Issues Paper:
Inquiry on Harvey Water Bulk Water Pricing

13 October 2006

Economic Regulation Authority
WESTERN AUSTRALIA

A full copy of this document is available from the Economic Regulation Authority website at www.era.wa.gov.au.

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Foreword

The Government has requested the Economic Regulation Authority (**Authority**) to conduct an inquiry into the level and structure of water storage charges to be applied by the Water Corporation (**Corporation**) to Harvey Water. These water storage charges are set as part of an agreement that is intended to be renegotiated prior to the 2007/08 irrigation season.

The inquiry is the first independent evaluation of dam water storage charges in Western Australian and provides an opportunity for Western Australians to have direct input into the process of determining irrigation water charges. The independent review of rural water charges is a component of the National Water Initiative, which is Australia's "blueprint" for national water reform.

Although the agreement between the Corporation and Harvey Water is a commercial one, there is a role for an independent body because there are costs and benefits that accrue to third parties, such as recreational users of the dams and downstream communities that are impacted by decisions about the level of dam safety.

The purpose of this Issues Paper is to provide background information and outline the issues to be investigated. It is intended to assist stakeholders to understand the nature of the issues under review and to facilitate public comment and debate. Throughout this Issues Paper questions are raised, highlighted in boxes, that may be of particular interest to stakeholders.

Submissions on any matters, including those raised in this Issues Paper, should be submitted no later than **Monday 13 November 2006** to harveybulkwater@era.wa.gov.au or in printed and electronic form addressed to:

> Inquiry on Harvey Water Bulk Water Pricing
> Economic Regulation Authority
> PO Box 8469
> Perth Business Centre
> PERTH WA 6849

Section 1.3 of this Issues Paper provides further information regarding the process for making a submission.

Interested parties and stakeholders will have a further opportunity to make submissions following the release of the Authority's draft report, which is due on or before 30 November 2006. The final report for the inquiry is scheduled to be delivered to the State Government by 1 March 2007, following which the Government will have 28 days to table the report in Parliament.

Given the importance of this inquiry, I encourage interested parties to consider the terms of reference and the matters raised in this Issues Paper and prepare a submission to the inquiry.

LYNDON ROWE
CHAIRMAN

1 Introduction

On 5 October 2006 the Treasurer of Western Australia gave written notice to the Economic Regulation Authority (**Authority**) to undertake an inquiry into the most appropriate level and structure of water storage charges to the South West Irrigation Management Cooperative Ltd (**Harvey Water**).

1.1 Terms of Reference

This inquiry has been referred to the Authority under Section 32 of the *Economic Regulation Act 2003* (**Act**), which provides for the Treasurer to refer to the Authority inquiries on matters related to regulated industries (i.e. water, gas, electricity and rail industries).

The Terms of Reference are provided in Appendix 1.

In accordance with the Terms of Reference, the Authority will make recommendations on the level and structure of water storage charges to Harvey Water, which will require consideration of:

- the cost of operating and maintaining the irrigation dams;
- the additional costs associated with maintaining and improving dam safety for the Water Corporation's South West irrigation dams;
- the beneficiaries of the South West irrigation dams;
- the ability of South West irrigation farmers and Harvey Water to meet their share of the costs of dam safety improvements and the impact on farmers of the rate of change of an increase in prices (if any); and
- the impact on State Government's net financial position associated with the recommended price level and structure.

In examining the water storage charges to Harvey Water, the Authority is required by the Terms of Reference to have regard to:

- the Government's social, economic and environmental policy objectives.

In undertaking the inquiry, the Authority recognises section 26 of the Act, which requires the Authority to have regard to:

- the need to promote regulatory outcomes that are in the public interest;
- the long-term interests of consumers in relation to the price, quality and reliability of goods and services provided in relevant markets;
- the legitimate business interests of investors and service providers in relevant markets;
- the need to promote competitive and fair market conduct;
- the need to prevent abuse of monopoly or market power; and
- the need to promote transparent decision making processes that involve public consultation.

The Authority invites interested parties to consider the Terms of Reference and the Issues Paper and prepare a submission to the inquiry.

1.2 Background to the Inquiry

In October 1996, the Corporation transferred its South West irrigation distribution business to the South West Irrigation Management Co-operative (now trading as Harvey Water) and entered into a ten-year water storage agreement with the irrigation water supplier.[1]

The Corporation owns and operates the eight dams in the South West that are used to provide water to three groups of customers: farmers, via the distribution network owned and operated by Harvey Water; private industry, which is supplied via Harvey Water (although the Corporation recoups some of the revenue); and to a lesser extent customers in Perth and elsewhere in the Integrated Water Supply System. In addition, some of the dams are used for a variety of recreational purposes.

While the Corporation owns and operates the dams, it does not have the rights to the water in the dams. These rights have been awarded to Harvey Water by licence under the *Rights in Water and Irrigation Act 1914*. The Corporation does not charge for the water itself but only for the costs associated with storing the water (where the charges are currently based on the future costs of providing the storage service).

The dams which supply the water to Harvey Water include Wellington Dam, Harvey Dam, Stirling Dam, Wokalup Dam, Logue Brook Dam, Waroona Dam, Drakes Brook Dam, and Samson Brook Dam. In 2005/06, Harvey Water had a total allocation of 152 GL, most of which is supplied from Wellington Dam (68 GL) and Harvey Dam (40 GL). Water trading between Harvey Water and the Corporation will reduce the allocation to Harvey Water to 136 GL by 2009/10.[2]

The Bulk Water Supply Agreement (**BWSA**)[3] specifies the terms and conditions under which the Corporation provides the water storage service for Harvey Water. The BWSA also provides for Harvey Water to meet a share of the costs of safety improvements on the South West irrigation dams.

Water storage charges to Harvey Water were set on the basis that 85 per cent of the future operating and renewal costs for dam headworks would be recovered from Harvey Water with the remaining 15 per cent of costs, which are attributed to other beneficiaries such as recreational users, paid for by Government.

Water storage charges amounted to around $0.8 million in 2004/05, of which $0.39 million was for dam safety charges, $0.25 million was for storing water for Harvey Water and $0.16 million was for bulk water to third parties. Bulk water to third parties, which represents less than one per cent of the total, attracts a higher charge.

