

**COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION**

IN THE MATTER OF:)
)
NOTICE OF ADJUSTMENT OF THE RATES OF) **CASE NO. 2004-00103**
KENTUCKY AMERICAN WATER COMPANY)
EFFECTIVE ON AND AFTER MAY 30, 2004)

**DIRECT TESTIMONY OF
BRUCE M. LARSON**

April 30, 2004

1 DIRECT TESTIMONY PRESENTATIING THE SECURITY MEASURES
2 IMPLEMENTED BY KENTUCKY AMERICAN WATER COMPANY
3

4 **I. INTRODUCTION**

5 Q. 1 Please state your name, employer, position, and business address.

6 A. My name is Bruce M. Larson. I am the Director of Security Programs for
7 American Water. My business address is 1025 Laurel Oak. Road, Voorhees, NJ
8 08043.
9

10 Q. 2. Please describe the responsibilities of your current position?

11 A. In my current role at American Water I am responsible for implementing and
12 managing a comprehensive set of security programs across all operations within
13 RWE Thames Water and American Water subsidiary companies globally,
14 including Kentucky American Water Company.
15

16 Q. 3 Please describe your background and professional affiliation.

17 A. I have 18 years experience in the field of security, protecting organizations
18 against attacks on critical infrastructure assets within the water, power,
19 telecommunications, information technology, and chemical industries. I have
20 worked directly for the US Military, US State Department and corporate industry
21 organizations in the assessment of operational risks and the implementation and
22 management of protective systems for high value assets and persons at more
23 than 200 facilities in the United States and other locations abroad.

1
2 I was appointed by the Administrator of the US Environmental Protection Agency
3 (USEPA) as a sitting member of the Water Sector Critical Infrastructure
4 Protection Advisory Committee (CIPAG), established under Presidential
5 Directive, to advise the USEPA on matters related to homeland security within
6 the water and waste water sectors. American Water is a board member of the
7 Information Sharing and Analysis Center for the Water Sector (Water ISAC). The
8 Water ISAC is a secure communications and collaboration environment for Water
9 Sector owner/operators to communicate with the Department of Homeland
10 Security (DHS), peers in the sector, and other sectors on matters relating to water
11 threats facing the Nation. I also serve as staff officer for a member of the National
12 Infrastructure Advisory Council (NIAC)¹. The members of the NIAC are
13 appointed by the President and consist of industry top-executives and others. The
14 council's purpose is to advise the President and DHS on matters relating to
15 securing the Nation's Critical Infrastructures.

16
17 Q. 4 What is the purpose of your testimony in this case?

18 A. I will present the steps taken by Kentucky American Water Company to protect
19 the communities it serves and our employees. I will describe the threat
20 environment that faces the US water industry and the vulnerability assessment
21 process that Kentucky American Water applied to its operations and

¹ <http://www.whitehouse.gov/news/releases/2003/12/20031217-5.html>

1 administrative assets. I will also detail the evolutionary, and incremental,
2 activities Kentucky American Water took before and after 9/11 to meet the threat
3 of terrorism. Finally, I will describe Kentucky American Water's plans to best
4 protect our customers, employees, and business in the future.

5
6 Q. 5 Are you sponsoring any schedules as part of your testimony?

7 A. Yes. I prepared the following schedules to accompany my testimony:

8
9 Schedule 1 Open Source Security Threat Assessments

10 Schedule 2 Department of Homeland Security Threat Advisories

11 Schedule 3 Kentucky American Water Security Costs within this test year

12 Schedule 4 American Water Threat Response Matrix

13 Schedule 5 American Water Security Management Framework

14
15 **II. SUMMARY OF TESTIMONY**

16
17 Q. 6 Please summarize your direct testimony in this case?

18 A. The American Water system and Kentucky American Water had begun planning
19 for the potential of terrorist actions at least since 1999, in large part as a result of
20 Presidential Directive 63 which defined water as a National Critical Infrastructure
21 Sector. This Directive called for the various industry sectors and the Federal
22 Government to coordinate to appropriately posture themselves against terrorist

