



## Form: Project initiation – Development of Good Practice Guide for Sewage Treatment Systems

### **Title**

*Development of the 'Good Practice Guide to the Operation of Sewage Treatment Systems (STS GPG)*

### **Focus Area**

Developing a GPG for the operation of STSs will primarily improve Operational (Service) Risk Reduction and Productivity (Focus Area 9) although will also have benefits for the Sustainable Management of Environmental Impacts (Focus Area 5) and potential for improved Resource Recovery and Re-use (Focus Area 10).

### **What is the problem?**

While the *Good Practice Guide to the Operation of Drinking Water Supply Systems for the Management of Microbial Risk* was published in 2015 and increasingly adopted by potable water supply authorities around Australia as a valuable tool to benchmark their facilities' performance and identify weaknesses, the sewage industry lacks an equivalent resource. This has been pointed out by several organisations.

Consequently, sewage treatment systems are assessed and regulated on an individual basis without a uniform approach. Unlike the regulations for drinking water, there are no national guidelines covering performance outcomes for the operation of sewage treatment systems, the closest being the Australian Guidelines for Water Recycling (AGWR).

### **Background**

In 2015 WaterRA published a GPG to minimise microbial risks to drinking water supply systems. This GPG has since been utilised to evaluate more than 70 water supply systems across Australia and is proving to be an invaluable tool in providing objective benchmarks to compare water supply systems and identify where improvements to treatment processes are possible and prioritise actions in order to manage microbial risks to consumers. The GPG provides recommended performance targets and acts as a standardised basis against which audits can be carried out. The GPG is like registering a car; if it passes assessment then it is capable, robust and roadworthy!

Theoretically a fully compliant STS is going to be able to treat effluent of varying quality and quantity to a sufficient level that it can be discharged or repurposed. However, each sewage treatment system is assessed and regulated on an individual basis and a wide range of technologies and practices are considered suitable (e.g. primary treatment (ocean outfall), oxidation ponds/evaporation, MBR etc). STSs face challenges not typically encountered by potable water supply utilities, namely poor control of source quality (due to illegal discharges, liquid trade waste and inflow/infiltration) and degrees of scale (large municipal versus small and remote).

The site-specific conditions unique to each STS facility makes evaluating their performance difficult without having a uniform and objective benchmark to compare against. It is the absence of such a resource that we seek to rectify by developing the proposed *Good Practice Guide to the Operation of Sewage Treatment Systems*. This GPG will provide process recommendations and performance goals (both numerical and observational), to target for the range of technologies and practices utilised in the sewage treatment industry as well as a template for conducting audits/assessments against these recommendations. Content will be concise, clearly defined and presented in a user-friendly package with unambiguous steps to follow in order for STSs to be judged on their compliance.

As its use spreads, the existing *Good Practice Guide to the Operation of Drinking Water Supply Systems for the Management of Microbial Risk* has been demonstrated to be a useful tool for evaluating systems and in prioritising where best to spend on projects to achieve quantifiable reductions in microbial risk. By developing a sister document covering the specific requirements for STSs, it is envisioned that comparable quantifiable characterisations of STS facilities will be achieved and used to prioritise future projects to improve the overall sewage treatment industry. A GPG for STSs will focus where this is best directed, by generating a set of targets and prioritised tasks to be achieved.

### **What is the desired outcome?**

It is envisaged that the project will deliver a GPG reflecting relevant sewage treatment and reuse guidelines and practice, an evaluation of accepted sewage treatment processes and technologies and an accompanying audit template. The guide would follow a similar approach to the water good practice guide.

To ensure the protection of public health and the environment, it is recommended that in approaching the GPG, that focus is prioritised on the management of process risk (maintenance and protection of the biological process).

A preliminary plan for content of the GPG document is:

1. Collection system
  - Inflow/Infiltration (minimise bypass and SPS surcharging )
  - Liquid trade waste (protect biological process)
2. Sewage Pumping Station (SPS)
  - Redundancy
  - Power supply
  - Storage
  - Flow relief provision
  - Emergency response procedures
3. Treatment plant
  - Residuals management (biosolids, grit etc.)
  - Peak flow management (bypasses management)
  - Flow measurement
  - Operational testing (for process control)
  - Plant automation (SCADA) etc.
  - Equipment redundancy (planning for major servicing)
  - Emergency response
4. Environmental discharge
  - Water quality drivers
  - Monitoring
5. Water Recycling
  - Risk assessment
  - Water quality objectives
  - Estimating Log Reduction Values (LRVs) in accordance with the AGWR
  - Critical control points (CCPs)
6. Audit template to assist in assessing compliance with recommendations contained within Sections 1-4.

There is potential for the development of a (mobile/tablet) software application that can be used to assist in conducting audits and measuring compliance.

### **Why would this idea be of benefit to the water industry?**

Assessing the compliance of sewage treatment systems against safety and environmental guidelines and industry good practice needs to be done in a uniform and objective manner. By comparing a STS against the recommendations contained within the GPG, a benchmark score is able to be ascribed that quantifies/measures/ranks its compliance against both other facilities and a minimal risk ideal. Problematic areas are thus identified and actions to remedy the deficiencies can then be developed. If the process is followed through on, the end result is a quantifiable improvement in STS operations with minimisation of risks to the public and environment.

### **How would the work/project be delivered?**

Bruce Murray, City Water Technology, has proposed the idea based on his experience as co-author of the *Good Practice Guide to the Operation of Drinking Water Supply Systems for the Management of Microbial Risk* and knowledge and expertise of wastewater systems. Further development of this idea would be via the WaterRA Problem Definition Workshop process. The project would require a Technical Advisory Group comprised of suitably qualified people from different sectors of the waste water industry.

The project could deliver:

1. GPG subject to extensive peer review;
2. Development of audit templates to streamline and standardise the assessment process (to be included as an addendum to the GPG);
3. Potential for development of a (mobile/tablet) software application that can be used to assist in conducting audits;
4. Potential for development of a (mobile/tablet) software application that can be used to assist in estimating pathogen LRVs of recycled water in accordance with the AGWR.
5. Potential for development to provide a template with guidance notes and automatic assessment for use on an iPad, iPhone or android app.

As the STS GPG would follow a similar approach to the water GPG, it is envisioned that some of the generic material could be reformatted and reused.

### **Is there wider support for the project idea?**

Implementing the water GPG and its recommendations is gaining wider traction within the water treatment industry. It is increasingly recognised as a valuable resource to guide audits and allow for the benchmarking of WTPs against both other facilities and a minimal risk ideal so that microbial risks to public health can be minimised and capital works prioritised.

An equivalent GPG covering the sewage treatment industry would be particularly welcome due to the variable operating conditions and complexity of treatment processes that exist in the sewage treatment industry and the dearth of national guidelines covering performance outcomes for the operation of sewage treatment systems and water recycling.

Providing a resource that standardises how sewage treatment systems are assessed will be especially invaluable for smaller authorities with limited resources and who would otherwise lack the technical knowledge required to identify and mitigate risks to their systems and subsequently the public and environment. Several organisations have taken an interest in this.

### **List any relevant references**

- *Good Practice Guide to the Operation of Drinking Water Supply Systems for the Management of Microbial Risk*. WaterRA Final Report Project 1074, ISBN 978-1-921732-27-0
- AGWR (2006) *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1)*. Natural Resource Management Ministerial Council Environment Protection and Heritage Council Australian Health Ministers Conference. Web Copy: ISBN 1 921173 06 8