

COST OF FIRE CONFERENCE

WATERS EDGE, PIER ONE, SYDNEY

MAY 29 – 30, 2007

“REDUCING WATER PRESSURE”

WHAT ARE THE IMPLICATIONS?

**Commander Adam Dalrymple
Metropolitan Fire & Emergency Services Board (Melbourne)
May, 2007**

TABLE OF CONTENTS

Introduction	1
Historical Background	3
State Government Policy (Victoria) ~ Our Water Our Future Strategy (2004).....	3
Pressure Management.....	3
Victorian Fire Services / Water Industry Reference Group.....	4
Australian Fire Authorities Council (AFAC)	5
Operational Impacts	6
Determining System Compliance	7
What does this mean?.....	8
What to do if Systems fail/cannot achieve performance?.....	8
Impacts	9
Who is Responsible?.....	10
Conclusion	11

INTRODUCTION

The aim of this paper is to provide an overview and opinion, relative to the practice of reducing the water pressure in reticulated water systems. The opinions given will be based upon the actual liaison with water authorities who provide this service to the various communities throughout the Metropolitan Fire District (Melbourne) and other areas throughout the state of Victoria & Australia.

To facilitate this rationale, an overview will be discussed relative to the principle reasons for the adoption of such a strategy. How this strategy has been communicated to the fire service, industry and the community and what various State & National representative bodies are implementing to augment this position.

From a fire service perspective, this strategy of reducing the availability of water for firefighting may present some issues relative to the overall operational response strategies of the responding fire crews. Such tactical considerations are:-

- availability of reticulated water supplies
- alternative sources of water supply
- effect of pressure reduction on existing installed fire safety systems
- system failure
- resource critical impacts on the fire crews

These issues are not isolated and need to be considered in a holistic light in order to facilitate the direction of Government policy and the associated compliance factors in terms of maintenance of essential safety measures, Australian Standards and Codes of Practice.

What do we do if systems fail and cannot action the desired performance levels?

A number of questions need to be asked.

- Who pays for retrospective compliance?
- What is the potential outcome for insurers?
- What is the outcome for the owner / occupier?
- What is the impact on the State & Water Authorities?

HISTORICAL BACKGROUND

State Government Policy (Victoria) ~ Our Water Our Future Strategy (2004).

This strategy was developed to address a range of issues for the management of water resources across the State of Victoria. The strategy identified the need for a number of water conservation initiatives to ensure a secure water supply could be provided into the future. As part of the implementation of this strategy, the Government has set a water conservation target of a 15% water reduction per capita by 2010.

To achieve the required reduction, a number of strategies have been employed by various authorities which include:-

- education & awareness programs
- leakage reduction programs
- implementation of pressure management to targeted areas

PRESSURE MANAGEMENT

Pressure management is the process by which areas within a supply network are identified as being subjected to excessively high pressures. In an effort to reduce these pressures and therefore minimise the impacts of leakage & pipe bursts, the water authorities reconfigure their supply networks and also install pressure reducing stations. These stations are fitted with automated “smart controllers” that manage the pressure & flow within the pressure grid.

If demand increases within the grid the controllers respond by releasing higher quantities of water to meet the demand.

System reliability is achieved through ongoing maintenance whereby the pressure grids are monitored and this is validated through calibration of Pressure Reducing Valves.

VICTORIAN FIRE SERVICES / WATER INDUSTRY REFERENCE GROUP

The fire services realised that after the deregulation of the Melbourne Metropolitan Board of Works, there had been no regular contact with the water authorities to address issues that have arisen over a period of time of some 10 years. As a result, the fire services began the process of formally establishing a reference group to enable the flow of information between nominated stakeholders where practical issues can be discussed in support of government policy to better facilitate each others requirements and expectations. This group held its inaugural meeting on Tuesday, May 3, 2005 and is represented by the Metropolitan Fire Brigade, Country Fire Authority, Local Government Professionals, Fire Protection Association of Australia, Yarra Valley Water, South East Water, City West Water, Association of Land Development Engineers.