1 threats. Traditionally, however, the water industry thought of threats to security in
2 terms of natural disasters, accidents and vandalism. Even in light of the
3 Presidential Directive of 1999, the water industry, like so many others in the US,
4 did not fully comprehend the scope, scale or violence of terrorist threats that, in
5 the wake of the events of 9/11, we now realize all too clearly. These events
6 changed the world we live in, sensitizing us to the clear and present threats to our
7 national security posed by terrorism. In light of these threats, KYWAC reacted
8 immediately and responsibly to substantially improve its defensive security
9 posture at critical operations locations. The Company's reaction to the events of
10 9/11 built upon the preliminary planning for security measures that had already
11 been developing since 1999. After 9/11, the American Water system, and
12 Kentucky American Water, began to enhance protection of its facilities,
13 customers and employees. Kentucky American Water embarked upon an
14 extensive analysis of its system to assess vulnerabilities and to identify and
15 implement the most effective and efficient means to protect the system in the
16 medium and long term. This remains an ongoing process as more information on
17 the nature of terrorist threats is obtained, technology develops and we gain more
18 experience and knowledge in meeting and assessing the threats. The actions
19 Kentucky American Water took during each step of this process were prudent,
20 reasonable and necessary in light of the circumstances and information known at
21 the time. In like manner, the future security plans are prudent, reasonable,
22 necessary and consistent with prevailing industry standards to the extent they
23 exist today. I will describe these actions in detail later in my testimony.

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III. THREAT TO THE WATER SECTOR

Q. 7 Please describe historic and post 9/11 threats the water sector in the United States faces.

A. The water sector has historically faced threats ranging from nature to vandalism to accidents. Traditional threats have evolved over time and water utilities have been able to keep pace with the threat by employing mitigation strategies learned over a period of years. Prime examples of this are the development of planning and engineering processes to meet or exceed the potential operational impact from floods or loss of principal power service. These threats have been defined in a consistent manner across the industry, their effects can be predicted with historical experience and the low impact or long periodicity allow for slow, deliberate implementation of mitigating countermeasures. The threats of traditional criminal acts and vandalism can equally be anticipated and planned for. The ability to look retrospectively at the impacts from previous occurrences of these threats allows common criteria for describing them within the context of “design bases”. These design bases allow for utilities to assess the consequences from the threats and to engineer appropriate countermeasures to limit their impact or occurrence.

In retrospect, the scope, scale and viciousness of potential terrorist threats to the US water sector was not fully understood until the world changed on 9/11. The

1 reactions of Kentucky American Water, and the nation as a whole, reflect the
2 ultimate realization of a scope and scale of attack simply not anticipated prior to
3 9/11. Furthermore, it is generally considered that the impact of a potential attack
4 simply cannot be accepted. The water sector had very little internal experience in
5 addressing this new level of threat. Nevertheless, the potential for massive,
6 unprecedented harm required prompt, expeditious action, even without perfect
7 information.

8
9 Immediately after 9/11 the nation and Kentucky American Water undertook a
10 robust reassessment of what the terrorist threat meant to the US water industry. A
11 sense of urgency and a new vision of what terrorists might be planning against the
12 sector resulted in many utilities across the US taking immediate measures to
13 protect their critical assets and customers from a scale of threat never before
14 envisioned. We now know that terrorists have been planning methods to interrupt
15 the service of national critical infrastructures including water, employ weapons of
16 mass destruction (WMD) to effect catastrophic loss of life, release hazardous
17 chemicals from storage facilities resulting in WMD like effects, and to poison
18 drinking water systems with the intent of killing the customers served with tainted
19 drinking water. Schedule BML – 1 shows some examples of the credible threats
20 posed against the water sector. Schedule BML-2 shows further threat references
21 from DHS and USEPA.

22
23 Q. 8 What threats has Kentucky American Water assessed as being valid against its

1 operations?

2 A. The security threats posed to Kentucky American Water at the present time
3 include the following:

- 4 • Contamination of the water supply with the intent to kill consumers.
- 5 • Release of hazardous chemicals used in the treatment of drinking water from
6 Kentucky American Water facilities with the intent to kill persons in the
7 communities surrounding our facilities;
- 8 • Interruption of water service to a significant portion of the customers served
9 by Kentucky American Water by destroying or disabling critical assets;
- 10 • Loss of service of a dependant sector resource (e.g. interruption of power
11 service or supply of essential chemical products used in the treatment
12 process);
- 13 • The collateral effects of a WMD being employed near our operations
14 facilities posing immediate danger to our employees and denying Kentucky
15 American Water personnel access to operations facilities for an extended
16 period of time;
- 17 • Gaining unauthorized access to automated process control and remote
18 systems control computer systems with the intent to interrupt service or
19 conduct other malicious actions;
- 20 • Arson;
- 21 • Theft of valuable and/or critical assets;
- 22 • And, Vandalism of our remote facilities.

