Smart Water Fund

Final Report

Working in Partnership: Recycling 12.8 ML with Vic Communities

Prepared by: James Gerrish – North West Dialysis Service

With the support of the Smart Water Fund

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City West Water
Melbourne Water
South East Water
Yarra Valley Water
Department of Sustainability and Environment

Our Water Our Future
A Victorian Government Initiative
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The Place To Be

Executive Summary

This report summarises the key elements of the ***Handbook for Reuse of Haemodialysis Reverse Osmosis Reject Water in Healthcare Facilities.***

This handbook is provided to haemodialysis service facilities as part of a Smart Water Fund Project grant obtained by the North West Dialysis Service. It aims to provide a simple framework for identifying and assessing reuse options for the reject stream from reverse osmosis (RO) machines that are used for water treatment in the provision of dialysis services.

The handbook outlines the opportunities for reuse, an awareness of the safety issues, quality requirements and legislative requirements for reuse as well as providing a cross section of case studies from the project reports.

The approach aims to be relevant to the variety of dialysis service delivery models in Victoria, from large metropolitan hospitals to smaller regional facilities. The approach is also relevant to dialysis service providers outside Victoria. However, this document is based on Victorian guidelines and regulations.

This handbook also examines several case studies where reuse of RO reject water is already underway. The manual details the successes of current practices and the scope of reuse applications already in use and some of the pitfalls of pursuing reuse opportunities of dialysis reject water. The experiences and lessons learned from these different cases provide valuable information for any future approach.

The reference manual aims to be a user friendly document to assist health care facilities (HCF) to independently explore RO reject water reuse opportunities. As such, the handbook aims to provide up to date and comprehensive information on the legislative framework in which recycling of RO reject water is classified, so that all reuse projects meet state guidelines and regulations.

In addition, a suite of innovative and practical recycling options are addressed with consideration for legislative, safety and quality issues surrounding its usage and adopting an intuitive risk management framework for assessing compliance, hazard reduction and control measures.

The risk management framework used to undertake and report on the assessment complies with the appropriate Australian Guidelines (Standards Australia 2004; NRMMC & EPHC 2006; DH 2009) .

This reference manual will be successful if it assists HCF in assessing reuse opportunities quickly and providing guidance to assess the costs and benefits of potential projects.

It is acknowledged that there is a strong motivation in the community to save water. This is an admirable aspect of community spirit, however, water conservation and reuse should be well considered and rational. This reference manual hopes to assist in providing a rational basis for decisions.

Any initiative to undertake a project to reuse RO reject water is at the discretion of the HCF,. All HCF are advised to undertake investigations and planning in consultation with all relevant standards and guiding authorities. The handbook aims to provide some assistance in this process.

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Background

North West Dialysis Service (NWDS) is one of the largest providers of dialysis services in Australia. NWDS provides dialysis (artificial life support) for more than 550 Victorians with kidney failure at 30 centres and 160 homes across metropolitan and regional areas. Around 480 of these patients are connected to machines that clean their blood for 12 to 48 hours per week. This process called haemodialysis (blood filtration) requires large volumes of water that has been processed by pre-filtration and reverse osmosis to achieve chemical and microbiological standards for dialysis. During this process, clean reject water (i.e. water that does not meet dialysis standards but may meet potable standards) is generated and goes directly to sewer unless it is "captured" and redirected for a suitable purpose.

NWDS alone produces over 12.8 million litres of recyclable reject water per annum, the majority of which currently goes to drain.

Currently, NWDS provides over 70,000 haemodialysis treatments annually, which represents 27% of Victorian and 7% of all haemodialysis treatments performed in Australia. Nationally, the dialysis dependent population continues to increase.

Introduction

Today, NWDS ensures that new dialysis centres are routinely designed with maximum water conservation and recycling from the planning phase. Wherever possible, NWDS purchases more contemporary water treatments systems with greater water conservation capacity, which is a priority for both metropolitan and regional communities.

However, the intended application of Department of Health (DH) funding for maintenance dialysis does not include funding activities to actively research and identify appropriate and safe applications for reject water and potential third party consumers in consultation with peak bodies and Victorian communities. In May 2008, Smart Water advisors indicated that there is no established resource to readily link dialysis reject water to suitable community needs across Victoria.

