Their choice has been made on the basis of costs and access to infrastructure.”*

For the environmental risk, and future water requirements of other mining ventures, towns and cities; modular desalination plants that can be expanded as required are needed. If a desalination plant is allowed at Point Lowly, pressure will eventually be applied to expand it at that site in the future, further exacerbating the problem.

Therefore desalination plants must be placed on the West Coast of Eyre Peninsula right from the start so that the current requirements and future expansions occur with no environmental risks to the Gulf.

I comment now on the report Volume 1

2 Existing Operation

2.6 Water supply.

The current water supply for BHP.

It is stated that about 13.5 gigalitres of water is currently pumped from the well fields in the Great Artesian Basin (GAB) to the mine site each year, some of which is desalinated for Olympic Dam Village, Roxby Downs and Andamooka.

NOTE: It is reported in this part, that a secondary supply of low quality water is obtained from a saline well field to the south of the mine, however the figure 2.10 referred to, does not say how much water is taken, nor if it forms part of the GAB allowance.

I would be interested to have answers to both these questions as it could change significantly the amount of water taken from the GAB and I am not aware of other sources in the area.

The GAB is under supply pressure and open bores are being capped, I understand, with assistance from BHP to reduce waste.

Further, I understand that Stations and BHP do not currently pay for this water and that BHP has an indenture agreement, giving legal rights for extraction of up to 42 ML/day (15.33 gigalitres per year) of fossil Great Artesian basin water every day for the next 40 years.

I believe an amendment to the indenture was made without public scrutiny and commits South Australians to supplying GAB water for at least another 100 years while BHP mines.

Does this therefore mean that the State government will have to allow BHP to continue to take GAB water over and above their current extraction of 15.33 gig litres per year when the mine expansion occurs, should a desalination plant not have eventuated by then?

4 Project Alternatives

It is noted on page 69 under Project Alternatives that the “*Primary water supply would be from a desalination plant not from the Great Artesian Basin*”.

However no account is being taken by the government for the future water needs of other mining ventures and the associated communities in the area which should be catered for at the same time.

It will hold back these other ventures, along with the jobs and royalties that they can provide to the State, if they are forced to build separate expensive water infrastructure.

Or will they want (or be able) to use GAB water for free under the precedent set with BHP?

Neither of these options is attractive and the government must therefore piggyback on BHP’s expenditure to set up a supply of water that can be extended for the future needs of other mines and communities.

4.8 Primary water supply source

“BHP Billiton has elected to use desalination to manufacture the project’s primary supply of water.”

I note that this water is now to be non potable water, which will not be able to be used by the Spencer Gulf cities or Eyre Peninsula without further treatment and the government has withdrawn the funds it was providing to supply additional water.

There is, therefore, no efficiency benefit to the State for having the desalination plant at Point Lowly.

Desalination is the only long term viable option for South Australia to sustainably increase its water supply. However reverse osmosis (RO) is one of at least five different methods of large-scale desalination.

This method chemically contaminates the discharge, making it unsuitable for harvesting salt from the discharge.

It is also unsustainable to return this discharge to the sea because of accumulation in the sediments, over time, to potentially toxic levels for marine life forms.

Other technologies such as Mechanical Vapour Compression (MVC) would enable the saline discharge to be recovered as salt from ponds and would be less likely to impact on marine life if it has to be released into the sea.

Safer desalination technology must be used instead of RO.

It is recognised that other methods may use more power, but by utilising wind power spillage, this will not matter. Additionally, MVC uses less staff to run thereby reducing the output cost.

4.9 Location of desalination plant

The criteria for the selection of a site for a desalination plant (page 78) are given as:

- *“Proximity to Olympic Dam with clean deep (more than 20m) and fast flowing water (i.e. water of high plant intake quality and a high-energy environment in which to dilute and disperse return water safely)”*
- *“Accessibility and constructability of the water supply pipeline”*
- *“Availability of land and established power, roads, and telecommunications infrastructure.”*

NOTE: However what could be considered the main criteria for BHP in choosing this site - that is, being the lowest cost option, is missing from this list.

The main criteria must not be - the lowest cost option - but instead the long term benefit of the environment and for future jobs and development of this part of the State.

