



**DETAILED TECHNICAL  
SUBPROJECT RESEARCH REPORT**

**ON**

**ARC CORROSION & ODOUR  
LINKAGE PROJECT  
LP0882016**

<b>Sub-project Title</b>	Development of Operational Strategies and User Guidelines for Ventilation		
<b>Sub-project No.</b>	SP4	<b>Date</b>	11/02/2011



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## **1.0 SUMMARY OF RESEARCH ACTIVITIES TO DATE**

### **1.1 Activities Completed**

#### **1.1.1 Activities Completed Previously**

- Completion of second round of field testing at Water Corporation sites
- Collation of sampling results for all sites
- Analysis of results from Water Corporation's Beenyup outfall sewer to determine whether it can be used for air/liquid drag characterisation
- Commencement of the forced ventilation guidance
- Teleconference with Sydney Water regarding supply of field data for internal purposes.
- Collation of field data into clear spreadsheets for distribution to all participants
- Analysis of sampling data from SA Water sites to determine whether it will be useful in air/liquid drag characterisation
- Development of the forced ventilation guidance tool into a draft form along with user instructions.

#### **1.1.2 Activities Completed This Reporting Period**

- Revision of the calculation process in the Ventilation Tool.

### **1.2 Activities In Progress**

- The final report detailing the literature search, experiments, results, and conclusions.
- Final versions of the ventilation guidance tool and user instructions.

### **1.3 Deviations from Agreed Research Plan**

- The project will be completed ahead of contract schedule.

## **2.0 VENTILATION TOOL – MODIFICATION OF CALCULATION PROCESS**

Towards the end of this reporting period, tests of the Ventilation Tool concluded that the calculation routine should be revised to make it easier for a user to apply. Originally the user adjusted pressure values to guide the Tool to providing a converged solution in an iterative process. It has been determined however that a more robust and easier execution of the Tool can be achieved if the user instead adjusts ventilation values to reach the converged solution.

This finding has required late changes to the Tool and User Manual. Whilst the delay is not ideal, of course the outcome will be a stronger and improved Tool.

A general finding arising from this development is that where iterative processes are applied in which there are as many parameters as there are in ventilation systems, there will be variants on the approach that can be taken to implement calculations to define the system, each with differing strengths of useability. There is no easy way though to identify which is the most optimum implementation except to create and trial routines.

### **3.0 IMPLICATIONS FOR INDUSTRY**

No new implications for industry have been identified. The findings below have been reported previously and still remain valid.

In a previous Detailed Technical Subproject Research Report (27 January, 2010), the forced guidance ventilation tool was found to be significantly better than the Pescod & Price equation currently in use for a natural ventilation condition – the Beenyup Outfall Sewer. The SP4 Quarterly Progress Report in April 2010 reported that the tool was able to predict forced ventilation for Bolivar Trunk Main in the same range as the observed values, proving it to still be a much better alternative.

Such outcomes indicate that the tool will eventually become the preferable option for industry for its key advantages:

- it is more accurate than other methods requiring similar levels of effort;
- costly alternatives such as computational fluid dynamics can be avoided;
- no special skills are needed to run the tool apart from experience with spreadsheets; and
- the tool is robust and easily updated for changes in sewer configuration.

### **4.0 REFERENCES**

SP4 Quarterly Progress Report, 22 April, 2010.

SP4 Detailed Technical Subproject Research Report, 27 January, 2010.