Objectives/Goals

1. Assess the quality of dialysis reject water at 20 NWDS dialysis centres where reject water currently goes to drain
2. Work in consultation with state and local authorities, hospitals, councils and industries to match the reject water to suitable community needs
3. Provide individual reports that enable our communities to pursue reject water distribution at their discretion
4. Develop an industry specific report and reference manual for Victorian Government (Smart Water, DH, DSE and EPA) as a reference for other key stakeholders in dialysis across Australia.

Work with the Smart Water Fund, DH and Melbourne Health to promote public awareness of achievements in reuse of dialysis reject water that arise from this project via media, professional presentations and publications.

Literature Review

The consultant, Arris Pty Ltd, performed a literature review prior to beginning work on the Handbook and industry report. Findings from the literature review have been used throughout the industry report and handbook.

Key Steps / Milestones

Milestone 1

- **Milestone Description**

  Establish key contacts with DSE, EPA & MH.

  Preliminary report detailing volume, general classification and anticipated range of potential uses.

- **Methodology**

  Steering group has been formulated with the purpose of formulating a suitable consultant's brief. Steering group consists of key NWDS stakeholders as well as an external member from South East Water.

  External industry experts to be consulted for a shortlist of potential consultants to be contacted.

  Minimum of 3 quotes to be sought before selection of most suitable candidate for the task.

- **Resources**

  In kind support of $5,000.00 to be provided by NWDS. Support to cover man-hours of NWDS staff.

- **Timing**

  Original expected completion date was 4/5/09. Request by SmartWater fund to include external members and provide feedback has stretched completion date. Anticipated milestone date of completion is 29/5/09

- **Financial Summary**

Funding Summary for Milestone 1		
Source	**Amount**	
	$	**In kind**
Smart Water Fund	20,000.00	0
Grantee	0	15,000.00
Other (please name)	0	0

Milestone 2

- **Milestone Description**

This milestone aims to evaluate the quantity and quality of Metropolitan dialysis site reject water and to explore and report on reuse opportunities.

- **Methodology**

NWDS has contracted the services of Arris Pty Ltd to conduct the technical aspects of the project.

Arris Pty Ltd has visited each of the five metropolitan dialysis sites (Royal Melbourne Hospital, Northern, Broadmeadows, Coburg and Brunswick) to perform site analyses. Extensive consultation with key site staff (engineering, maintenance, management) was undertaken at each site.

Arris Pty Ltd undertook the following actions at each of the Metropolitan sites:

Assessed the volumes of RO reject water.

Assessed the quality of the RO reject water.

Identified potential reuse options based on site visits and interviews.

Conducted a preliminary assessment of the feasibility and cost or potential reuse options

Identified the drivers and motivations to pursue reuse options.

Progress meetings between NWDS and Arris Pty Ltd were held to ensure that tasks were undertaken as planned and that the direction of the project was as set out in the consultant's brief.

- **Resources**

NWDS staff. Most of the resources for this milestone relate to staff contribution in kind.

Jenny Soding – NWDS Director. Oversaw project.

James Gerrish – NWDS Business Activity Coordinator. SWF Project Administrator. Acted as liaison between Arris Pty Ltd and NWDS/RMH. Attended some site visits. Attended and contributed to progress meetings between NWDS and Arris Pty Ltd.

Tony Beeston – NWDS Dialysis Services Technical Manager. SWF project Champion. Key technical liaison between NWDS and Arris Pty Ltd. Provided contacts to Arris Pty Ltd in the dialysis plumbing industry to allow some cost scoping of potential projects. Attended and contributed to progress meetings between NWDS and Arris Pty Ltd.

- **Timing**

Original time for completion of Milestone 2 was October 29. Arris Pty Ltd initially encountered difficulty in gaining access to some RMH engineering staff. During these delays, Arris Pty Ltd were able to undertake work on Milestone 3, ensuring that overall timeline of the project was not extended. Data and supporting information required from Arris Pty Ltd for Milestone 2 was provided to NWDS on 2nd November.

- **Financial Summary**

Funding Summary for Milestone 1		
Source	**Amount**	
	$	**In kind**
Smart Water Fund	25,000	
Grantee		5,000
Other (please name)		

Milestone 3

- **Milestone Description**

This milestone aims to evaluate the quantity and quality of regional dialysis site reject water and to explore and report on reuse opportunities.