State criteria must be added to the BHP criteria.

While cost is clearly important, over the 100 year life of this mine it would be a minor factor so it should not be the overriding factor in deciding the site of the desalination plant.

On the West Coast only Ceduna was said to be a site considered at all and Ceduna is not open to the ocean. Many other West Coast sites with the required “*high intake*”

quality and high energy environments in which to dilute and disperse return water,” were not even considered but they must be.

It is difficult, if not impossible, to understand how the seawater in Upper Spencer Gulf can be described as “*fast flowing*” except locally for short periods. I understand a petro-chemical plant proposed for Redcliffs in the Upper Spencer Gulf in 1976 was denied approval because in the event of an oil spill it would take a lifetime to exit the gulf.

The sea in the upper reaches of Spencer Gulf is more saline than the sea at the mouth of the gulf.

This proves there is little water movement to disperse the discharge with the concentrated saline water and “*anti-scalant chemical used to control scale deposits on the reverse osmosis membranes*” building up in the area, which will be to the detriment of marine flora and fauna.

No research has been undertaken to determine the effect on the marine environment of such discharge 24/7 over many years.

The water depth in most of this region is less than the “*more than 20m*” stated as one of the criteria for the selection of a desalination site.

Evidence from the Lower Lakes debacle is pertinent here. Water Security Minister Karlene Maywald said recently on ABC radio that there is evidence the saline water from the Lower Lakes is taking longer to disperse than was anticipated because of the critically low flows of water.

Spencer Gulf is one of only three inverse estuaries in the world, the other two being St Vincent Gulf and one in Mexico. Spencer Gulf is therefore of unique world significance and must be protected.

The discharge area is a nursery for many fish species, including prawns and the unique giant cuttlefish. Destruction of the marine flora would impact adversely on fisheries with the eventual outcome being the possible destruction of the commercial and recreational fisheries, especially the Spencer Gulf prawn fishery.

These fisheries employ hundreds of people and provide revenue for the state. The Spencer Gulf prawn fishery has been judged by the United Nations to be the best managed fishery in the world.

Have there been any studies undertaken on the effect a desalination plant will have on the State's emblem the Leafy Sea Dragon who live and breed in these waters?

4.10 Options for managing desalination plant return water

As mentioned in 4.9, discharging into the upper reaches of Spencer Gulf threatens the ecology and environment of the gulf. The EIS states that "*the potential environmental impacts are considered manageable*" however what does 'manageable' really mean?

Is it code for 'there will be damage, it could be substantial but it will take a long time and be difficult to prove!'

After all, global warming could be a very convenient scapegoat. It is an unknown that could speed up destruction.

Being 'manageable' does not fill me with confidence and I don't think it is a good enough argument if we are to be certain of the survival of the ecology of the gulf and all that depends on it.

The continual discharge of low salinity stormwater and wastewater over many years into the sea off the city of Adelaide's coastline, has led to the degradation of large areas of seabed, along with the destruction 'of more than 5,000 hectares of seagrass'. (Adelaide Coastal Waters Study Final Report, Volume 1 Summary of Study Findings November 2007 initiated in 2001 by the Environmental Protection Authority, with the aid of the CSIRO).

It is at best naïve, and at worst deceptive, to put forward the notion that high salinity desalination plant discharge 24/7 over many years will not "*impact marine species*" at the top of Spencer Gulf in a similar manner. The water movement is insufficient to disperse the discharge over a wide area, leading to the denser water (with a higher salinity content), sinking to the seabed and remaining there. No research has been

undertaken to determine at what salt-level marine species would be affected, if not by immediate death then by interfering with reproduction leading to the eventual extinction of species. The twice monthly low tides, when there is virtually no water movement, combined with the natural drop in oxygen levels at night when algae use up oxygen instead of producing it, has also not been adequately tested. Lack of oxygen will quickly kill all marine species leaving a dead zone as are being found around the world.

5.7 Water supply

The demand for water of various qualities, and the other requirements for BHP expansion, will be replicated with other mines in the vicinity as they come into production. The best solution would be to consider the current and future needs and address them with **flexible** solutions such as a series of well placed modular desalination plants that can be built as needed.