The Government makes a Community Service Obligation (**CSO**) payment ($3.3 million in 2004/05) to the Corporation to cover the difference between its water storage costs and revenue raised from the storage charges. The CSO provides the Corporation with a

[1] In fact, the assets were transferred to the South West Irrigation Asset Co-operative which was established as a separate entity to the South West Irrigation Management Co-operative, and which owns the assets.

[2] Harvey Water will have a reduced allocation from both Samson Dam, Stirling Dam and Logue Brook Dam. A potential future trade could reduce it by at least a further 22 GL.

[3] While the agreement is called the “Bulk Water Supply” Agreement it actually refers to the terms and conditions associated with the Corporation storing water that Harvey Water has a licence to take (i.e. the Corporation does not “sell” water to Harvey Water).

return on the dam assets that were in place at the time of the transfer and pays for the estimated benefits to the public, such as to recreational users.

The BWSA expired on 30 June 2006 and has been extended in the same form by mutual agreement of the parties. A new agreement will be completed following this inquiry. The new agreement will be framed within a context that is different now to 1996 when the BWSA was initially endorsed. At the time of the original agreement, a long-term shortage of rainfall was not contemplated and neither was the prospect of trading water with the Corporation.

In addition, the original agreement did not contemplate the significantly higher expenditure on dam safety that would be required to meet Australian National Committee on Large Dams (**ANCOLD**) guidelines.[4] The costs of improvements to the dams were estimated at around $16 to 18 million at the time of the transfer, but have since increased to around $128 million[5]. A review by Marsden Jacob Associates in 2003 confirmed that the proposed dam safety program was required in order to meet the ANCOLD guidelines.[6] The review concluded that the allocation of these costs to Harvey Water would be unaffordable, and recommended that Harvey Water pay 25-35 per cent of the dam safety costs for Waroona Dam and 40-50 per cent of the remainder of the dam safety programme.

1.3 Review Process

The recommendations of this inquiry will be informed by the following public consultation process:

- This Issues Paper, which is structured to reflect the Terms of Reference, invites submissions from stakeholder groups, Government, industry and the general community on matters in the Terms of Reference (submissions are due by 13 November 2006);
- The Authority intends publishing a draft report by 30 November and inviting further public submissions, to be received by 26 January 2007;
- The Authority's Consumer Consultative Committee will be consulted throughout the course of the inquiry; and
- The final report for this inquiry is to be delivered to the Treasurer by 1 March 2007. Under the legislation, the Treasurer then has 28 days to table the report in Parliament.

In accordance with section 45 of the Act, the Authority will act through the Chairman in conducting this inquiry.

[4] ANCOLD guidelines are published on the ANCOLD website, www.ancold.org.au.

[5] Source: Water Corporation

[6] Marsden Jacob Associates (August 2003), *Review of Dam Safety Program Relating to South West Irrigation Dams: Final Report*, a report for Harvey Water and the Water Corporation.

1.4 How to Make a Submission

Submissions on any matters raised in this Issues Paper or in response to any matters in the Terms of Reference should be in written form and electronic form (where possible) and addressed to:

Inquiry on Harvey Water Bulk Water Pricing
Economic Regulation Authority
PO Box 8469
Perth Business Centre
PERTH WA 6849

Email: harveybulkwater@era.wa.gov.au
Fax: (08) 9213 1999

Submissions must be received by 13 November 2006.

In general, submissions from interested parties will be treated as in the public domain and placed on the Authority's website. Where an interested party wishes to make a confidential submission, it should clearly indicate the parts of the submission that are confidential. For more information about the Authority's submissions policy, see the Authority's website.

The receipt and publication of a submission shall not be taken as indicating that the Authority has knowledge either actual or constructive of the contents of a particular submission and, in particular, whether the submission in whole or in part contains information of a confidential nature and no duty of confidence will arise for the Authority in these circumstances.

Further information regarding this inquiry can be obtained from:

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2 What Method Should Be Used to Recover Costs from Harvey Water?

2.1 Terms of Reference

The Authority is expected to consider and develop findings on:

> The cost of operating and maintaining the irrigation dams, based on:
>
> a. a "renewal costing" methodology which carries forward the model used for the 1996 Bulk Water Agreement;
>
> b. a "full costing" methodology, consistent with National Water Initiative pricing principles, including efficient operating costs and capital expenditure requirements and a suitable rate of return on past and future investment in storage and distribution assets owned by the Water Corporation.

2.2 Background

The BWSA was based on an assessment of the costs associated with providing a water storage service to Harvey Water. The following costs underpinned the contract price:

- the expected amount that needed to be put aside so that the assets that were in place at the time of the handover could eventually be replaced;
- the expected new capital expenditure (excluding dam safety expenditure); and
- the expected operating and maintenance expenditure.

After determining the expected costs for a period of 100 years, the Corporation worked out the annual amount of revenue that would cover those costs. This approach has been referred to as the "renewal costing" method for the purpose of the agreement between the Corporation and Harvey Water.[7] Eighty five per cent of this annual amount was charged to Harvey Water because it was assumed that 15 per cent of the benefits of the expenditure would accrue to third parties such as recreational users of the dams (see Chapter 4 for a discussion on why this particular allocation was chosen). The third party benefits were to be funded by CSOs from the State Government.

Dam safety expenditure was treated separately (that is, it was not used to determine the base contract prices). The agreement included a provision for Harvey Water to contribute to the costs of dam safety, and a payment was subsequently made by Harvey Water in 2004/05[8]. Dam safety expenditure is discussed in Chapter 3.

2.3 Issues

The Terms of Reference require the Authority to consider whether the renewal costing method should continue or whether an alternative method is more appropriate for the

[7] In this case, the renewal costing method differs from other similar methods based on the annualisation of costs in that in this case no return on existing assets has been factored into the calculation.

[8] Harvey Water has indicated that the agreement was to exclude the new Harvey Dam from these contributions because the effect of building that dam was to free up higher quality water from Stirling Dam for potable purposes.

purpose of setting the water storage charges to Harvey Water. The alternative "full costing" method referred to in the Terms of Reference involves:

- establishing an initial asset value;
- estimating how this asset value would change over time as new capital expenditure is incurred and as assets are depreciated;
- applying an appropriate rate of return to the changing asset value:[9] and
- estimating an efficient level of future operating and maintenance costs.