- **Methodology**

NWDS has contracted the services of Arris Pty Ltd to conduct the technical aspects of the project.

Arris Pty Ltd has visited each of the fifteen regional dialysis sites (Ararat, Daylesford, Mildura, Yarrawonga, Seymour, Horsham, Wodonga, Ballarat, Edenhope, Hamilton, Myrtleford, Nhill, Portland, Robinvale and Yarram) to perform site analyses. Extensive consultation with key site staff (engineering, maintenance, management) was undertaken at each site.

Arris Pty Ltd undertook the following actions at each of the regional sites:

Assessed the volumes of RO reject water.

Assessed the quality of the RO reject water.

Identified potential reuse options based on site visits and interviews.

Conducted a preliminary assessment of the feasibility and cost of potential reuse options.

Identified the drivers and motivations to pursue reuse options.

Progress meetings between NWDS and Arris Pty Ltd were held to ensure that tasks were undertaken as planned and that the direction of the project was as set out in the consultant's brief.

- **Resources**

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Tony Beeston – NWDS Dialysis Services Technical Manager. SWF project Champion. Key technical liaison between NWDS and Arris Pty Ltd. Provided contacts to Arris Pty Ltd in the dialysis plumbing industry to allow some cost scoping of potential projects. Attended and contributed to progress meetings between NWDS and Arris Pty Ltd.

- **Timing**

Original time for completion of Milestone 3 was November 24. Arris Pty Ltd initially encountered difficulty in gaining access to some RMH engineering staff. During these delays, Arris Pty Ltd were able to undertake work on Milestone 3, ensuring that overall timeline of the project was not extended. Data and supporting information required from Arris Pty Ltd for Milestone 3 was provided to NWDS on 3rd December.

- **Financial Summary**

Funding Summary for Milestone 3		
Source	**Amount**	
	$	**In kind**
Smart Water Fund	25,000	
Grantee		5,000
Other (please name)		

- **Key Performance Indicators**

There were 2 key performance indicators associated with this milestone. The first was the development of a site report for each metropolitan site. This was achieved. The report is held by NWDS with significant data and results utilised in this Milestone 3 report.

The second KPI involved classification of quality and quantity of reject water at each regional site. This KPI was achieved. See findings for results.

Milestone 4

- **Milestone Description**

This milestone aims to ensure that a dialysis industry specific handbook is developed that provides guidance to health care facilities enabling them to pursue their own reuse of haemodialysis reverse osmosis reject water projects.

- **Methodology**

NWDS contracted the services of Arris Pty Ltd to conduct the technical aspects of the project.

Arris Pty Ltd visited each of the five metropolitan dialysis units (Royal Melbourne Hospital, Brunswick, Coburg, Northern and Broadmeadows) to perform site analyses. Extensive consultation with key site staff (engineering, maintenance, management) was undertaken at each site.

Arris Pty Ltd visited each of the fifteen regional dialysis sites (Ararat, Daylesford, Mildura, Yarrawonga, Seymour, Horsham, Wodonga, Ballarat, Edenhope, Hamilton, Myrtleford, Nhill, Portland, Robinvale and Yarram) to perform site analyses. Extensive consultation with key site staff (engineering, maintenance, management) was undertaken at each site.

Arris Pty Ltd undertook the following actions at each of the sites:

- Assessed the volumes of RO reject water.
- Assessed the quality of the RO reject water.
- Identified potential reuse options based on site visits and interviews.
- Conducted a preliminary assessment of the feasibility and cost of potential reuse options.
- Identified the drivers and motivations to pursue reuse options.

Progress meetings between NWDS and Arris Pty Ltd were held to ensure that tasks were undertaken as planned and that the direction of the project was as set out in the consultant's brief.

- **Resources**

NWDS staff. Most of the resources for this milestone relate to staff contribution in kind.

Jenny Soding – NWDS Director. Oversaw project.

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Tony Beeston – NWDS Dialysis Services Technical Manager. SWF project Champion. Key technical liaison between NWDS and Arris Pty Ltd. Provided contacts to Arris Pty Ltd in the dialysis plumbing industry to allow some cost scoping of potential projects. Attended and contributed to progress meetings between NWDS and Arris Pty Ltd.