The group developed the Terms of Reference whose principle scope is to:-

- develop stronger relationships & work together to ensure the best outcomes are achieved in terms of fire protection
- to meet on a quarterly basis & discuss issues associated with policy, legislation & government direction
- to facilitate communication between stakeholders, raise awareness & disseminate information to other organisations & within our own organisations
- to identify trends & emerging issues associated with water supply, usage & maintenance
- to identify potential projects & provide direction on the establishment of working parties
- to establish a database of relevant contacts

AUSTRALIAN FIRE AUTHORITIES COUNCIL (AFAC)

AFAC have established a Water – Pressure & Flow Project Group which was formed primarily to negate the need for individual member agencies, being all fire services nationally, to develop positions on this issue in isolation.

The AFAC Council deemed it appropriate that the organisation should support its members in researching the issues and developing sustainable approaches in both the fire service operations and built environments.

The objectives of the project group are aimed at working toward the practical application in two functional areas:-

- the provision of water in publicly accessible reticulated mains for firefighting operations
- the performance of installed fire protection equipment within both new & existing properties in the built environment

The focus areas of the project group are:-

1. Investigate whether a reduction of water pressure & flow is a strategy being implemented through all States & Territories.
2. Research whether programmed pressure & flow reduction is negatively impacting:-
 - firefighting operations
 - the performance of installed fire protection systems in existing building stock (in breach of the design requirements of the Certificate of Occupancy)
 - the cost benefit of installing fire protection equipment in new buildings in accordance with current design standards.

This project group has developed a survey that will enable AFAC to identify where this strategy is being implemented. From the analysis of this data AFAC will research the impacts of the pressure & flow reduction in both the operations & built environments.

OPERATIONAL IMPACTS

A.S.2419.1 (2005) states the minimum water supply pressure “for the fire hydrant system design, to satisfy the required flow for the most hydraulically disadvantaged fire hydrants, shall be based on the residual pressure available to the property from the source of supply at the required flow”.

The Building Code of Australia makes reference to this particular standard and as such the use of external street fire hydrants can be used as the primary and or supplementary hydrant to service a development. The minimum required performance of such hydrants are as detailed in Table 2.2 of the Standard.

TABLE 2.2

MINIMUM FIRE HYDRANT OUTLET FLOW RATES AND PRESSURES

Fire Hydrant Type	Minimum Flow Rate (L/S)	Minimum Required Residual Pressure (kPa)	
		NSW	All other States & Territories
Feed Fire Hydrant Unassisted	10	150	200
Attack Fire Hydrant Unassisted “Internal”	10	250	350
Internal / External at Boost by Fire Brigade Appliance	10	700	700

Where fire hydrants are utilised to provide firefighting coverage to a development they must achieve the criteria set out in the table, otherwise additional systems must be installed to achieve the required pressure and flow rates.

This suggests that the minimum required performance of a street fire hydrant should effectively be 10 L/S @ 150 kPa (NSW) and 200 kPa (all other). With the implementation of a strategy that decreases the available pressures and flows within the reticulated network, emphasis would be to maintain a level of service that compliments the operational requirements of the responding fire service.

Research suggests that not all states are the same and that there is no consistency in the minimum volume and maximum pressure delivered to service different risk profiles.

In Queensland there is a requirement that a minimum flow rate of 30 L/S for industrial areas be supplied in the reticulated water system, this is not the case in Victoria. The effects of this are that there is a reliance on the performance of installed systems within a development. If the design of the system is supplemented or solely based on the unassisted criteria of Table 2.2 of AS2419.1 (2005), fire brigade intervention becomes critical in the overall fire protection strategy.

DETERMINING SYSTEM COMPLIANCE

It has been discussed that installed fire safety systems that are designed to the minimum criteria, may in some instances fail to perform as intended when a pressure reduction strategy has been adopted by the water authorities in an area that is subject to excessive pressure.

To determine compliance it is essential that building owners and managers comply with State legislation in the maintenance of their fire safety systems. The new Maintenance Standard AS1851-2005 sets out the required schedules for the maintenance of fire protection systems although it has not been adopted by the Building Code of Australia.

WHAT DOES THIS MEAN?

