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Report to the Utility Services Committee
From Dan Roberts, Group Manager Operations

Security Review of the Water Group Operations

1. Purpose

The purpose of this report is to overview the security measures in place at the water treatment plants, reservoirs, pumping stations and within the distribution system.

2. Public Excluded

Grounds for exclusion of the public under section 48(1) of the Local Government Official information and Meetings Act 1987 are:

That the public conduct of the whole or relevant part of the proceedings of the meeting would be likely to result in the disclosure of information for which good reason for withholding would exist, i.e. not to endanger the safety of any person.

3. Background

The Water Group of the Wellington Regional Council operates and manages the Wellington metropolitan region's wholesale water supply business to provide a quality cost-effective water supply resource in accordance with the following standards as adopted by the Regional Council within the Annual Plan.

Our Water Quality Standards

- The quality of water will continually meet the Ministry of Health's Drinking Water Standards 2000.
- An effective quality management system will be maintained to ensure accreditation under the international quality standard ISO9002.

Our Environmental Standards	All water supply activities will be undertaken in a sustainable environmental manner according to the principles of the Resource Management Act 1991.
Our Customer Service Standards	The Water Group will continue to demonstrate that it has a high standard of customer service. It will provide customers with up-to-date and relevant information as well as listening and responding to their needs.
Our Efficiency Standard	The operational costs of collecting, treating and delivering the metropolitan region's water will be reduced where practicable while maintaining the levels of service as agreed with our customers.
Our Security of Supply Standards	Enough water will be available on a daily basis to meet a 1 in 50 year return period drought situation. Appropriate contingency plans will be in place to cover a major emergency.
Our Ownership and Governance Standards	All necessary steps are taken to ensure that the wholesale water activity remains in public ownership.
Our Health and Safety Standards	<ul style="list-style-type: none"> • The Council is committed to providing and maintaining safe working environments for all staff and others that come into contact with its place of work. • Hazard Management is at the core of the Water Group's Health and Safety Plan. A hazard register is in place at all sites.

Security in its broadest meaning impinges on all the standards identified above.

The Water Group has always been concerned as to the security of its installations, and the welfare of its staff, and has regularly carried out hazard assessments at the various installations.

A Hazard assessment process was also initiated during the run up to Y2K and various works were initiated at that time.

4. **Incident Management System**

A comprehensive Incident Management System was issued in November 2000 covering all incidents and hazard events occurring within the geographical area in which the Water Group operates.

These incidents include:

- Loss of Communication

- Interruptions to supply because of:
 - (a) Mains Burst
 - (b) Loss of Power
 - (c) Flooding
 - (d) Fire
 - (e) Explosion
- Detection of *Giardia/Cryptosporidium*
- Contamination of:
 - The water source
 - The treatment plants
 - The distribution system
 - Aquifer
 - Chemicals
- Earthquake
- Tsunami
- Bomb threat or sabotage
- Unusual occurrence/emergency conditions at Te Marua Lakes.

Following the incidents in America on 11 September 2001, assessments of our readiness to respond to terrorist activities have also been undertaken. We are now in a position to report on security measures in place and proposed within the operation of the water system.

5. International Best Practice

The United States Government is leading the way in the preparation of response plans to potential terrorist, man-made or natural emergencies.

5.1 Introduction

In April 2002, the EPA in America published a paper entitled *Guidance for Water Utility Response Recovery and Remediation Actions for Man-made and/or Technological Emergencies*. Excerpts from this paper include:

The Environmental Protection Agency in America has been given the responsibility, under Presidential Decision Directive, to work with the water sector to provide for the protection of the nation's critical water infrastructure including the systems used to collect, treat and distribute potable water. These critical infrastructures are fundamental to the public health and welfare and are subject to both natural disasters such as floods and earthquakes, and man-made hazards such as terrorist attacks.