The annual revenue requirement under the full costing method comprises three amounts: the return on assets, the return of assets (generally referred to as depreciation) and operating expenditure. The main difference between the full costing method and the renewals method as applied in this case is that the full costing method includes a return on existing assets while the renewals method does not.

The full costing method is currently used by the Corporation for the purpose of calculating its CSOs. The asset value used is the written down replacement value of assets, commonly referred to as the book value of assets, which is what it would cost to replace the assets in their current condition. The Corporation applies a lower rate of return to assets that were in place prior to the transfer (a 4 per cent rate of return (real pre-tax) is used for pre-1996 assets and a 6 per cent rate of return is used for post-1996 assets).[10]

If the Authority chose to recommend the full costing method, consideration would need to be given to the magnitude of the initial asset value. In particular, would it be appropriate to use the written down replacement value or some alternative? The issue is to what extent (if at all) Harvey Water should be required to pay a return on existing assets. This depends on whether the assets have an economic value, which exists only if the dams could generate a future stream of revenue that someone would be prepared to pay. That is, the future stream of revenue from the dams would need to exceed the future costs of dam safety by a sufficient margin to either cause someone, hypothetically, to purchase the dams or give an economic reason to the current dam owner to not decommission the dams.

In addition, under the full costing method, consideration could be given to setting the date for calculation of the initial asset value at the original transfer date (1996). Setting the initial asset value at 1996 would involve adding capital expenditure incurred after the transfer and deducting the relevant depreciation over that period.

Other issues that will be considered by the Authority include the level of productivity that is applied to future operating expenditure.

[9] The Authority applied a real pre-tax rate of return to the Corporation as part of the Inquiry on Urban Water and Wastewater Pricing and expects to apply the same real pre-tax method in this inquiry.

[10] In fact, the Corporation currently uses 1999/00 as the base asset value for its CSO calculations; the base is indexed to bring it up to the current year. The Corporation "rebases" the CSO calculation periodically.

Issues

1) Should the Bulk Water Supply Agreement be based on the full cost method or the renewal costing method (as applied in the past) to recover the Corporation's costs of owning and operating dam infrastructure?

3 What Amount of Dam Safety Expenditure Should Be Included in Future Costs?

3.1 Terms of Reference

The Authority is expected to consider and develop findings on:

> The additional costs associated with maintaining and improving dam safety for the Water Corporation's South West Irrigation Dams. This should include consideration of:
>
> a. the requirements of the current Australian National Committee on Large Dams (ANCOLD) dam safety guidelines and the requirement for the Water Corporation to manage their dams to these guidelines; and
>
> b. the overall merits, for all parties, of alternatives to the ANCOLD dam safety guidelines.
>
> These considerations should utilise existing studies, including:
>
> a. Marsden Jacob Associates August 2003 *"Review of Dam Safety Program Relating to South West Irrigation Dams";*[11] and
>
> b. Snowy Mountains Engineering Corporation July 2006 "*Evaluation of Alternative Risk Management Strategies*".[12]

3.2 Background

The BWSA provides for Harvey Water to meet a share of the costs of safety improvements on the South West irrigation dams. The costs of improvements to the dams were estimated at around $16 to 18 million when the BWSA was signed, but have increased to around $128 million.[13]

Prior to 1995, the (then) Water Authority was aware of the issues regarding the safety of the dams, but no detailed review of the costs of upgrading the dams had been carried out.[14] Following the establishment of the Corporation in 1995, the Corporation reviewed its dam safety requirements. In the absence of State-based regulations on dam safety, the Corporation adopted the framework of guidelines and risk standards set by the Australian National Committee on Large Dams (ANCOLD). ANCOLD was established in 1937, as the national branch of the International Commission on Large Dams. ANCOLD produces guidelines, for example, on:

- environmental management of dams;
- the selection of acceptable flood capacity for dams;
- assessment of the consequences of dam failure;
- dam design;
- dam safety management; and

[11] This document is available at www.era.wa.gov.au

[12] This document will be available on the Authority's website when the final report is completed (it is currently only a draft report).

[13] Source: Water Corporation.

[14] Water Corporation, personal communication, 25 August 2006.

- management of risk for dams.

ANCOLD guidelines are not standards but include a range of measures for consideration when undertaking dam safety works. These measures include alternative means such as management of risk as well as engineering solutions.

The BWSA, signed in October 1996, required safety upgrades in accordance with the ANCOLD *Guidelines on Dam Safety Management 1994*. An estimate of $17 million for dam safety upgrades was included in the BWSA, although it was acknowledged that this estimate was highly uncertain, pending a thorough review of the dams.

The Corporation commenced a dam safety review in 1997, with a portfolio risk assessment to identify dams with the highest safety risk. Six South West dams were included in the high priority list for design reviews. These were carried out in 1997-98, followed by concept designs, detailed designs and customer consultation (although not with Harvey Water), with detailed business cases by 2001. In 2002, the estimate of the dam safety upgrade costs for the South West irrigation dams was $102 million.

In 2002, the Corporation and Harvey Water commissioned Marsden Jacob Associates to conduct a review of the expenditure on dam safety for the South West irrigation dams.[15] The review confirmed that the proposed dam safety program was required in order to meet the ANCOLD guidelines. The Marsden Jacob review examined best practice dam safety management in Australia and concluded that the Corporation compared favourably with other major dam owners in terms of implementing best practice in dam safety management.

ANCOLD adopts a risk-based approach to setting guidelines, in which dam safety standards are based on tolerable levels of risk. One aspect of the ANCOLD guidelines is the definition and application of limits of tolerability of events such as dam failure or flooding. For example, the guidance set out in ANCOLD for existing dams is that the probability of a dam failure resulting in the loss of three lives or more should be less than 1 in 100,000 in each year. In the case of road accidents, the fatality rate in Western Australia in 2005 was 1 in 12,330[16]. The dam safety tolerability limits define the level of risk above which risks are intolerable. Below this tolerability limit, risks are tolerable, but should be reduced to "As Low As Reasonably Practical" (the ALARP principle). The tolerability limits for existing dams are slightly higher than for new dams and major augmentations (i.e. a higher probability of dam failure is tolerated for existing dams). The ALARP principle reflects the trade-offs between cost and risk; risks are reduced to the point at which it is not cost-effective to further reduce risk.

