

BEST PRACTICE MANAGEMENT OF EFFLUENT AND BIOSOLIDS



Paper Presented by :

Maree Bethel

Author:

Maree Bethel

Project Manager- Industry Services

EPA Victoria



*62nd Annual Water Industry Engineers and Operators' Conference
Civic Centre - Wodonga
8 and 9 September, 1999*

BEST PRACTICE MANAGEMENT OF EFFLUENT AND BIOSOLIDS

Dr Maree Bethel, *Project Manager - Industry Services*, Environment Protection Authority (Vic)

INTRODUCTION

EPA's Industrial Waste Strategy *Zeroing in on Waste* released in 1998 challenges Victorian industry to change the way it thinks about its wastes. It encourages industry to adopt more creative ways of avoiding the generation of wastes at source and where wastes cannot be avoided, it encourages industry to pursue more economically and environmentally beneficial opportunities to return wastes to resources through reuse, recycling or recovery of energy.

For the water industry this effectively means effluent and sludge, by-products of sewage treatment, should be viewed as resources to be reused in a beneficial and sustainable manner, rather than wastes requiring disposal. The reuse of these materials involves treating them to a level appropriate for their intended reuse application, and using the resulting water (termed reclaimed water) or sludge (termed biosolids) in a sustainable manner for a beneficial purpose. Beneficial reuse is defined as the sustainable use of reclaimed water or biosolids in a manner which provides some direct or indirect economic, social or environmental value, while still protecting the environment, public and agricultural (being stock and plant) health.

The concept of beneficial reuse is different from that of wastewater disposal to land. The primary purpose of land disposal is to discharge waste to land in a controlled manner so as not to cause pollution. In contrast, the primary purpose of beneficial reuse is to use what was previously considered "wastewater or sludge" as a resource in a beneficial and safe manner.

The Environment Protection Authority (EPA) is working with the water industry to facilitate this conceptual change in thinking. EPA has facilitated this change through the development of Best Practice Environmental Management Guidelines (BPEMGs) for the reuse of reclaimed water and biosolids. The specific titles are *Best Practice Environmental Management Guidelines for the Use of Reclaimed Water* and the proposed *Best Practice Environmental Guidelines for Biosolids Management* respectively. These Guidelines have been developed in consultation with the water industry.

EPA is committed to working with the water industry to ensure the effective implementation of these Guidelines.

1.0 CURRENT WASTEWATER MANAGEMENT PRACTICES

Effluent from wastewater treatment plants represents a resource that in many cases may be recovered and put to productive use via sustainable reuse schemes. Victorians generate about 1300 ML of sewage daily, of which approximately 80% is discharged to coastal waters, 10% discharged to inland streams and 10% reused. The majority of reuse applications are low-grade agricultural and horticultural applications.

Currently, the majority of secondary treatment plants in Victoria produce effluent that is generally suitable for restricted agricultural, horticultural, industrial and municipal uses where public and stock access can be restricted through practical controls.

Advanced treatment (eg. coagulation, filtration and disinfection) of the effluent is generally required for water authorities to achieve a class of reclaimed water that can be used with no restrictions placed on public and animal access or exposure. Currently, no plants in Victoria achieve this quality. No plants in Victoria currently achieve an effluent quality suitable for unrestricted use.

Notwithstanding climatic, topographic, economic and other constraints, the above data indicates there is scope to increase the reuse of effluent in Victoria.

2.0 CURRENT BIOSOLIDS MANAGEMENT PRACTICES

There is approximately 220,000 dry tonnes of biosolids produced annually in Victoria. Twenty thousand dry tonnes are produced from the 18 non-urban metropolitan plants and 200,000 tonnes from Melbourne Water's Eastern and Western plants. The non-urban metropolitan plants, therefore, produce less than 10% of the total biosolids generated annually in Victoria. It is predicted that there will be an approximate 3 -5% increase in the quantity of biosolids produced in Victoria from treatment plants over the next 5 years. In particular, there will be an increase in chemically enhanced biosolids for plants that continue to discharge to freshwater beyond 2000, due to the implementation of nutrient reduction controls.

The majority of biosolids currently produced are stored on-site at treatment plants for future reuse. Storage generally occurs in above-ground stockpiles. A small percentage (<10%) of the total biosolids produced is disposed of to either constructed on-site pans or to larger off-site sewage treatment plants. Currently, only a very small percentage of the total biosolids generated are reused (<7% at the non-urban metropolitan plants and approximately 15% at Melbourne Water's plants). Reuse occurred at 9 treatment plants out of the 176 surveyed. Reuse was mainly via on-site landscaping or soil conditioning, with a small percentage used in off-site composting/blending operations.

The quality of biosolids currently generated in Victoria was reviewed against the environmental quality guidelines in the proposed *National Biosolids Management Guidelines* (ANZECC, 1997). In terms of unrestricted use of biosolids (eg. biosolids can be used for any application without site restrictions human and stock access or application rates), the majority of biosolids produced significantly exceed the zinc, mercury and copper guideline levels. Approximately 40% of the biosolids produced exceed the cadmium guideline level also. All biosolids analysed complied with the organic level guidelines set for unrestricted use. No data was provided on the microbiological quality of the biosolids. Achieving the microbiological quality is a critical element for the protection human and agricultural health.