In October 2001 the EPA established an internal Water Protection Task Force to provide guidance in the protection of public health and critical water infrastructure affected by five different incident types, namely:

- (1) Threat of an actual intentional contamination of the water system.*
- (2) Threat of contamination at a major event.*
- (3) Notification from health officials of potential water contamination.*
- (4) Unauthorised access through SCADA system.*
- (5) Significant structural damage resulting from an international attack.*

5.2 Development

Each incident type is assessed for the potential impact on water system operations and public safety to identify the minimum actions for each element of the water system to consider taking in response to the incident, recover from the incident and to remediate the impacts of the incident. Where applicable each incident type is assessed as if it had occurred separately at each of the system elements and the potential impacts were assessed upstream and downstream of the incident location. Additionally the guidance was developed considering the response needs of large medium and small water systems.

5.3 Structure

The guidance provides recommended actions in the categories of response actions, recovery actions and remediation actions in separate tables for each incident type. Each of these categories contains a section on notification and utility action. Where applicable, specific actions for each element of the water system are provided under the utility action section of the guidance.

5.4 Response Planning

This response, recovery and remediation guidance to international acts can be used to supplement existing water utility emergency operation plans. EPA recommends that established policies and procedures contained in existing plans can be used to the maximum extent while incorporating the recommendations in this guidance.

5.5 Notification Considerations

Water utilities that have established notification procedures should use them as the starting point for developing broader notification procedures.

The notification procedures developed should include specific agency names and contact numbers on a 24-hour basis.

An intentional act to disrupt the operations of a water utility or to jeopardise public health is a criminal act.

5.6 **Sampling**

The results of sample analysis after a threatened or actual contamination event can serve a critical role in determining response recovery and remediation actions assessing the potential impacts of the contamination and providing data for eventual prosecution.

6. **Review**

Comparisons have been made between the Water Group's Incident Management System 2000 (IMS) and the Guidance produced by America's Environmental Protection Agency in 2002 and it is reassuring to note that procedures included within the IMS mirror the recommendations identified within the guidance notes.

There are however specific actions included within the guidance notes which are not included within the IMS. It is not believed that these specific actions should be included as they are actions which are included within the normal day-to-day decision process or will be taken once the emergency management group has been established following the escalation of an incident.

7. **Notification**

Following the escalation of an incident when the emergency management group has been established the Incident Management System identifies a list of agencies that are to be notified. This list is totally in accord with the advice given within the EPA guidance notes.

8. **Vulnerability Assessment**

The Incident Management System adopted by the Water Group identifies the response strategy to the incidents that impact on the quality and quantity of water as supplied to our customers. The quality of the water supplied from our treatment plants and within the distribution system is routinely monitored and provisions are in place to respond to any deviations from the norm.

9. **Treatment Plants**

The Water Group operates four water treatment plants situated at:

- Te Marua
- Wainuiomata
- Waterloo, and
- Gear Island.

Any recorded deviation from accepted quality requirements of the water produced from these treatment plants initiates an automatic shutdown of the plant. These quality parameters are based on the usual problems associated with treatment of water abstracted from a river or from the aquifer.

Any contamination of the water supplied due to the introduction of chemical or biological substance is difficult to detect by routine analysis procedures until the nature of the additive is suspected. It is therefore difficult, if not impossible, to identify the possibility of any substance being introduced into the water to be treated. This can only be detected by acknowledgement of forced entry into the treatment plant, which must then be fully investigated.

Access into the treatment plant buildings is alarmed and notification alerted to the relevant security firm and duty personnel.

All treatment plants are secure buildings or are within fenced enclosures. There are no alarms fitted to the access gates to these enclosures and it is proposed that alarms be fitted with data transmitted via the SCADA system.

10. **Catchment Areas**

One of the possible locations for contamination of the raw water would be for the contamination to be added upstream of the treatment plants.

10.1 **Wainuiomata and Orongorongo Catchments**

Fortunately the Wainuiomata and Orongorongo catchment area is closed with only restricted access permitted to organised parties. The access to the catchment at Wainuiomata is closed by locked gates which are monitored by CCTV. It is proposed that these gates be alarmed and monitored. Access to Reservoir Road is restricted, however it is proposed that the automatic gates be relocated to the gates on the boundary of Wellington Regional Council land.