Western Australia is not alone in its increased focus on dam safety. Dam safety management in the United States became more formal and active following legislation and guidelines enacted in the decades following the failure of the Triton Dam in 1976. Since the corporatisation of State government organisations in Australia in the 1990s, the boards of dam-owning corporations have moved to assess the risks of dams and implement remedial works in accordance with the relevant standards (either ANCOLD or State-based standards, where they exist.[17]

In May 2004, the Western Australian Government appointed a working group on dam safety, chaired by the Water Services Planning Branch of the Department of Environment, to examine the merits of developing State-based regulations on dam safety. The working

[15] Marsden Jacob Associates (August 2003), op.cit.

[16] Australian Transport Safety Bureau (2006), *Road Deaths Australia 2005 Statistical Summary*, p15.

[17] Ibid, p8.

group included representatives from the Department of Treasury and Finance, the Corporation and Harvey Water. The working group has published a draft report on the evaluation of alternative risk management strategies for dam safety (the outcomes are discussed below).[18]

3.3 Issues

A key issue is whether the application of the ANCOLD guidelines is the most efficient method for determining the amount of dam safety expenditure.

The primary focus in public policy analysis is the maximisation of benefits across society (i.e. Western Australia) as a whole. It can be assumed, for example, that if the money were not spent on the South West irrigation dams it would be spent elsewhere in the economy, producing some alternative level of social benefit, for example on road or rail safety. The optimal level of dam safety expenditure can only be determined with reference to the best alternative opportunities for public benefit.

It is possible, therefore, for the community's levels of tolerable risk to differ from those which underpin the ANCOLD guidelines. This means that, in meeting ANCOLD guidelines, a utility may be required to invest more in dam safety than would be necessary to meet the community's risk expectations. As indicated above, the community accepts a greater risk in rail and road safety than in the level of dam safety underpinning the ANCOLD guidelines.

It is also possible that the perceived optimal investment programme from the point of view of the Corporation could differ from that of Harvey Water. The Marsden Jacob review noted that both the Corporation and Harvey Water have an incentive to meet set standards rather than adopting risk-based approaches, in order to minimise legal liabilities. However, they noted that Harvey Water differed from the Corporation in that it has a small annual turnover, limited funding and charging bases, a limited capital expenditure budget, and a limited ability to secure additional funding from its shareholders. These constraints would lead to Harvey Water adopting a different approach to the Corporation on dam safety, including, for example, moving towards ANCOLD standards more slowly over time, adopting interim and staged solutions, and more extensive customer consultation. Marsden Jacob cited Goulburn-Murray Water, SA Water and Melbourne Water as examples of water utilities where capital constraints had an impact on the prioritisation and timing of dam safety improvements.

The question of whether the investment in dam safety is economically efficient therefore depends not only on whether the dam safety standards are appropriate, but also on whether the capital expenditure programme required to achieve those standards is efficient in its method and timing.

Determining an economically efficient amount of dam safety expenditure might require a reconsideration of the current institutional arrangements. Under the current arrangements, the Corporation owns and operates the dams but it does not have the rights to the water in the dams. These rights have been awarded to Harvey Water by licence under the Rights in Water and Irrigation Act. The Corporation does not charge for the water itself but only for the costs associated with providing the water.

[18] Snowy Mountains Engineering Corporation (June 2006), *Evaluation of Alternative Risk Management Strategies Draft Report*, prepared for the Department of Environment.

An alternative arrangement would be to transfer the ownership and operation of the dams to Harvey Water, so that Harvey Water would become a vertically integrated entity with the rights to the water and ownership of the storage and distribution network. This arrangement would not confer any additional market power onto Harvey Water because it already has the water rights. However, under this arrangement the entity primarily responsible for the level of dam safety would become the entity that is the primary beneficiary of the dam safety expenditure.

The water rights could alternatively be transferred to the Corporation, which could then sell the water at the market price. If market price does not recover the costs of dam safety, the Corporation would need to consider whether to continue the service or obtain funding elsewhere such as through a CSO. It is common for minimum standards to be set by regulation, drawing on guidelines such as those provided by ANCOLD, although in a market standards are also influenced by customers' expectations and willingness to pay. However, the resulting market (which would also arise if Harvey Water were a vertically integrated entity) would not be typical:

- it would include only one seller that would have market power and therefore an incentive to restrict the volume of water sold to extract monopoly profits; and
- there are third parties, such as recreational users and downstream communities, who place a value on dam safety that would not be reflected in the market.

Nevertheless, the revenue generated by the dam owner under this approach would represent the value that the farmers and private industry derive from using the water, which would represent an upper limit to the costs that should be incurred in maintaining and operating the dams for the benefit of those customers. The additional dam safety expenditure that would benefit third parties would need to be funded by other means, such as through CSO payments.

Another approach is to use legislation or directions to specify alternative risk-based measures (for example, supporting the application of the ALARP principle), particularly in cases where achieving set limits of tolerability would be unreasonable. New South Wales, Queensland, Victoria, the ACT and Tasmania have developed and enacted State-based legislation on dam safety, based largely on the ANCOLD guidelines and principles, but modified in accordance with State-specific risk standards.

- In NSW, dam safety is governed by the Dam Safety Committee, established under the *Dam Safety Act 1978*. While the standards adopted by the Committee are generally in line with ANCOLD guidelines, there are some qualifications.[19]
- In the ACT, the Independent Competition and Regulatory Commission has established the *Dam Safety Code 2003*, as one of its Water and Sewerage Technical Codes. The code applies to water and sewerage utilities and covers the operation and maintenance of dams. It is based on ANCOLD guidelines and NSW Dam Safety Committee Technical Guidelines.
- In Queensland, dam safety matters fall under the *Water Act 2000*, administered by the Chief Executive of the Department of Natural Resources and Mines. The Department produces guidelines for dam owners to assist them in complying with the dam safety conditions of the *Water Act 2000*, largely based on, but not

[19] For example, current Dam Safety Committee requirements for acceptable flood capacity for dams (publication DSC11) are based on the ANCOLD "Guidelines on Design Floods for Dams 1986", subject to qualifications in regard to hazard ratings, acceptable flood capacity, quantitative risk assessment, base safety conditions, flood emergency plans, screening procedures for spillway adequacy on existing dams and diversion capacity.

identical to, the ANCOLD guidelines.[20] Under the legislation, the owners of the dams remain liable for dam safety failures. A recent report commissioned by the Queensland Government concluded that the ANCOLD guidelines are an appropriate defacto standard for flood safety, and should be used as benchmarks, but that it was appropriate for Queensland to develop its own specific guidelines.[21] In particular, the report recommended State-specific guidelines in relation to spillway upgrade programs, since improvements in meteorological models indicate that the probability of major floods is higher than previously thought.