To place a desalination plant at Point Lowly is not a flexible solution. Once a major facility is built at Point Lowly there will be pressure to expand the plant there because of the huge cost to set up another plant in a much more appropriate site on the west coast of Eyre Peninsula powered by nearby available green energy. It is ridiculously short sighted not to consider future water demands prior to committing to Point Lowly.

16 Marine environment

As mentioned in 4.9 and 4.10, the proposed siting of a desalination plant at Point Lowly is detrimental to the marine environment.

The planning of the project is flawed since it ignores facts that don't fit the BHP Billiton model. As I mentioned in the introduction, I concur with the company's assessment that, *'Environmental and social performance is a critical success factor for us. We are well aware of the costs of getting it wrong. As importantly, we recognise the value that can be created by getting it right.'*

BHP has had some experience in disaster management however it is preferred that disasters do not happen especially where the effects cannot be undone.

The OK Tedi mine disaster in Papua New Guinea is described as the biggest man made natural disaster in the world. Decisions on the setting up of the OK Tedi mine were “modelled” just as the decisions on the siting of the desalination plant and the effect on the marine environment are now being “modelled”.

And there are many other examples of disasters that require future management so it is essential that we get it right now.

Models can be very wrong and if this one is, and a desalination plant causes the death of the marine plants and animals, then we will have no cuttlefish, fishing, prawn or tourism industries and the Spencer Gulf will no longer be a good place to live.

We simply can not take that risk.

If the model proves incorrect, at what stage will the State Government tell BHP to turn off the desalination plant?

Just how much damage will BHP argue is manageable, and how much will be acceptable for this State government, particularly when BHP’s economy is already bigger than the State’s is.

Appendix 012 Desalination plant construction

This is a large document in its own right. However one only has to look at the map, figure 5.1 showing the Spencer Gulf Far Domain, to be shocked at the proposed location for the Point Lowly desalination plant at the very top of the Gulf.

Interestingly it is not actually identified as the Point Lowly desalination site and requires the reader to know that it is located alongside the proposed Port Bonython expansion.

I now comment on, The Power Supply, Report Volume 1, 2 Existing Operation

2.7. Energy Supply

General Statement

Once again there is a need to take a holistic view of the current and future requirements of the mining and communities within the vicinity, to optimise the

opportunity of providing electricity for others and not just BHP at a reduced cost overall.

More bang for the buck and benefit for the owners of the resource - the people of South Australia!

There is significant benefit from bringing forward jobs and royalties in the broader mining industry that will otherwise be significantly delayed by many years.

A power line from the west coast of Eyre Peninsula to Roxby Downs would enable wind energy to be provided by two companies that already want to provide 1,000 megawatts of power from what is considered to be one of the top wind energy sites in the world.

Wave power is also being trialled in the same area.

This green energy could replace much of the fuel currently being used at great cost, in money and to the environment, in green house gases.

There is already excess wind energy from the Mount Millar and Cathedral Rocks wind farms on Eyre Peninsula that is not being used because the current 132 KV line is inadequate. However this can be changed with the implementation of a power ring main that will also provide security of supply.

I challenge the EIS statement under 4.11.2 *‘Reasons for rejecting other options.’*
“Dedicated wind or solar generation at the scale and availability required by the Olympic Dam expansion are not currently available. Solar and wind energy technologies are at an early stage of market development and are unable to supply base load power on a continuous basis. Accordingly, they are unsuitable for steady state power supply and their costs are generally higher than for competing conventional systems.”

Wind energy is being used by countries around the world on a much greater scale without problems and to say that wind is in *‘an early stage of market development’* is simply nonsense.

I understand Spain is successfully operated with in excess of 50% wind energy.

From the quarterly bulletin from the Australian Uranium Association, issue eight 2009, I quote from Dr Manfred Lenzens report '*Nuclear has a key role in world power portfolio – New research.*' "*The mature technologies are the fossil fuel technologies, nuclear, hydro and wind. Wind requires the least energy input per unit of electricity output, followed closely by large hydro and nuclear, then solar and fossil fuels. The fossil fuel based technologies are the lowest cost, followed by nuclear and wind, then hydro and then solar.*"

If BHP build a 600MW on site combined cycle gas, (CCGT) power plant as they are proposing, it will be more than enough to take out any fluctuations in the wind energy supply. They probably wouldn't need such a big one or it could replace the power station at Port Augusta and secure the grid for all users. Anyway there is graphite block technology now available. The Lloyd Energy graphite rock technology to store energy as heat to be used to provide continuous power from intermittent suppliers such as solar and wind is proven and viable.