1
2 These threats could be effected by outsiders (terrorists or criminals), or by
3 insiders (persons infiltrating Kentucky American Water posing as employees).
4 Some of the threats can be directed at Kentucky American Water from remote
5 locations (computer attack across the network), others require physical presence
6 at or near the facilities to have an impact. While these threats are valid today, they
7 may change over time. We will continue to depend upon Federal and State
8 Government organizations and our own experience to assist in assessing valid and
9 appropriate threats to Kentucky American Water.
10

11 **IV. POST 9/11 SECURITY MEASURES**

12 Q. 9 Would you generally describe Kentucky American Water's security responses
13 post 9/11?

14 A. Yes. Immediately following 9/11, Kentucky American Water implemented a
15 series of security enhancements that included security guards, additional water
16 quality sampling, and various facility improvements (see BML Schedule 3). It
17 also began an in-depth and on-going threat and vulnerability assessment.
18 Terrorism was defined as the most catastrophic potential threat. Following 9/11,
19 the Homeland Security Advisory System was set and maintained at threat
20 condition "yellow" or higher. Therefore, Kentucky American Water
21 appropriately determined that "yellow" or "elevated" was the operating threat
22 level at which Kentucky American Water would routinely operate, while being
23 prepared to respond to higher threat levels. In line with this threat level,
24

1 Kentucky American Water took actions that included, but were not limited to, the
2 following:

- 3
4 • On September 12th 2001, Kentucky American Water contracted to deploy
5 off-duty law enforcement officers at operations facilities. This
6 deployment was intended to bring the very best possible security guard
7 force to bear against the threat.
- 8 • By September 14th 2001, American Water Corporate Center had
9 collaborated across the water industry, Federal Government and the other
10 subsidiaries of American Water to identify a set of best practices that
11 could further protect our critical assets beyond the capabilities of a guard.
12 These actions included restricting access to our facilities and taking
13 significant measures to harden our assets.
- 14 • With these initial controls in place, American Water established a central
15 security organization responsible for continually assessing the threat
16 environment and developing appropriate near and mid-term plans to
17 implement comprehensive security measures consistently across all
18 American Water operations.
- 19 • The first near-term processes initiated were formal vulnerability
20 assessments across all facilities. We found that there were similar
21 vulnerabilities, consequences and risks at many facilities. The ability to
22 assess consistent threats across disparate operating environments, allowed

1 development of a flexible set of common best practices that could be
2 employed against potential threats.

- 3 • In March of 2003, the Vulnerability Assessment (VA) for Kentucky
4 American Water was completed in accordance with Section 1433(a)(1) of
5 the Safe Drinking Water Act as amended by the Public Health Security
6 and Bioterrorism Preparedness and Response Act of 2002 (P.L. 107-188,
7 Title IV Drinking Water Security and Safety).
- 8 • In June 2003, an aggressive capital deployment and operational training
9 program was initiated across 104 American Water system including
10 Kentucky. This security initiative utilized findings from the 100+ VA's
11 American Water conducted to deploy consistent risk controls, thereby
12 leveraging best practices and common procurement savings through out
13 the system.

14
15 The above processes bring layered security precautions, including robust
16 operational practices and emergency response capabilities, appropriate to best
17 protect specific assets from terrorist acts. These measures provide a
18 comprehensive interwoven suite of protective measures, which are under constant
19 review to ensure that they remain effective and appropriate as the threat
20 environment changes over time – see Schedule BML-4. This ongoing review
21 process will utilize the experiences and threat assessment capabilities across the
22 entire American Water and RWE Thames Water Systems and will ensure that the

1 most appropriate security measures are employed to mitigate the threats in a cost
2 effective manner.

3
4 Q. 10 Can you more specifically describe the actions Kentucky American took to
5 harden its facilities and improve the security of its operating procedures?
6

7 A. Yes. These actions include but are not limited to the following:
8

- 9 ● **Fencing and barriers.** Kentucky American Water installed fencing and
10 barriers around all operations facilities to delay human intrusion. In addition,
11 to prevent surprise attacks against critical facilities using vehicles, barriers
12 were placed around critical production and distribution facilities.
- 13 ● **Lighting.** Enhanced lighting was added to further deter clandestine
14 reconnaissance and entry onto Kentucky American Water facilities.
- 15 ● **Testing/water quality monitoring.** Immediately following 9/11, testing and
16 inspection for chlorine, pH, turbidity, biotoxins, color and odor were increased
17 to daily or multiple times daily. To the maximum extent practicable,
18 investments were made in infrastructure and technology to make testing for
19 chlorine, pH and turbidity continuous or automated under the control of
20 SCADA staff. More frequent inspections of remote and unmanned facilities
21 by Kentucky American Water staff were established as routine. Where
22 automated testing was not feasible, testing was performed manually.