There is no vehicular access to the Orongorongo catchment, other than through the Wainuiomata entrance and thence via the access track into the catchment. Again there are locked gates to this track and it is proposed that these gates be alarmed and monitored.

10.2 **Te Marua Catchment**

Access into the catchment is restricted because of its geographical location. Access to the Kaitoke intake is only possible through the park and via locked gates. It is proposed that these gates be alarmed and monitored.

The restriction of vehicular access into the catchment will radically reduce the possibility of contamination.

11. Pumping Stations

The Water Group is responsible for the operation of the following pumping stations:

- Te Marua Pumping Station
- Haywards Pumping Station
- Ngauranga Pumping Station
- Johnsonville Pumping Station
- Warwick Street Pumping Station
- Kaiwharawhara Pumping Station
- Karori Pumping Station.
- Randwick Pumping Station
- Pinehaven Pumping Station
- Silverstream Pumping Station
- Kingsley Pumping Station
- Wainuiomata Pumping Station No. 1
- Wainuiomata Pumping Station No. 2
- Thorndon Pumping Station

The following are fitted with intruder alarms:

- Johnsonville
- Wainuiomata No. 1
- Wainuiomata No. 2
- Sar Street Pumping Station.

All pumping stations will be fitted with intruder alarms connected to the SCADA system.

The operation of all pumping stations is continually monitored through SCADA system.

Any malfunction is automatically alerted through the SCADA system.

12. Reservoirs

The Water Group is responsible for the operation of the following reservoirs:

- Ngauranga Reservoir
- Haywards Reservoir
- Te Marua Treated Water Reservoir
- Wainuiomata Treated Water Reservoir
- Waterloo Treated Water Reservoir.

The points of vulnerability are the access hatches on the roof of the reservoirs.

All access hatches will be alarmed and monitored through the SCADA system.

In view of the risk imposed by unauthorised access into these reservoirs, it has been decided during the recent security review that immediately following any indication of unauthorised access, that the reservoirs will be isolated automatically until an on site inspection has been carried out, and it has been determined that it is safe to bring the reservoir back into service. This decision-making process will be assisted by a sampling regime and therefore during the initial inspection following an incident, a 5-litre sample of the water contained in the reservoir will be taken.

13. **The Distribution System**

The treated water from the water treatment plant is delivered to the four territorial authorities by a network of large diameter pipelines.

An assessment of the vulnerability of the system has been carried out and it has been identified that the critical sections to terrorist attack are the lengths of exposed pipe work that could be subjected to demolition charges. These sections could be easily isolated with repairs carried out using the same techniques as would be used following earthquake damage. Incidents of this nature would be readily detectable either by observation, drop in mains pressure or rapid drop in reservoir level.

The points which could be subjected to contamination through the injection of chemical or biological substances are the numerous hydrant points. It should be noted that this process would have to overcome the high pressures within the distribution and as such it is considered that the risk of this occurring is minimal.

The work necessary to achieve this contamination would be lengthy. It would require specialised equipment to overcome the pressure in the mains. Because of the location of hydrant points on the system, any activity of this nature would be readily visible.

There is currently no known way that chemical or biological substances could be drip fed into the distribution system because of the pressure in the mains.

14. **The Aquifer**

The aquifer is classified as secure with the age of the water contained therein in excess of 12 months old.

The major risk to the aquifer would be the addition of a large quantity of hydrocarbon derivatives in the area downstream of Silverstream Bridge where the Hutt River recharges the aquifer. Even this attempt to pollute the aquifer would have minimum effect – as the discharge of any hydrocarbon derivative would tend to be carried on the surface of the river.

In addition, the quality of water in the aquifer is routinely monitored at various locations to monitor for saltwater intrusion or any deterioration in water quality and pressure.

14.1 **Bore Holes**

Under the requirements of the *Drinking Water Standards for New Zealand 2000* the water from all bore holes is sampled and analysed on a regular basis conforming with the standards laid down by the Ministry of Health.