- **Timing**

Original time for completion of Milestone 4 was Dec 24, 2009. Arris Pty Ltd initially encountered difficulty in gaining access to some RMH engineering staff. During these delays, Arris Pty Ltd was able to undertake work on Milestone 3, ensuring that overall timeline of the project was not extended. Data and supporting information required from Arris Pty Ltd for Milestone 4 was provided to NWDS on Dec 23, 2009.

- **Financial Summary**

Funding Summary for Milestone 4		
Source	**Amount**	
	$	**In kind**
Smart Water Fund	30,000	
Grantee		5,000
Other (please name)		

- **Key Performance Indicators**

There were 2 key performance indicators associated with this milestone. The first KPI was the development of an industry report. This was achieved. Significant findings and outcomes from the industry manual have been utilised in the creation of this Milestone 4 report.

The second KPI was for the consultant to provide appropriate data to enable NWDS to pursue publications in relevant professional journals. This was achieved. NWDS has submitted an abstract to the Renal Society of Australasia to aid in disseminating the information.

Findings/Results/Outcomes

The Industry Handbook aims to assist HCF to pursue dialysis reverse osmosis reject water reuse projects independently. To do so, -HCF must be presented with a guide to the steps necessary to ensure a successful project outcome.

This Handbook has achieved this aim with the outcome being a step-by-step approach that is easy to follow for HCF.

An initial recommendation of the Handbook is the HCF Water Audit.

To assist HCF with reaching these water conservation and recycling targets, the Victorian Government, through the Department of Sustainability and the Environment (DSE) and water authorities have developed the WaterMAP (Water Management Action Plan). The WaterMAP is for consumers of more than 10 million litres of water per annum in Victoria (Our Water Our Future 2007). This will assist the larger healthcare facilities in accounting for water consumption and provides a basis for determining priority areas for water conservation and recycling/reuse within their facilities.

The objective of the WaterMAP is for large consumers of water to:

- assess water usage;
- identify inefficiencies and opportunities for water savings;
- prepare an action plan to implement water conservation activities; and
- report annually on the implementation of water conservation activities.

For smaller facilities where there are currently no WaterMAP requirements, there has been a concerted effort by the Greening Our Hospitals (GOH) program to audit HCF across Victoria. This has resulted in at least 69 audits being conducted by the end of 2009.

Audits of water and energy within HCF lead to the identification of areas of wastage of good resources. They also allow for subsequent strategies to reduce wastage and attempt to reuse or recycle these waste streams where possible.

Typical patterns of water usage in HCF

A key outcome of a water audit is a detailed understanding of the patterns of water usage within a specific HCF. It is also useful to understand the pattern of water usage compared with other HCF. This benchmarking approach may provide opportunities and limits for water conservation and reuse. Table 1 provides an indication of how water is typically used within a HCF.

Table 1 Summary of proportional water uses within HCF in Victoria (based on water audits)

Water use	%age
Ablutions (basins, showers, sinks)	20-40%
Sanitary Flushing (toilets, pan sanitisers)	15-30%
Process (sterilisers, laboratories)	15-40%
Food Preparation (kitchen)	5-25%

Source: (DH 2009)

The values in Table 1 are based on real audits undertaken in Victorian HCF. One important observation is that there is significant variation between HCF. A limitation of this data is that it does not identify specific end uses.

By contrast,
Figure 1 provides a further breakdown of the demands for different end uses of water.