- 1 • **Intrusion detectors and alarms.** Intrusion alarms were installed on exterior
2 and some interior doors, and motion detectors were installed at various points
3 around and within critical facilities.
- 4 • **Physical access controls.** Access controls using a combination of locks,
5 welds and physical alterations were installed on critical storage and
6 distribution facilities.
- 7 • **Automated access control.** A system of controlled access to verify the
8 identity of all Kentucky American Water and security staff, contractors and
9 visitors was established for all critical facilities.
- 10 • **Personnel reliability.** A system of background screening was initiated for all
11 Kentucky American Water operations and management personnel to provide
12 for enhanced personnel reliability.
- 13 • **SCADA Protective Measure.** Robust and effective security controls for both
14 logical and physical access to Kentucky American Water SCADA systems
15 were implemented to mitigate the possibility of unauthorized access to these
16 critical control systems.
- 17 • **SCADA system monitoring.** Where appropriate, facilities were placed under
18 SCADA control to provide continuous monitoring, control, and effective
19 alarm mechanisms should a parameter threshold be exceeded. Operating
20 procedures were developed to define the form of immediate response the
21 supervisor must make depending on the severity of the alarm.

- **Security Hotline 800 telephone number.** American Water established a statewide toll-free number and posted signs encouraging citizens who see suspicious activity or had security concerns to call and advise Kentucky American Water. Information from such calls is made available to local and senior Kentucky American Water operations staff.

Q. 11 Would you please discuss the company use of security guards after 9/11?

A. Yes. In the direct aftermath of 9/11, Kentucky American Water needed to take immediate action to enhance the security of its operations, in an environment where the full extent of terrorist threats to the Country or potentially Kentucky American was not known. To best respond to this threat Kentucky American Water retained the services of off-duty law enforcement officers through the Lexington Police Department to protect critical facilities from terrorist attack and other improper human intrusion. Using off duty law enforcement officers provided a number of advantages. These include arrest authority and a direct and continuous connection with the community's public safety response system. Kentucky American Water utilized local law enforcement officers for its treatment plants in Lexington area and other facilities that were considered critical to maintaining service to the Lexington area and to protecting our customers.

In April 2002, Kentucky American transitioned from retaining the security guards through the Lexington Police Department to utilizing a management firm to serve

1 as an intermediary. There were a number of reasons for this. First, the
2 administrative burden on the Department because too great and it indicated it
3 could no longer continue to coordinate these efforts. For basically the same
4 reasons, Kentucky American Water concluded that scheduling and otherwise
5 coordinating the more than 300 law enforcement officers that, over time, were
6 involved in protecting critical facilities would result in an unacceptable
7 administrative burden on Kentucky American. Second, use of a management
8 company helped to mitigate potential liability issues for Kentucky American in
9 the event of some unfortunate incident involving the guards. However, Kentucky
10 American Water personnel worked closely with the management firm to
11 familiarize contract personnel with its facilities and security protocols and to
12 define responsibility. This approach to obtaining contract services was essential
13 based upon Kentucky American Water's need to act quickly in the post 9/11
14 period and due to the size and geographic extent of Kentucky American Water's
15 operations.

16
17 Q. 12 In securing the services of off duty law enforcement officers, did Kentucky
18 American engage in competitive bidding?

19
20 A. No. Kentucky American determined that the training, background, connections
21 with law enforcement agencies and other attributes of off duty law enforcement
22 officers could not be matched by conventional security services in the area and
23 provided the best security for the company's system and customers. In the

1 aftermath of 9/11, competition for the services of these officers was intense, as
2 numerous entities sought to protect their critical facilities from potential terrorist
3 attack. Competitive bidding in these circumstances was not practicable.