The bore holes which have produced problems internationally usually abstract water from shallow wells and are subject to ground water intrusion (vis the Walkerton Incident in Canada). The Knights Road bore holes, supplying Waterloo Water Treatment Plant, and those supplying Gear Island Water Treatment Plant, all abstract water at depths in excess of 20 metres from a secure aquifer. The supply to these bore holes is protected by the impervious layer above the aquifer which prevents ground water entering the aquifer and the pressure within the aquifer.

15. **Power Supply**

In the event of an attack on the power supply system the procedures that would be followed are as included in the IMS.

In order to assess our vulnerability it should be noted that prior to December 1999 an assessment of the vulnerability of the operations identified that the main point of risk was the fact that if power failed in the Te Marua area then although we had standby generation to operate the treatment plant it would be impossible to pass sufficient water into the distribution system due to our inability to operate the pumping station. Therefore standby generation was installed at the Pumping Station to enable use to continue to meet basic demand requirements.

Waterloo Water Treatment Plant is the next most vulnerable installation and a proposal will be submitted to increase the size of the standby generator to provide sufficient power to operate the distribution pumps as well as the treatment process of control system as at present. This proposal will include the movement of the existing generator to Gear Island to provide power for pumping and treatment facilities.

It is not believed necessary to provide standby generation at any of the other Water Group facilities. As switchboards are renewed at pumping stations, provision is being made to plug in a portable generator.

16. **Staff**

All staff within the Water Group and senior managers of the Regional Council, together with the Council Chairperson and the Chairperson of the Utility Services Committee, have received copies of the IMS which is a controlled document.

All Water Group staff have received instruction into the operation of the system.

The contents of the document are periodically tested and any appropriate amendments are made to procedures involved.

All operational staff have been advised on what to look for when they respond to an intruder alarm at one of our facilities. They are also fully aware of what procedures to follow when working in isolation. These procedures are included with the Health and Safety Plan. Procedure No. HSP-010 refers.

17. External Contractors and Suppliers

The Health and Safety Plan requires a safety induction prior to commencement of work and therefore all contractors and subcontractors are known to the persons controlling any particular site. Procedure No. HSP-025 refers.

All persons working on any particular site are required to record their presence on site, the reason for being on site and indicate the person whom they are reporting to.

17.1 Chemicals and Hazardous Material

Chemicals and hazardous materials are delivered to the site following placement of an order by the person in charge of the particular facility to which the materials are to be delivered. The procedure to be followed in respect of transportation, delivery and handling is clearly identified within the Health and Safety Plan Procedure No. HSP-017 refers.

Because of the close contact we have with chemical/material suppliers, all drivers are known to us and it is necessary for them to undergo an induction process prior to entry on site as clearly defined within the Health and Safety Plan – Procedures No. HSP-002 and HSP-017 refers.

18. Sampling

An extensive regime of sampling and analysis is in existence within the treatment plants and distribution system. This regime is in accordance with the requirements of the *Drinking Water Standards for New Zealand 2000* and has received approval from the Ministry of Health.

In addition, a sampling and analysis regime is in existence at the bore holes to ensure the integrity and security of the ground water secured in the aquifer. In the event of a major *Cryptosporidium* or *Giardia* outbreak in the area, negotiations are in hand for our Laboratory to receive technical assistance from Watercare and vice versa.

19. **Summary**

Following the above assessment of vulnerability the following actions will be taken. These additional upgrades will be met from existing budgets and completed by 31 March 2003.

19.1 **Catchment Areas**

All access gates as specified within the report will be alarmed and monitored. The automatic gate at Wainuiomata will be moved to the boundary of Regional Council land.

19.2 **Water Treatment Plants**

All access points will be fitted with intruder alarms that will be monitored.

19.3 **Pumping Stations**

All access points will be fitted with intruder alarms that will be monitored.

19.4 **Reservoirs**

All reservoir access hatches will be fitted with intruder alarms. These will be monitored and control systems put in place to provide automatic isolation of the reservoirs in the event of unauthorised access being detected.

20. **Recommendation**

That the report is received and the information and actions noted.

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