Individual systems that have been designed in accordance with a particular standard are required to be maintained. The maintenance of such systems can be referenced in Building Legislation applicable standards or as detailed on the Occupancy Certificate. Currently in Victoria, pre 1997 buildings will be required to undertake an assessment to determine the required maintenance regime, post 1994 the buildings maintenance regime is stipulated on the Occupancy Permit.

The maintenance of fire protection systems will identify system performance and whether system complies with the applicable Australian Standard. This does not imply that the system will not work; it does suggest that it may not be as effective in controlling or suppressing a fire as it was designed to do initially. Once again there may be a reliance on fire brigade intervention.

WHAT TO DO IF SYSTEMS FAIL/CANNOT ACHIEVE PERFORMANCE?

To alleviate the direct risk factors of systems not being able to achieve performance, there is a need to identify what the possible direct and indirect risks may be.

The direct risks are:-

- the potential for injury & life loss to occupants and possibly firefighters
- the loss of building contents
- the loss of the building itself
- business interruption

The indirect risks are:-

- insurers may not pay claims
- possible legal action against the owner/manager of the premises

To minimise or even mitigate such risks it is essential that building owners and managers undertake to employ a maintenance regime that will identify if the fire protection systems are compliant.

If it is identified that systems may fail, consultation with the water authority may lead to a change or modification of their pressure management strategy. Alternatively rectification work may need to be undertaken through an assessment of the fire safety systems in an effort to ensure compliance.

In every instance it is imperative that the building owners and managers contact their water authority to determine whether their site is affected and confirm if the design of their fire safety system can be maintained due to pressure and flow reduction.

Impacts

A major impact of such a strategy that has a direct effect on property developments is the additional costs associated with compliance due to re-design of fire safety systems. In about every case where system performance fails there will be a requirement to install more infrastructure. This could be in the form of static storage, pump sets and or the installation of larger fire mains. From here there is a direct flow on effect in terms of cost as these systems must be maintained.

New developments will require that the water authorities data be managed and be accurate, in order for the design of fire safety systems to reflect the current strategy of the water authority. This in turn may have another direct effect on building design, whereby in an effort to offset or balance the cost of safety, fire engineered designs may impact other systems and construction methods.

For future designs there is a need that developers and the water authorities work together to ensure that:-

- data capture from the water authorities is accurate
- if the pressure management strategy changes, will it effect new developments?
- the design of new fire safety systems reflects the new minimum

WHO IS RESPONSIBLE?

The impacts on fire safety systems has been discussed with an emphasis on direct and indirect risk, the impacts on the building owner and manager and what may be required in the future to ensure compliance.

A number of questions are posed:-

Who pays for retrospective compliance?

What is the potential outcome for insurers?

What is the outcome for the owner/occupier?

What is the impact on the State & Water Authorities?

These questions cannot be answered simply. Each State and Territory has legislation that provides the minimum acceptable levels for community safety. When this is impacted upon the level of compliance do not diminish, who then is responsible for the maintenance of a community standard.

Whatever the outcome, the fire services throughout Australia will continue to provide exemplary service and employ fire brigade intervention activities as required. This activity along with strict adherence to the maintenance of fire safety systems will go a long way to maintaining the community standard.

CONCLUSION

This paper sets out to address the issues associated with the impacts of pressure and flow reduction strategies adopted by water authorities. The discussion focused upon a range of areas from what pressure management aims to achieve and how fire services and AFAC are responding to Government direction.

Pressure management is aimed at reducing the amount of water loss through leakage and pipe burst in areas of excessive pressure. Where this is employed is there a direct relationship between the strategy and the performance of the fire service operationally and to that of compliance with legislation of installed fire protection systems.

Identification of system performance is a key element relative to system maintenance and system compliance. There is a real need for building owners & managers to liaise with the water authorities to identify possible breaches of the legislation & therefore implement remedies to ensure compliance.

The responsibility of system maintenance lies directly with building owners and managers. When this is impacted upon by a change in Government direction, who bears the cost?

- the owner
- the insurer
- the State
- the Water Authority

Until this is tested, the answer is unclear, but there is still a requirement to comply with legislation.