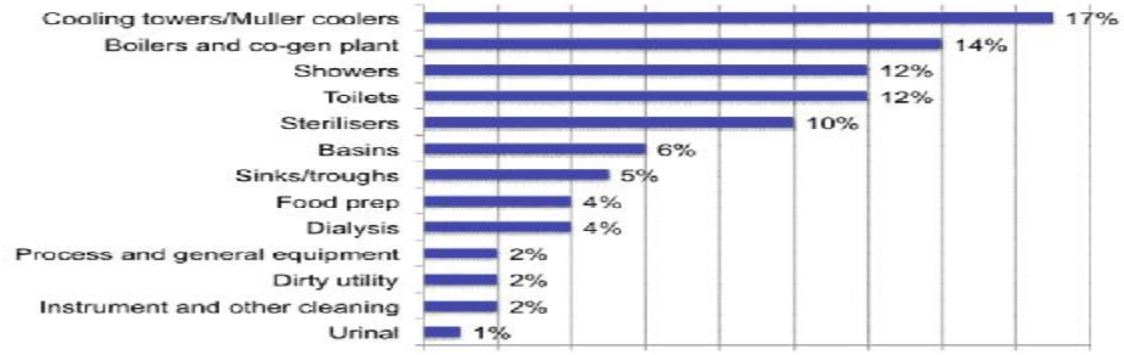


Figure 1 Sources and uses of water in HCF Source: DH 2009

There are significant potential demands (cooling towers, Muller coolers, boilers, toilets, sterilisers) for RO reject water and larger opportunities for water savings at hospitals (
Figure 1). According to DH (2009), dialysis represents on average 4% of the water used in a HCF (
Figure 1). This can be a significant volume of water (several million litres) at large facilities. Based on the typical performance of RO units, this indicates that 2% of water supplied to hospitals is available for reuse from RO units alone. This is important because it provides an indication of the extent of opportunities and limitations.

Figure 1 describes water usage at a typical HCF site. At some other HCF sites where dialysis is one of the main services provided, reuse of the RO reject water could save 6% of the potable water supplied to the HCF (Deere et al. 2009).

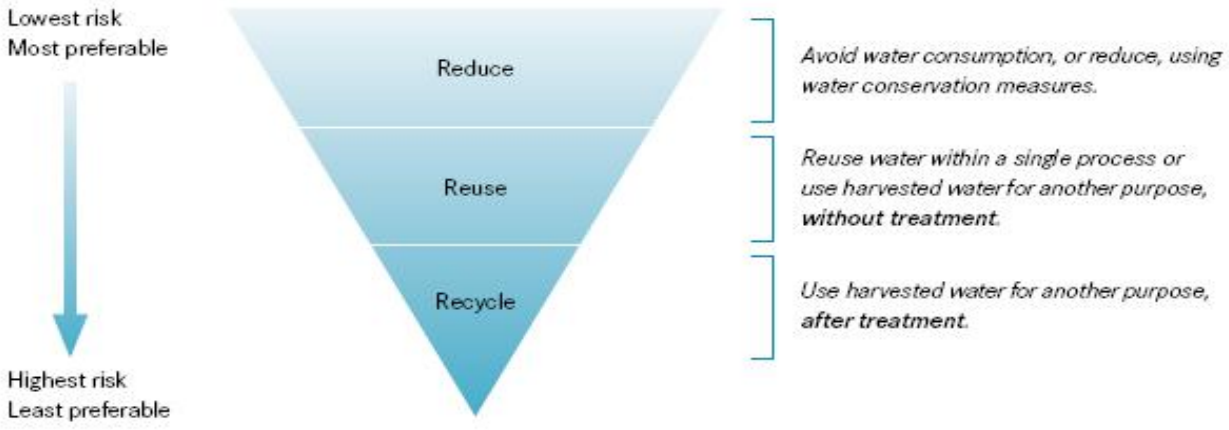
The typical volume of RO reject water at metropolitan or large regional dialysis centres is 1000 KL/annum. This is approximately the volume of water used by 5 family households per annum.

Reuse of RO reject water presents one of many opportunities for HCF and it often does not represent the largest volumes that could be reused.

Waste Management Hierarchy

Fundamental to the pursuit of any water conservation project is an understanding of the waste hierarchy (DH 2009). It is imperative that the hierarchy is adopted and that opportunities to reduce water consumption are considered before reuse and recycling.

Figure 2 The key steps in water conservation Source: (DH 2009)



Reverse osmosis reject water represents a significant opportunity in HCF water conservation efforts. However it is typically not the simplest to achieve. There are easier gains to be made, such as installing dual flush toilets and low flow showers, to reduce water consumption. In line with the waste hierarchy, the opportunities to reduce water consumption should be pursued first. When the 'reduce' opportunities have been exhausted, reuse of RO reject water presents new opportunities.

This handbook utilises a step-by-step approach to identify the actions and decisions required to develop a reuse project for dialysis RO reject water.

Table 2 (below) and the accompanying steps in this section are provided to use as a walk through to quickly identify whether reuse is feasible both in terms of costing, volumes and matching demands and the key issues.