<http://www.lloydenergy.com/presentations/Cloncurry%20Solar%20Thermal%20Storage%20Project%20FAQ.pdf>

The hot rocks power source being developed close by will also overcome this problem if there is one!

Even coal power stations are not on line all the time. Each of these options is environmentally sustainable and reduces carbon emissions.

A power ring main, roughly from Port Augusta to Roxby Downs, down to Wudinna then across to Port Augusta, with an input line for wind power from Elliston would provide the most secure and environmentally sound power supply. This would protect Olympic Dam from a break in power caused by line breakdowns or other causes and would also provide reliable power to the many mines that are being developed along the way. Details of this can be located on my web site in my recent submission to ETSA utilities.

<http://www.lizpenfold.com/PDF/submission%20etsa%20directions.pdf>

The other consideration is the current push by the Prime Minister Mr Rudd and the Premier Mr Rann to provide green jobs and reduce the production of green house gases. Significant funding is being directed into renewable energy sources.

The original Port Augusta coal fired power station is considered one of oldest and dirtiest polluters in Australia and could be shut down. At the moment there may possibly be Federal Government assistance to do it and it would provide an optimum connected approved site for an alternative clean power supplier. A carbon tax on coal powered energy supplies could make this ageing station uneconomic in the future.

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The BHP mains electricity energy supply in 2007 as stated on page 45 was 866,890MW. The 275kV BHP owned and operated line has to be de-energised before the 132 kV line fed from an Electranet line can supply 40MW to Olympic Dam in emergencies.

Fuels used in 2007 were:

- Diesel 25,131,540 litres,
- LPG 16,950 tonnes,
- Kerosene 6,564,780 litres,
- Petrol 263,940 litres,
- Fuel oil 5,175 tonnes and
- Coke 9,940 tonnes.

It should be noted that as a tonne of diesel and other hydrocarbons produce about 3 tonnes of CO₂, the present operation is a massive polluter and this must be minimised in the future by the use of sustainable energy where possible.

Liquid fuels are used for heating in the smelter and gold, silver and calcining furnaces. Diesel is also used for engine fuel at the pump stations and for the underground mining and surface vehicles. There are also emergency back up diesel generators that can provide 10MW.

NOTE: I understand that the Federal diesel rebate received is more than BHP pays in royalties to the State government each year.

4.11 Primary electricity supply

The EIS states here “*Figure 4.4 shows the predicted energy demand and supply for South Australia, with or without the Olympic Dam expansion, up to 2018 (Electricity Supply Industry Planning Council 2008). This shows that the increasing South Australian demand, even without the Olympic Dam expansion, would exceed supply by the 2012-2013 financial year.*” This is very close!

Increased power of an estimated 650MW is needed for the expansion and could be supplied by 1,000MW of wind energy available from the west coast of Eyre Peninsula. (see Deloitte Touche Tohmatsu report.)

<http://www.lizpenfold.com/PDF/00Deloitte%20Touche%20Tohmatsu%20Report.pdf>

Hot rocks may also be a future option however the technology has yet to be proven viable in Australia and 4th generation nuclear power is, as yet, unacceptable.

In his article, ‘4th generation nuclear power’, Dr James Hansen states: ‘*There are two compelling alternatives to address these issues, both of which will be needed in the future. The first is to build reactors that keep the neutrons ‘fast’ during the fission reactions. These fast reactors can completely burn the uranium. Moreover, they can burn existing long-lived nuclear waste, producing a small volume of waste with half-life of only several decades, thus largely solving the nuclear waste problem.*’

The waste heat from these reactors could be used for desalinating water.

5.8 Electrical supply

5.8.8 Renewable

I was pleased to see that, “*Opportunities to incorporate renewable electricity technologies are continuing to be investigated by BHP Billiton.*”

However, only a commitment to investigate the use of renewable electricity to power the coastal desalination plant has been made.