4 5 **V. VULNERABILITY ASSESSMENT METHODOLOGY**

6
7 The vulnerability assessment performed for the Kentucky American Water
8 system utilized current security assessment models and assessment tools
9 provided by the USEPA and Sandia National Laboratories. Both utilize a
10 performance-based assessment methodology which focuses on assessing the
11 effectiveness of security controls in preventing or limiting the scale of impact
12 from threats. This assessment utilizes a risk equation of $R=C*V*P$, where C
13 represents the consequences of the event, V is the assessed vulnerability against
14 the threat, P is the probability of the event occurring, and R is the product of the
15 other variables, resulting in a numeric risk value. Potential security threats
16 against storage, production and distribution facilities and operations were also
17 assessed using the Risk Assessment Methodology for Water² (RAM-W),
18 developed by Sandia National Laboratories. Utilizing these assessment
19 methodologies, Kentucky American Water employed the Vulnerability Self
20 Assessment Tool³ (VSAT) developed by the USEPA and the American
21 Metropolitan Sewerage Association (AMSA) to make the assessment process

² <http://www.awwa.org/education/seminars/index.cfm?SemID=13>

³ <http://www.vsatusers.net/>

1 consistent and easily repeatable. All American Water systems, as well as
2 thousands of other systems around the country, utilize the VSAT tool which
3 allows all of them to directly and consistently assess the effectiveness of
4 potential countermeasures. Most significantly, the VSAT assesses potential risk
5 reduction opportunities both in terms of the effectiveness of the countermeasures
6 in reducing risk and with regard to cost effectiveness. Marrying the methodology
7 of RAM-W with the VSAT assessment tool results in consistent assessments
8 across all of the American Water system, allowing for repeatability of the
9 process and deployment of finite resources in the most effective manner.

10
11 Q. 13 When was the vulnerability assessment conducted for Kentucky American
12 Water?

13 A. Kentucky American Water was in the process of conducting a detailed
14 vulnerability assessment even before 9/11, based on the threat parameters and
15 best practices which were generally recognized at that time. The vulnerability
16 assessment was completed in March of 2003.

17
18 **VI. SECURITY PLANNING**

19 Q. 14 Please generally describe the current security plans of Kentucky American
20 Water to mitigate the threats identified in the vulnerability assessment?

21 A. Current plans and preventive countermeasures within Kentucky American Water
22 are based upon the following security principles:

- 1 • Detect - The ability to detect adversaries' actions while conducting a
2 malicious act (e.g. an alarm system);
- 3 • Delay – Countermeasures deployed to delay an adversary from conducting
4 the malicious act (e.g. hardened door with strong lock);
- 5 • Assessment - The ability to assess the nature of the threat and the
6 appropriate emergency response procedures (e.g. video cameras to assess
7 critical assets or water quality monitors);
- 8 • Response – The ability of the utility to implement response procedures to
9 limit the likelihood that the attacker will realize the maximum potential of
10 his actions (e.g. call the police to respond to an intrusion);
- 11 • Recovery – Actions taken to return the system to normal operations (e.g.
12 disinfect distribution system after a contamination event);
- 13 • Event Learning – A formal learning process conducted after any event to
14 ensure that all possible lessons from that event are learned and that security
15 procedures are adjusted to avoid a future event.

16
17 This framework for security planning is at the core of each action Kentucky
18 American Water is taking to mitigate the impact of potential threats to the
19 system.

20
21 While concerns remain high in 2004 for such attacks, significant national,
22 state, Kentucky American Water and American water efforts have been

1 made to conduct threat and vulnerability assessments and to develop
2 enhanced and integrated security plans that include security guards, technical
3 security, facility hardening, enhanced planning and establishment of
4 personnel reliability programs. Each of these improvements is insufficient in
5 and of itself to prevent terrorist attacks.

6 However, when integrated and targeted against specific threats to reduce
7 specific vulnerabilities, there is a substantially enhanced probability of
8 detecting, deterring and /or delaying a terrorist attack.

9
10 Q. 15 Was any grant money available to defray any portion of Kentucky American
11 Water's security costs?

12 A. No grants or other funding has been appropriated to defray either the capital costs
13 or operating expenses Kentucky American Water incurred and is incurring for its
14 security program. The Federal government appropriated funds, to be distributed as
15 grants, to defray a portion of the costs of preparing vulnerability assessments for
16 systems serving populations of 100,000 or more. The maximum amount any one
17 system could obtain was \$110,000, but could be less. The grant monies could only
18 be used within a very strict set of parameters. These included the preparation of
19 the mandated vulnerability assessment, review of the Emergency response Plans,
20 taking into consideration the output of the vulnerability assessment, and for
21 planning efforts to improve security at the utility. None of the grant funds could
22 be used for any implementation of security controls, nor would the funds
23 available have been anywhere close to meeting these needs. The grant funds

1 were also not available for the expenses incurred prior to the award of the grant to
2 the utility. Kentucky American Water had already completed 95% of the effort
3 for which grant monies would have been available, prior to the time the company
4 could have applied for the grant.