Table 2 Steps to quickly identify reuse feasibility at Health Care Facilities

Step No.	Description
1	Undertake review of water audit
2	Confirm operation of dialysis service
3	Confirm volume of RO reject water available
4	From water audit, identify possible reuse opportunities
5	Match reuse options with available supply
6	Check water quality is fit for purpose
7	Undertake design and costing for reuse options
8	Develop Risk Management Plan (RMP)
9	Undertake project plan and confirm business case

Step 1: Review the water audit or ensure that one has been undertaken

Prior to investigating a specific option involving the reuse of dialysis RO reject water, it is necessary to undertake a water audit or review that one has been recently undertaken, and explore projects that involve reducing potable water consumption directly.

This preliminary step is important to provide a context and ensure that the waste hierarchy is adopted. It is important that the 'low hanging fruit' are identified and that any efforts to reuse dialysis RO reject water are seen in the context of a larger water conservation effort.

Step 2: Confirm the future operation of the dialysis service

If a dialysis reuse project is to be successful, it is necessary to ensure that the dialysis service is continuing in its present form or expanding on site. There are examples where changes to dialysis services are planned, such as relocation, hence any investment in water reuse projects at this point is unlikely to achieve the payback period.

Step 3: Confirm the volume of RO reject water generated

It is fundamental to establish the volume of RO reject water being generated. There are significant economies of scale in the reuse of RO reject water, and this leads to more significant opportunities at metropolitan and large regional hospitals.

There are several regional sites which generate relatively small volumes of reject water. This is due to the small number of chairs and limited operating hours per week. These volumes are comparable with a single patient undergoing home dialysis due to the longer operating hours with home dialysis.

Step 4: Identify and list possible dialysis RO reject reuse opportunities

There are a wide range of potential uses for RO reject water within a hospital setting. One of the first tasks is to identify the potential reuse options for the specific site. This may involve some lateral thinking as well as keeping in mind the complexity of the reuse option and benefits of keeping the project simple.

The typical reuse opportunities are toilet flushing, garden watering, cooling water for sterilisers, washdown water and cooling tower water.

This Handbook also provides some general rules of thumb as to situations where these identified options are not viable based on a survey of 20 Victorian HCF providing HD services. The aim is to accelerate the screening out of non-viable projects where possible.

Step 5: Matching opportunities for reuse with the available supply

The viability of reuse schemes depends very much on the match between the supply and demand of RO reject water. These reuse options are demand driven. No demand means no reuse is possible. It is critical that the volumetric demand and demand profile are well understood. For example, toilet flushing water is an excellent reuse opportunity. It provides a constant demand profile over the entire year and is a significant user of water. By contrast, using RO reject water for irrigation can lead to an underutilisation of the reject water as there may be little demand through winter months.

Step 6: Confirm Water quality

Once a good match between supply and demand has been established with respect to volume and demand profile and the supply of RO reject water, it is necessary to confirm that the RO reject water is fit-for-purpose.

Whilst of high quality, RO reject water cannot be guaranteed to be potable water. It contains more salt (up to three times the salt concentration of the potable feed water), has been dechlorinated and may have been in contact with RO membrane cleaning fluids or other hazards.
Typically RO reject water is fit for many reuse purposes, but this needs to be confirmed. If it is found not fit for the specific end use it can usually be treated or shandied with other water to make it fit-for-purpose. This treatment and dilution can come at a cost and may question the project viability.

Step 7: Preliminary Design and Costing

In order to assess the viability of a potential reuse project, it needs to be designed and costed. The preliminary design is also required to enable a health and environmental risk assessment to be undertaken. This work is typically undertaken by the hospital engineering department following internal business procedures. This Handbook does not attempt to provide any guidance on how the design and costing will be undertaken as these will be defined internally by the specific organisations undertaking the assessment.

Step 8: Assess and manage the human and environmental risk

In order to comply with the Guidelines for Water Reuse and Recycling in Victorian Health Care Facilities (DH 2009), it is necessary to undertake a Risk Management Plan (RMP) for any water reuse project. This should be undertaken prior to project approval to ensure that the project achieves an acceptable risk profile and any costs associated with the monitoring and verification for the project are included in the business case. This step details the inputs for these risk assessments following the Guidelines. It should be noted that in other states of Australia, alternative guidelines may need to be followed.

Step 9: Confirming the business case

The potential reuse project needs to secure hospital approval to go ahead. This is an internal business process that is beyond the scope of this Handbook. However, the project viability may hinge on the availability of additional funding, confirming key project drivers. This section details potential funding sources that may improve the financial viability of the project and details on non-financial project drivers and provides overview of the key elements of success for established reuse projects.