“This would most likely be in the form of purchased wind energy contracted through the NEM. Additionally, solar hot water systems would be installed on new housing in Roxby Downs and on permanently occupied accommodation buildings in Hiltaba Village.” and “The investigations into incorporating renewable energy sources into the proposed expansion are described in greater detail in Chapter13, Green house Gas and Air Quality.”

These “commitments” are simply not good enough for such a large power user for reducing its CO2 level output.

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4.6 Port location for exporting concentrate

The selection of the port of Darwin for export of ore from 2016 onward with increasing volume until 2020 to 1.6 Mtpa maximum is stated on Page 74.

It is noted that if, in the future, a suitable port for the loading of bulk vessels was built in South Australia, BHP Billiton may consider using such a port.

South Australia should have its own deepwater port near Port Neill, connected to a standardised rail system and connecting to the existing national system, to enable export of minerals from mines in the north and west, including those from the Eyre Peninsula, and not just BHP’s.

The proposed Port Bonython would be too shallow (at around 14 metres depth) to take larger than Panamax sized vessels which are now considered small for the transshipment of ore. 300,000 to 400,000 tonne capacity Cape Bulker ships which are now becoming the world standard in the ore shipping business, require 20 to 22 metres depth of water and a much larger turning circle than can be provided at Port Bonython. The existing jetty itself significantly reduces turning space.

Many smaller mining ventures in the Gawler Craton will need access to a deep sea port hence BHP Billiton may also consider using such a port in the future.

4.14 Location of landing facility

As mentioned in 4.9, a deep sea port is a necessity for mining ventures in the Gawler Craton to proceed. Planning for such a port has been going on for some time and will eventually become a reality on coast of Spencer Gulf near Port Neill. If the proposal includes a service wharf in addition to the loading wharf it will be suitable for use by BHP as well, for landing heavy equipment. If the railway is standardised and linked to the national line it would be able to take equipment to all mines not just BHP's and save a great deal of cost and damage to roads. This solution would solve the problems for all mines in the future and also resolve the current negatives that arise from building an unloading facility at Port Augusta. BHP Billiton would not have to contribute to the cost of building the port which could be built by a private operator.

4.15 Port location for import of sulphur and diesel

A new deep sea port's service wharf for southern Eyre Peninsula would be capable of handling imports of sulphur and diesel and would eventually be a cheaper option for BHP Billiton.

5.9 Transport

Transport should also be coordinated on a state basis by planning for the future. The increased use of rail proposed in the EIS is applauded. A rail line connecting to an upgraded and standardised Eyre Peninsula division would facilitate imports and exports. An upgraded road network possibly from Wirrulla to Kingoonya or Glendambo has already been flagged and could also be used as a corridor for the power and water supplies.

13 Greenhouse gas and air quality

The aforementioned use of renewable energy – wind, solar, nuclear – would reduce the mine's CO₂ emissions to an acceptable level and is a direct responsibility of BHP's.

The State Labor government is focussed on having plans for coastal protection, marine parks, water etc.

Every council has to have a plan for its area and they, by necessity, have to integrate their plans with their neighbours.

However the BHP development and many of the other mines are outside of a Council area and the planning and integration with other areas has not been a priority. Before this EIS is approved the government must ensure that it is integrated into the plans being made by others to provide the optimum solutions for the environment, the people and the State as a whole.

Currently the EIS document is just what it says an EIS for BHP with very little consideration for the integration and benefit to the rest of the State. Work must be done to undertake this planning to integrate the plan to provide the optimum benefit to all players not just BHP before approval is granted. Construction is not planned for some time so this could be achieved and still fit with most of BHP's criteria but add considerable value for the State and its people.

Thank you for the opportunity of commenting on the EIS. I sincerely hope for the generations of South Australians to come, the concerns raised by the people into the foolhardy location of the proposed Point Lowly desalination plant are truly taken into account by BHP and State and Federal Governments.

A handwritten signature in black ink, reading "Liz Penfold". The signature is written in a cursive, flowing style.

Mrs. Liz Penfold MP
Member for Flinders