5
6 Q. 16 Will you discuss the processes that Kentucky American Water will employ to
7 provide continual review and appropriate modifications to its security program?

8 A. Kentucky American Water continues to implement security changes consistent
9 with findings of the vulnerability assessment and an increasing understanding,
10 based on experience, of deploying a layered set of responses designed to be most
11 effective against the potential threats. Kentucky American Water will also
12 continue to leverage the most appropriate and cost effective technology and
13 operations solutions that become available. Many desirable pieces of technology
14 that Kentucky American Water wants to deploy do not currently exist. American
15 Water is sponsoring research programs with USEPA, other industry organizations
16 and academia to develop pieces of technology that will provide additional
17 comfort. Security guard levels and deployment have been assessed as a part of
18 the security improvement initiatives. Extensive use of qualified security
19 personnel was entirely appropriate in the aftermath of 9/11 when vulnerability
20 assessments were not complete and there was little or no experience in dealing
21 with the scale of threat the events of 9/11 introduced. Completion of the VA's,
22 developing technology and increased experience acquired over time, however,
23 eventually allowed the company to reduce its reliance on security personnel while

1 maintaining comparable or better levels of protection.

2
3 Q. 17 Can you describe the American Water Security Risk Management Framework?

4 A. In order to best bring a consistent level of protection through consistent
5 assessment of the threats facing our utilities and to guide robust appropriate
6 remediation programs, American Water has established a Security Risk
7 Management Framework – see Schedule BML-5. This framework allows
8 American Water subsidiaries to quickly attain a reasonable operating baseline,
9 retain flexibility to respond to changes in the security environment, and to
10 implement security measures based upon design bases threats. The framework
11 provides engineering and operational standards and encourages qualified
12 external validation of the security measures.. Lastly the framework requires
13 ongoing assessment of the utility’s security posture against the changing threat
14 environment, thus allowing for an appropriate evolution of security systems
15 that can be better forecasted and budgeted for.

16
17 In the near future the water sector will establish a single body to facilitate
18 coordination with the Federal Government on security matters and a common
19 approach to securing water assets across the US. This body is the Water Sector
20 Coordination Board (WSCB). The WSCB has been formed per Presidential
21 Directive #7 (HSPD-7).⁴ The WSCB will be currently conducting working
22 groups to develop the American Water framework into a process that is effective

1 across the industry regardless of utility size, source of supply, process, or
2 geography. The DHS has also reviewed the framework and will be working
3 with the WSCB to best integrate selected practices from other sectors into it.
4 (How do we know the WSCB will use our framework?)

5
6 Q. 18 Can you describe how Kentucky American Water and American Water have
7 benefited on matters of security from their relationship with Thames Water and
8 RWE?

9
10 A. American Water has directly benefited from relationships with Thames Water
11 and RWE AG in that both organizations have business interests and
12 operational facilities around the globe. Many of the facilities are located in
13 extremely hazardous environments, such as: Indonesia, the People's Republic
14 of China, and South Africa. RWE Thames Water has been vigorously
15 pursuing effective counter terrorist measures to protect these facilities,
16 operations, and employees for over eighteen years in direct participation with
17 the British government. RWE Thames Water has had terrorist acts conducted
18 against their operating facilities in the United Kingdom and has had several
19 major natural disasters requiring large-scale response measures. RWE
20 Thames Water has hosted conferences and training sessions in security and
21 has afforded American Water personnel the ability to review the operational
22 procedures and physical security measures that have been employed in RWE

⁴ <http://www.dhs.gov/dhspublic/display?theme=9&content=3445>

1 Thames Water facilities over 2 decades. Leveraging their experiences has
2 allowed American Water and Kentucky American Water to develop a
3 comprehensive security strategy and program.

4

5 Q. 19 Does this conclude your prepared testimony?

6 A Yes, it does.

OPEN SOURCE SECURITY THREAT ASSESSMENTS

The Vulnerability of Drinking Water Supplies to Intentional Contamination



Alan K. Burnham

Presented to the 95th CST

May 19, 2003

Lawrence Livermore National Laboratory, Livermore CA 94550

This work was performed under the auspices of the U.S. Department of Energy by the University of California, Lawrence Livermore National Laboratory under contract No. W-7405-Eng-48.