- Dam safety in Victoria is covered by the *Water Act 1989*, administered by the Department of Sustainability and Environment, Catchment and Water Division. Under the Act, the Minister for Water issues a Statement of Obligations to each of the water authorities, which includes obligations on dam safety. The Statements to individual authorities can be tailored to reflect individual circumstances; however, the generic Statement of Obligation requires that the authorities must have regard to the ANCOLD Guidelines in their management of dam safety.
- In Tasmania, the *Water Management Act 1999* establishes the Assessment Committee for Dam Construction, operating under the Minister for the Department of Primary Industries and Water. The Department produces regulations on dam safety, which are largely based on ANCOLD guidelines, but allow for variation away from the ANCOLD guidelines.[22]

The draft report by the Western Australian Department of Environment dam safety working group recommended that there be a greater acceptance of interim measures (upgrading over time) and risk mitigation measures such as monitoring, early warning systems and evacuation procedures.[23] It also recommended that the State Government develop methods to assess and compare risks so that the principles applying to expenditure on safety are consistently applied across government agencies.

One possible approach is to build upon research that attempts to establish a benchmark for the level of expenditure required to prevent a fatality. This approach recognises that people are prepared to pay a certain amount to reduce the risk of fatality, but there is a limit to how much they would pay.[24] To illustrate, people make decisions each day that are risky and that could potentially result in death, such as driving a car. While people take measures to avoid the risk of dying, there is a limit, e.g. a person may choose not to buy the safest motor vehicle on the market because it is too expensive and they would rather spend the money on other things. Governments also have limits to how much they can spend on safety, above which community resources would be better allocated to other activities. It may therefore not be appropriate for governments to spend more on safety in one part of their operations (e.g. dams) than in other part (e.g. roads) to achieve the same reduction in risk.

One of the first developments of a generic risk management framework across statutory bodies was by the Health and Safety Executive in the United Kingdom. The framework

[20] For example, *Queensland Dam Safety Management Guidelines for Referable Dams* and *Guidelines for Failure Impact Assessment of Water Dams*.

[21] Blackmore, D. J. AM, FTSE (August 2004), *The Draft Guidelines on Selection of Acceptable Flood Capacity for Dams*, Report to the Queensland Government.

[22] For example, the Tasmanian dam safety regulations require that the operation and maintenance manual "comply substantially with section 4.3 of the *Guidelines in Dam Safety Management* published in 2003 by ANCOLD, as amended from time to time" (Water Management (Safety of Dams) Regulations 2003, Part 3, section 12).

[23] Snowy Mountains Engineering Corporation (June 2006), op.cit.

[24] This approach should not be interpreted as placing a value on a life. It is simply an estimation of the amount people are prepared to pay to achieve a given reduction in average risk.

originated after the 1987 inquiry into the safety breaches at the Sizewell B nuclear power plant, and has since been extended to all other areas of health and safety. The current framework sets out the HSE's decision process for risk management, including a generic framework for the tolerability of risks to society and individuals.[25]

In New South Wales, there are some moves towards a whole-of-government approach to risk assessment. The NSW Dam Safety Committee has recently reviewed the regulatory policy framework for dam safety in NSW (the final report is soon to be considered by Government). The draft framework revised some standards-based approaches and recommended the progressive introduction of risk assessment practices consistent across government agencies. It noted that the risk regulation framework adopted by the Health and Safety Executive in the United Kingdom is a "good model". For long-term safety improvements, the draft framework incorporated the criteria developed by the NSW Department of Infrastructure, Planning and Natural Resources on tolerability of life safety risks.

Issues

2) Are the ANCOLD Guidelines the appropriate guidelines to determining dam safety standards for the South West irrigation dams?

3) Do the ANCOLD Guidelines give rise to an economically optimal allocation of Government expenditure taking into account the need for Government to minimise the risk of fatality across all relevant Government services including road, rail and other transport services and areas of health and safety more generally?

4) Are the current institutional arrangements for dam ownership and water rights in the South West irrigation district a barrier to achieving economically efficient levels of dam safety expenditure?

5) Would it benefit Western Australia to develop its own legislation for dam safety standards?

6) To what extent should dam safety be based on measures that are comparable throughout the economy?

[25] Health and Safety Executive (2001), *Reducing Risk, Protecting People: HSE's Decision-Making Process.*

4 How Should the Costs be Allocated Between Harvey Water and Other Beneficiaries?

4.1 Terms of Reference

The Authority is expected to consider and develop findings on:

> The cost sharing arrangements between beneficiaries of the South West irrigation dams, including:
>
> a. customers that benefit from the water stored in the dams and how this may change over time with water trading;
>
> b. the recreational and other social benefits to the community of the dams; and
>
> c. the beneficiaries of dam safety expenditure, including an assessment of those who benefit from the use of the dams and those that benefit from a reduced risk of flooding.

4.2 Background

This chapter considers how the total costs of operating and maintaining the dams (including dam safety expenditure) should be recovered from Harvey Water and other beneficiaries.

The price in the original BWSA was set to recover 85 per cent of the projected operating and renewal costs for the headworks infrastructure for the dams storing the water (excluding dam safety expenditure). The remaining 15 per cent of costs were attributed to non-irrigation beneficiaries, such as recreational users, and are paid for by Government through a CSO.