The environmental guideline levels in the 1997 draft ANZECC Guidelines for the restricted use of biosolids are significantly less stringent than the quality required for unrestricted use (allowed uses include agricultural, forestry and landscaping and horticulture where human exposure can be restricted). A broad survey of the current biosolids quality produced indicated that the majority of biosolids produced. In general, the survey also showed that the technology currently used by the water industry would result in most biosolids only being suitable for restricted use in terms of the stabilisation and microbiological quality of the biosolids.

3.0 FUTURE MANAGEMENT PRACTICES

Water authorities will need to develop sustainable reuse strategies for effluent and biosolids generated at treatment plants.

Currently, the majority of biosolids produced are stored and effluent is generally disposed of to surface waters or land. This cannot be viewed as a long-term sustainable option for either the water industry or Government departments involved in the regulation and management of biosolids and effluent.

EPA's Industrial Waste Strategy flags EPA's intent to prohibit the disposal of biosolids to on and off-site landfills after 2000, where there are sustainable reuse options available. Water authorities are

required to report on their performance in terms of percentage reuse of effluent and biosolids achieved, and the efforts made to increase the reuse of biosolids and effluent.

Currently, the most practical reuse options based on current biosolids and effluent quality will be restricted (or class B) applications. These include agriculture, horticulture, landscaping and forestry applications. Unrestricted (or Class A) applications will require further advanced treatment of the materials compared to that which is currently undertaken at the majority of plants.

4.0 CURRENT REGULATORY FRAMEWORK FOR REUSE SCHEMES

The reuse of reclaimed water and biosolids undertaken in accordance with the *Best Practice Environmental Management Guidelines for the Use of Reclaimed Water* (Publication 464) and the *Draft Best Practice Environmental Guidelines for Biosolids Management* respectively are exempt from EPA works approval and licensing provisions. The disposal of effluent and biosolids is, however, subject to EPA works approval and licensing. The exemption provisions are intended to encourage reuse schemes rather than disposal, by allowing them to proceed without unnecessary regulatory control.

5.0 THE GUIDELINES

The Guidelines and their implementation are based on the concept of best practice environmental management (BPEM). BPEM means managing an activity or organisation to achieve a high level of environmental performance which is sustainable, continuously improves and is consistent with business or economic objectives.

BPEMGs outline key environmental performance objectives relevant to the activity or industry, and provide measures to achieve these objectives. Satisfactory implementation of the measures will generally achieve compliance with the outlined performance objectives. Operators are, however, encouraged to consider alternative ways to meet the objectives and to apply site-specific measures equivalent to, or better than, the suggested measure. As a result, innovation is not stifled and flexibility is encouraged through the Guidelines.

EPA does not impose BPEMGs unilaterally on industry. Instead, they represent the outcome of a joint industry/EPA process. In fact, the usefulness of BPEMGs is largely determined by the quality of the industry input.

In general the biosolids and reclaimed water *Guidelines*:

- ◆ encourage the beneficial use of reclaimed water and biosolids
- ◆ set performance objectives for the beneficial use of reclaimed water and biosolids
- ◆ establish the obligations of the supplier and user of reclaimed water and biosolids
- ◆ establish quality gradings (classifications) for reclaimed water and biosolids for specific uses
- ◆ specify appropriate treatment processes and surrogate indicators to meet the appropriate quality grading
- ◆ identify appropriate measures for site selection, application and management
- ◆ specify appropriate monitoring, reporting and auditing programs

The Victorian *Guidelines* complement the draft ANZECC *National Biosolids Guidelines* (1997) and the *Guidelines for Sewerage Systems – Use of Reclaimed Water* (1999), prepared as part of the National Water Quality Management Strategy. The *National Guidelines* establish an Australia wide framework for biosolids and effluent management and are intended to be accompanied by state Guidelines, which will interpret the National Guidelines in the light of local conditions.

6.0 CONCLUSION

EPA has established a management framework to encourage the reuse of effluent and biosolids from wastewater treatment plants. BPEMGs form a key part of this framework, by setting out EPA's performance objectives for reuse schemes.

The BPEMGs for reclaimed water and biosolids reuse are part of a series of BPEMG publications. There are currently nine in the series, covering industries from dairy processing to printing, and several more are in preparation. The BPEMGs are intended to assist industry to better manage its own environmental performance, as an alternative to the more traditional regulatory approach, which relied on detailed, prescriptive controls. EPA continues to review and develop BPEMGs as part of a broad program to work cooperatively with industry, which includes environmental management systems, environment management plans, cleaner production and waste minimisation initiatives and industry waste reduction agreements.

7.0 REFERENCES

Environment Protection Authority (1998) *Industrial Waste Strategy – Zeroing in on Waste*. Publication 537, Melbourne

Environment Protection Authority (1999) *Guidelines for the Use of Reclaimed Water*, Best Practice Environmental Management Series, Publication 464, Melbourne

Environment Protection Authority (1999) *Draft Guidelines for Biosolids Management*, Best Practice Environmental Management Series, Melbourne

ANZECC, ARMCANZ, NHMRC (1999) *Guidelines for Sewerage Systems – Use of Reclaimed Water*

ANZECC