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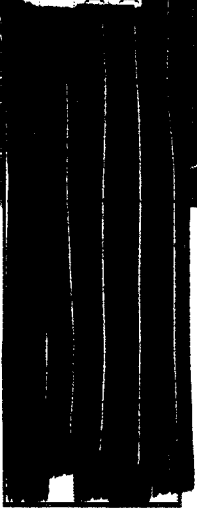
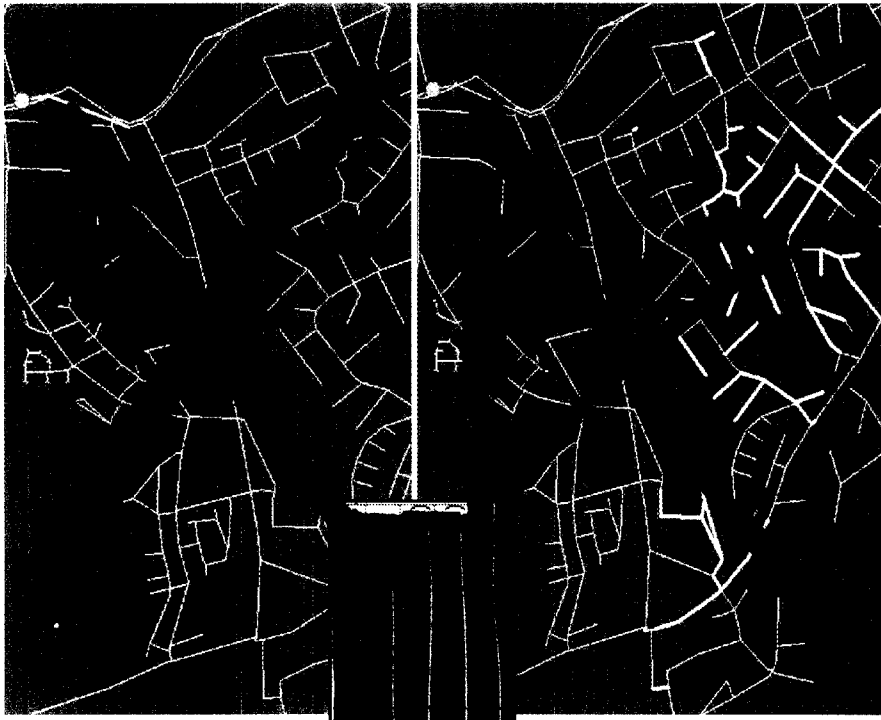
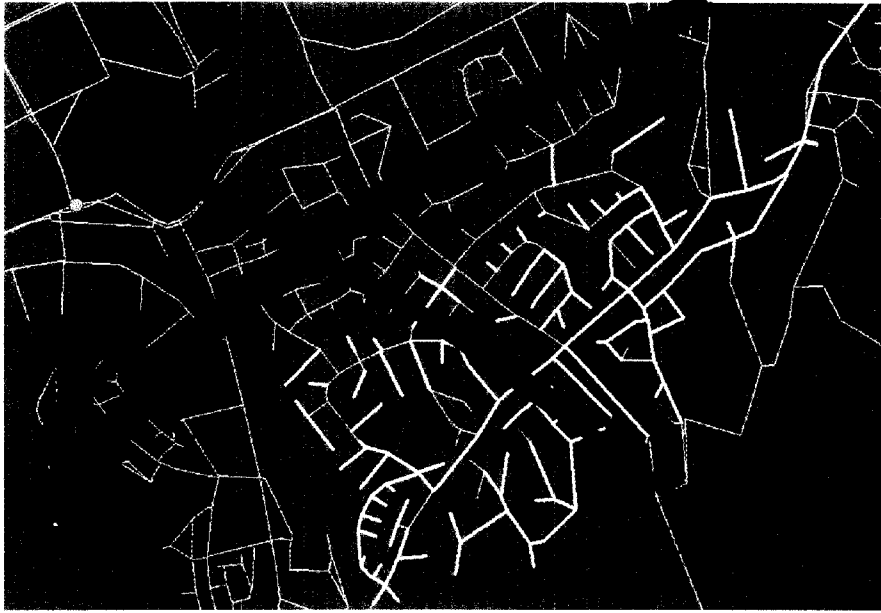
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Calculations by
R. Bahadur & W.
Samuels, SAIC,
McLean, VA