According to the Corporation, the 85:15 split was based mainly upon an evaluation of dam use for recreational purposes using a travel cost method. The travel cost method involves a statistical study describing the frequency of visits to a valued site. By taking into account the costs of reaching the site, which incorporates direct travel expenses as well as time-associated costs (forgone wages), recreational demand can be derived.

The BWSA foreshadowed future dam safety upgrades and specified that the water storage charge could be increased as a result of such expenditures, but did not specify what share of upgrade costs should be borne by Harvey Water. A one-off payment in the order of $0.4 million was subsequently made in 2004/05, which represented 30 per cent of the dam safety cost for that year. This contribution was agreed to by Harvey Water pending the resolution of issues surrounding dam safety expenditure.

4.3 Issues

The Terms of Reference requires the Authority to consider the beneficiaries of maintaining and operating the dam infrastructure as well as how costs should be apportioned among these beneficiaries.

The Authority's preliminary considerations indicate that there are three classes of consumers of dams, and the Authority is interested in views about whether there are other beneficiaries.

1) *Identifiable private beneficiaries*. These beneficiaries are the customers who make a payment to the Corporation for their private use of water. They are called private beneficiaries because property rights over who owns the resource are clear and because one person's use prevents another person's use. Markets can work well to allocate the private benefits provided the price is allowed to adjust freely to supply and demand. In the case of South West irrigation dams, the identifiable private beneficiaries include:

   a) farmers using irrigated water (64.7 per cent of the volume in 2005/06[26]);

   b) Corporation customers in the IWSS (34.0 per cent of the volume);

   c) Corporation customers in the region (0.6 per cent of the volume); and

   d) other purchasers of water (0.7 per cent of the volume);

2) *Identifiable public beneficiaries*. These beneficiaries typically include the recreational users of the dams such as water skiers, bush walkers and picnic goers. The public benefits generated have the main characteristic that their enjoyment does not fully diminish the value that accrues to others using the dam (e.g. the recreational use of the dam by one person can also be enjoyed by another). Public goods are typically underprovided by markets. Nevertheless, when public beneficiaries are identifiable they could, potentially, be excluded from using the dams (i.e. fences can be erected to keep people out that are unwilling to pay for amenity) and so could, in principle, be charged for the benefits they receive. In practice however, the recreational users of South West irrigation dams have not been charged for their public usage – i.e. they have either been allowed access to recreational areas without charge, or have been fully excluded from areas for purposes of water quality.[27]

3) *Non-identifiable public beneficiaries*. These beneficiaries are those who gain from the existence of the dam in such an indirect communal sense that they cannot be charged by the owner of the dam. This relates to the strongest type of public consumption: people cannot be excluded from their enjoyment of the good, and the value that one person receives does not diminish the value that others receive. It is a lack of property rights, combined with communal usage, that prevents a private company from capturing a financial reward through the provision of these non-excludable public goods. Therefore, without government provision, these goods will be undersupplied by markets. In the case of the South West dams, the non-identifiable public beneficiaries include:

   a) local residents who benefit from the presence of the dam because of the reduced risk of natural flooding;

   b) those who enjoy the aesthetic attributes of the local countryside that result from the dams (although there will be others who prefer the aesthetic attributes of non-irrigated land where rivers are not dammed);

[26] The data in this dot-point has been sourced from the Corporation.

[27] It should also be noted that recreational use is not a pure public good in that: (a) congestion can diminish the value of use to other public beneficiaries; and (b) in the case of potable water, contamination can reduce the value of the resource to private beneficiaries.

c) those local communities, tourists or passers-by who value the protection that accrues from maintaining the structural integrity of the dams; and

d) in the case where land is set aside to protect dam water quality; those people who see value in a healthy environment (i.e. the preservation of natural vegetation, habitat and biodiversity).

It is worth noting that the economic value of agricultural production made possible by the dams is represented in the value of the water sold. Therefore, the local employment generated via increased agricultural productivity is accounted for in the value of economic benefits produced by the dams.

Once the efficient level of dam safety costs has been determined, there are two main considerations that will help determine how the costs should be recovered. First, are there any legacy costs? Legacy costs are costs that current and future users should not have to pay because the costs resulted from the activities of past users.[28] These costs can be paid for through CSOs. In advising IPART on this matter, ACIL Tasman provided the following examples of legacy costs in relation to dam storage activities:

- infrastructure repair and maintenance costs that were higher than they would have been if pre-1997 maintenance had been optimised (in WA's case, the equivalent date would be the establishment of the BWSA);
- costs associated with ongoing salinity intrusions attributable to past extractive users;
- some costs associated with enhancements to community standards such as dam safety and occupational health and safety, including costs induced by changes in current practice as a result of new information or risk assessments.[29]

The BWSA did not specifically incorporate any legacy costs although the agreement allowed for the Minister of Water Resources to decide on the amount that Harvey Water would pay for dam safety upgrades. The Authority is interested in views about whether dam safety expenditure (either in part or in full) represents a legacy cost.

A second consideration is whether the expenditure on dam safety should be recovered from those who are causing the money to be spent on dam safety ("impactor pays") or from those who benefit from the dam safety improvements ("beneficiary pays"). These two approaches are summarised as follows:

1) The *impactor pays* principle is where those people who cause costs to be incurred pay for those costs. In the case of expenditure on dam safety improvements, the main impactors are the Corporation and Harvey Water, since the dams mainly supply water for Harvey Water and Corporation customers and the expenditure is required to meet safety standards on those dams. Under an impactor pays approach, water consumers and suppliers face the full costs of their activities rather than passing those costs on to third parties (such as the general community).

2) The *beneficiary pays* principle is where those who benefit from an expenditure pay for that expenditure according to the extent to which they benefit. In the case of

[28] IPART (December 2001), *Department of Land and Water Conservation Bulk Water Prices from 1 October 2001: Final Determination*, p30.

[29] ACIL Consulting (July 2001), *Review of Water Resource Management Expenditure in the NSW Department of Land and Water Conservation and State Water Business, Executive Summary and Main Report.* A report for IPART, p28.

expenditure on dam safety, all members of the community, whether they be water consumers, producers, or third parties, would pay for dam safety upgrades in proportion to the private benefits each receives from them.