Risk Management

Managing the risk for Milestone 4 was unproblematic. NWDS has significant relationships with each of the metropolitan and regional satellite dialysis sites allowing significant access to all aspects of the sites for Arris Pty Ltd.

Discussion/Evaluation

Milestone 4 was the capstone of NWDS' Smart Water Fund Project. The culmination of the visits to metropolitan and regional sites was the development of the industry handbook.

Evaluation of the project identifies the Handbook as a significant achievement. Prior to project implementation, NWDS considered there may be opportunities to utilise RO reject water external to the HCF or as a commercial venture. Results of the NWDS site feasibility studies (Milestones 1, 2 and 3) indicated that external projects were difficult and costly to implement. There was opportunity at one site to utilise RO reject water in a car wash facility next door. Although a potentially viable project, there were some uncertainties surrounding lifespan of the car wash and the impact on payback periods if the carwash were to close.

Prior to project implementation, NWDS estimated that approximately 12.8 ML of RO reject water would be available for reuse/recycling. Whilst Arris Pty Ltd agreed on the available volume, they also noted that project viability at each site was very much volume dependant This meant that sites with relatively small volumes of RO reject water had limited options to find projects that achieved suitable payback periods. This finding has been highlighted in the Handbook.

The benefit of the Handbook will be apparent to any dialysis service/HCF looking to pursue RO reject water reuse/recycling projects. Prior to release of the Handbook, NWDS has received calls from parties interested in the project indicating that there is an unmet need for this type of resource.

A limitation of the Handbook, which has been acknowledged in the document, is that the findings and recommendations have been based on Victorian studies and refers to Victorian legislation and regulations.

Return on Investment (ROI)

As noted in the in the Project Plan, quantifying ROI for this project is difficult. The scope of this project does not extend to infrastructure projects to realise potable water savings. The objective of this project is to provide the 'tools' for NWDS and other dialysis service providers to assess their capabilities to effectively recycle their RO reject water. NWDS has made significant steps in developing a pathway for others to utilise.

Although the viable reuse opportunities within the regional sites were limited, Arris Pty Ltd did identify some projects that would be viable. Arris Pty Ltd as part of the scope of works, have also identified a funding stream through "Greening Our Hospitals" that each site has an opportunity to access. Should individual sites be successful in obtaining this funding, the return on investment will continue to be favourable.

Confirmation has been received from Albury Wodonga Health (Wodonga Dialysis) that as a result of this project, funding through Greening Our Hospitals has been awarded. This is a significant achievement for the project and based on RO reject water estimations, Wodonga will be able to realise a 1.68 ML a year potable water saving.

Along with identifying several viable RO reject water reuse projects and the development of a reference manual, this project has afforded NWDS the opportunity to present the findings at the Renal Society of Australasia (RSA) national conference in June 2010. With a theme of "Rising Tides of Innovation," this SWF project is ideal and has been accepted as an oral

presentation. This provides NWDS with an ideal forum to communicate the achievements of the project as well as highlight the availability of the reference manual and acknowledge the support of the Victorian Government's Smart Water Fund initiative.

Conclusion

Completion of Milestone 4 has delivered significant benefits to NWDS and its objective of developing a reference manual for use throughout Australian dialysis services.

Along with the development of process identification, several viable opportunities to recycle RO reject water were identified. NWDS has alerted its regional partners to the process of applying for funding through "Greening our hospitals" to bridge the divide between theoretical constructs and real-life infrastructure projects.

The development of the reference manual will provide other dialysis providers the opportunity to pursue their own projects.

Capping off the project will be the oral presentation of the project findings at the RSA conference to be held in Cairns in June. The conference provides an ideal forum for communication of the project findings as dialysis representatives from across Australia and New Zealand will be in attendance.

Recommendations

NWDS recommends that the Industry Handbook be available to the wider Australian dialysis community. To facilitate this, NWDS requests that SWF make available through its website a copy of the Handbook.

NWDS recommends that Australian dialysis services wishing to build dialysis facilities refer to the Handbook prior to project implementation.

References

Please see attached Industry Handbook for complete list of references used to create the documents

Appendices

Please find attached Industry Report for NWDS sites – Appendix A

Please find attached Industry Handbook – Appendix B