The beneficiary pays approach is the more difficult approach to apply if community benefits are to be covered by general government revenue. This would rely on an accurate estimation of how the benefits of dam safety divide between each of the groups identified above. There are, however, economic techniques that can be applied towards this end - for example, the beneficiaries of dam safety could be surveyed for their willingness to pay at various levels of dam safety upgrade, or alternatively, the travel cost approach could be applied for recreational users, which was the basis of the original 15 per cent estimate (see above).

Issues

7) Who are the beneficiaries of the expenditure on maintaining and operating the South West irrigation dams?

8) How should the costs be allocated between Harvey Water and other beneficiaries?

9) Are there any elements of the expenditure on the dams which could be viewed as legacy costs?

10) What other basis might be used to determine cost recovery?

5 How Should the Authority Take Into Account Harvey Water's Ability to Pay for Dam Safety Upgrades?

5.1 Terms of Reference

The Authority is expected to consider and develop findings on:

> The ability of South West irrigation farmers and Harvey Water to meet their share of the costs determined from 1 and 2 above, and the impact on customers of the rate of change of an increase in prices (if any).

5.2 Background

The original BWSA appears to have been designed not to accord Harvey Water any significant subsidies from an economic perspective. While Harvey Water was not required to pay for a return on the dam assets in place at the time of the agreement, it is unclear whether this represented a significant subsidy (particularly, given that the asset value of the dams is unclear – see Chapter 2).

However, affordability considerations are likely to be of greater importance now as the estimate of the cost of the dam safety program has increased from $16 to 18 million to $128 million.

5.3 Issues

The Terms of Reference require the Authority to consider the "ability of Harvey Water and South West irrigation farmers to meet their share of the costs". The precedents for considering affordability matters in this inquiry include the fact that irrigators in other jurisdictions pay a fraction of the costs of dam safety upgrades (as identified in the Marsden Jacob review);

- Irrigators in NSW and Victoria effectively pay less than 15 per cent of the cost of upgrades to Murray Darling Basin dams. (25 per cent of capital and upgrade costs are paid for by the Commonwealth.)
- In South Australia, all dam safety upgrades are paid for by the State Government (i.e. are not allocated to irrigators).
- In Queensland, irrigators pay 60 per cent of the cost of safety upgrades to State-owned dams.

The Marsden Jacob review concluded that the allocation of dam safety costs to Harvey Water would be unaffordable, and recommended that the farmers pay 25-35 per cent of the dam safety costs for Waroona Dam and 40-50 per cent of the remainder of the dam safety programme. These recommendations were based in part on Marsden Jacob's assessment of the affordability of price increases by farmers and impacts on the profitability of dairy businesses. Marsden Jacob utilised data from a survey by the Department of Agriculture on dairy farm performance to establish that if farmers were to pay the full cost of dam safety upgrades, this would result in a seventeen-fold increase in

the water storage charge, a 120 per cent increase in the total delivered price of water, and a reduction in farm operating profit of between $20,000 to $30,000 per farm (from an original level of around $50,000 for an average farm). The impact on farm profitability would be greater for dairy farms than horticultural farms, since the cost of water forms a larger proportion of the overall costs of dairy farms.[30]

The Authority is interested in receiving views on how the matter of affordability should be incorporated into its analysis. One factor that may be relevant is that the value of the water is currently captured by farmers and private industry (and generally incorporated into the value of their farms or businesses). A question arises: is it appropriate to use this value to pay for the dam safety upgrades? The value of the water is revealed in the three geographical markets which operate for trades between farmers within the cooperative. Prices averaged between $5 and $20 per ML (depending on the market) for temporary trades in 2004/05.[31]

Consideration should also be given to the way that economic analysis deals with the concept of ability to pay. Consumers buy goods and services because the value they place on a purchase exceeds the cost of the purchase.[32] A consumer's ability to pay directly affects the private valuation placed on a good (their *private* demand). In making their decisions, consumers are conscious that they have a limited budget and therefore buy only what they feel they can afford.[33]

In the case of South West irrigation, any lack of affordability may represent a lack of private demand for water priced at an amount that includes dam safety expenditure. Affordability is therefore an important consideration in so far as it reveals the amount of private benefits that dam safety will create.

To the extent that it can be demonstrated that additional *social* benefits exist, public subsidisation of dam safety may be warranted (under the beneficiaries pays principle – see Chapter 4). However, it would be an economically inefficient outcome if private inability to pay was used as a justification to divert resources away from a higher valued public use towards a lower valued private use (that is, subsidies come at a social cost).

Issues

11) How should the Authority take into account farmers' ability to pay for dam safety upgrades?

12) Does the value of water traded within the Harvey Water cooperative provide any guidance on the value of dam safety upgrades?

[30] Marsden Jacob Associates (August 2003), op.cit, p104.

[31] There are actually three separate markets with the following average temporary and permanent trade prices per ML: Waroona $15/$250; Harvey $20/$450 and Collie $5/$30 (source: Harvey Water).

[32] From the point of view of society as a whole, the more value that is created above the cost of creating it, the higher the level of economic efficiency.

[33] The budget of any individual or firm is limited because the resources controlled by society are also limited. At the same time, it can be observed that human wants are virtually unlimited. With these circumstances in mind, economists attempt to maximise the benefits of society as a whole. 'Benefits' describes the demand for a good which is in turn determined by the ability to pay for that good. In this way demand incorporates the notion of unlimited private wants under resource constraint.

6 How Should the Water Storage Charges be Structured?

6.1 Terms of Reference

The Authority is to consider and develop findings on:

> the most appropriate level and structure of water storage charges to the South West Irrigation Cooperative (Harvey Water).

6.2 Background

The water storage charge to Harvey Water has a fixed component (in the form of a fixed charge) and a variable component (a price per ML of water used). In 2005/06, the fixed charge accounted for 30 per cent of the total charge.

6.3 Issues

The structure of water storage charges to irrigators has been considered as part of reviews in other States. For example, IPART reviewed the prices of bulk water services provided by the State Water Corporation (State Water) and the Department of Natural Resources (DNR).[34] As part of the review, IPART assessed the appropriate balance between entitlement charges (fixed fees per ML of water entitlement) and usage charges. Submissions to the inquiry raised various issues regarding tariff structures, including the price signals to users through the usage charges, and the sharing of volumetric risk between users and the community:

- environmental groups were in favour of making the usage component as large as possible;
- some irrigators favoured a move towards a larger usage component on the grounds that it would provide better signals for water conservation;
- other users argued that a larger usage component would increase the variability in State Water's revenue and impact on its infrastructure maintenance.

For regulated rivers, State Water's Operating Licence requires it to move from a ratio of 50:50 to a ratio of 40 per cent fixed fee to 60 per cent usage.

In June 2006, the Essential Services Commission of Victoria released its final decision for its review of rural water prices.[35] The review covered the prices to be levied by the five

[34] IPART (May 2006), *Bulk Water Prices for State Water Corporation and Water Administration Ministerial Corporation from 1 August 2006 to 30 June 2010*. State Water provides mainly river operation activities such as water delivery, asset management of dams and weirs, and flood mitigation. DNR carry out water resource management activities and licensing activities. The DNR administers the Water Administration Ministerial Corporation, which is the legal entity that provides these services.

[35] ESC (June 2006), *Rural Water Price Review: Rural and Urban Water Businesses' Water Plans 2006-07 to 2007-08, Final Decision*.

Victorian rural water businesses for the two years from 1 July 2006.[36] However, as this was the first independent review of rural water prices, it was limited to the determination of efficient revenues for the service providers, and did not address the structure of prices, which will be covered in the next price review.

The Authority is interested in establishing the principles that would govern the efficient structure of water storage charges to Harvey Water. The context for such a consideration is that the water storage costs incurred by the Corporation are by nature largely fixed and therefore the costs of operating a dam are generally independent of the volume of water. Indeed, once the dam and catchment are established the cost of producing an additional megalitre of water is dependent on rainfall rather than any significant production process (therefore marginal costs are very low).

It may be the case that the structure of water storage charges is not relevant for ensuring water is allocated to its most valued use because an effective water trading market will achieve this result. In other words, an effective water trading market would signal the value of the water and farmers would decide whether it is in their best interest to utilise it themselves of transfer it to others.

While the water trading market operating within the co-operative appears to be working well, the market operating between the co-operative and other potential purchasers, such as the Corporation, could be more effective. For example, the trade under negotiation between the Corporation and Harvey Water is administratively cumbersome because it requires the Department of Water to reduce Harvey Water's water allocation and to increase the Corporation's allocation, rather than a straight forward exchange of water rights. In addition, the water entitlements are held by the co-operative rather than individual water users, which limits the potential for individuals to trade water outside of the co-operative. The Government has announced that it intends reviewing the current water trading legislation.[37]

In relation to environmental considerations, the need to provide an adequate flow of water for environmental purposes is currently a factor that affects the amount of water allocated to irrigation use. Increasing the usage charge relative to the fixed charge would affect the amount of water used by farmers because the cost-effectiveness of implementing on-farm measures to save water would increase. However, if there is an effective water trading market operating, a farmer's decision to implement water efficiency measures will be influenced by the price on the water trading market and not just the price of the water from the dams.

It should be noted that the BWSA currently allows for third parties to be charged at a higher rate. This revenue is currently collected by Harvey Water and recouped to the Corporation. The Authority is interested in views about whether such a differentiation in charging should continue.

[36] The five regional water providers are Goulburn-Murray Water, Grampians Wimmera Mallee Water (GWMWater), Lower Murray Water, First Mildura Irrigation Trust (FMIT) and Southern Rural Water.

[37] Water Reform Implementation Committee (July 2006), *A Draft Blueprint for Water Reform in Western Australia: Discussion Paper.*

Issues

13) What principles should govern the structure of water storage charges to Harvey Water?

14) Should the water storage charge to Harvey Water be the same as the charge to other users?

APPENDICES

Appendix 1: Terms of Reference

HARVEY WATER BULK WATER PRICING INQUIRY TERMS OF REFERENCE

I, ERIC RIPPER, Treasurer, pursuant to section 32(1) of the *Economic Regulation Authority Act 2003* (the ERA Act), request that the Economic Regulation Authority (the Authority) undertake an inquiry and make recommendations on the most appropriate level and structure of water storage charges to the South West Irrigation Cooperative (Harvey Water). In doing so the Authority is expected to consider and develop findings on:

1. The cost of operating and maintaining the irrigation dams, based on:

    a. a "renewal costing" methodology which carries forward the model used for the 1996 Bulk Water Agreement;

    b. a "full costing" methodology, consistent with National Water Initiative pricing principles, including efficient operating costs and capital expenditure requirements and a suitable rate of return on past and future investment in storage and distribution assets owned by the Water Corporation.

2. The additional costs associated with maintaining and improving dam safety for the Water Corporation's South West Irrigation Dams. This should include consideration of:

    a. the requirements of the current Australian National Committee on Large Dams (ANCOLD) dam safety guidelines and the requirement for the Water Corporation to manage their dams to these guidelines; and

    b. the overall merits, for all parties, of alternatives to the ANCOLD dam safety guidelines.

    These considerations should utilise existing studies, including:

    a. Marsden Jacob Associates August 2003 "*Review of Dam Safety Program Relating to South West Irrigation Dams"*; and

    b. Snowy Mountains Engineering Corporation July 2006 "*Evaluation of Alternative Risk Management Strategies*"

3. The cost sharing arrangements between beneficiaries of the South West irrigation dams, including:

    a. customers that benefit from the water stored in the dams and how this may change over time with water trading;

    b. the recreational and other social benefits to the community of the dams; and

    c. the beneficiaries of dam safety expenditure, including an assessment of those who benefit from the use of the dams and those that benefit from a reduced risk of flooding.

4. The ability of South West irrigation farmers and Harvey Water to meet their share of the costs determined from 1 and 2 above, and the impact on customers of the rate of change of an increase in prices (if any).

5. The impact on the State Government's net financial position associated with the recommended price level and structure.

The Authority is to have regard to the Government's social, economic and environmental policy objectives.

The Authority will release an issues paper as soon as possible after receiving the reference. The paper is to facilitate public consultation on the basis of invitations for written submissions from industry, Government and all other stakeholder groups, including the general community.

A draft report is to be made available by 30 November 2006 for further public consultation on the basis of invitations for written submissions.

A final report is to be completed by no later than 1 March 2007.