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**DEPARTMENT OF HOMELAND SECURITY
THREAT BULLETINS**

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**KENTUCKY-AMERICAN WATER COMPANY
SECURITY COSTS WITHIN THE TEST YEAR**

**Kentucky American Water
Security Related Costs**

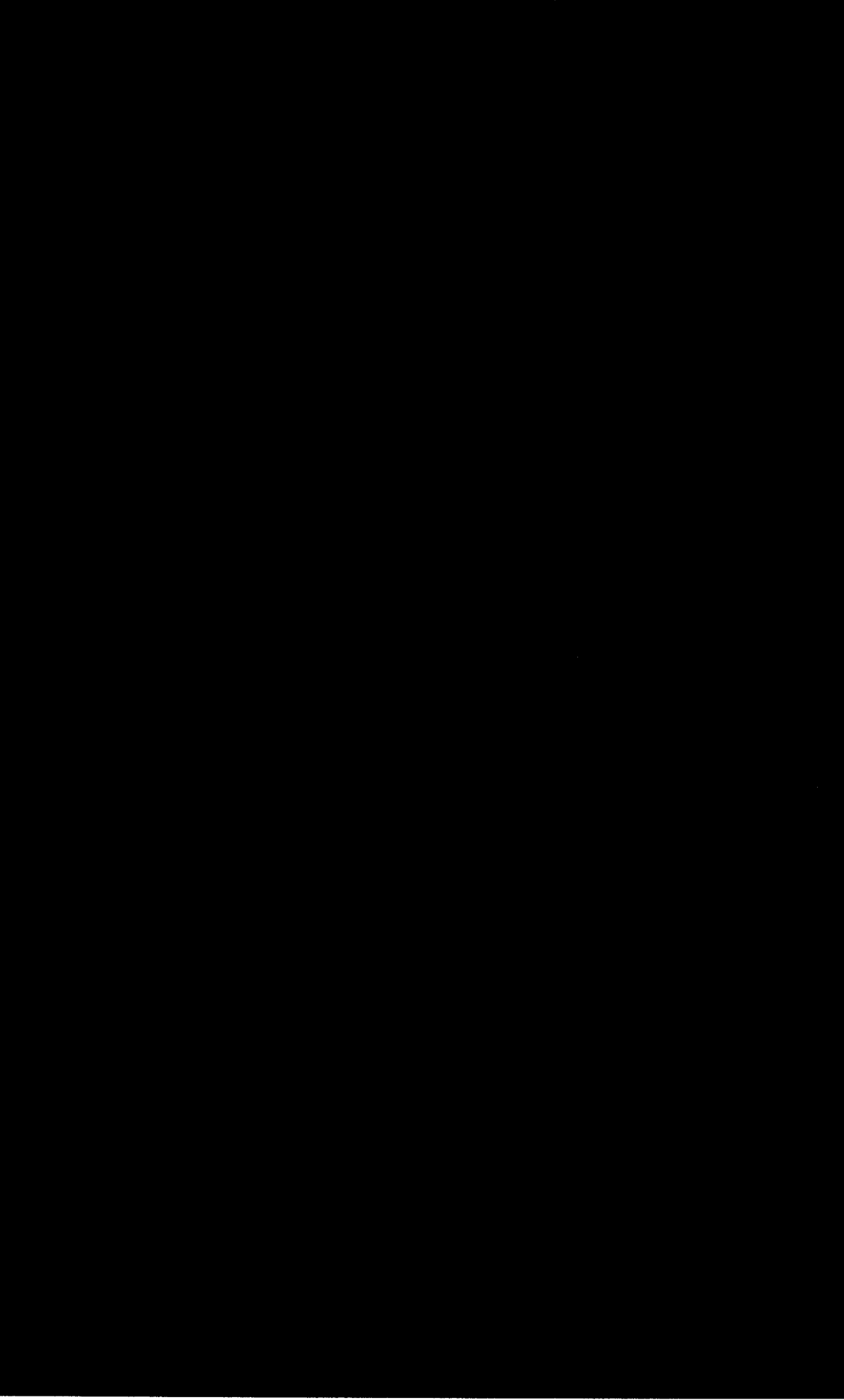
Item No.	Description	Task Order	Business Unit	Total Costs	Planned Pre 9-11 Cost	Unplanned Post 9-11-01 Costs	Task Order Completion Date	Comment
1	Security System - [REDACTED]	12009745	1202000H	\$ 106,512.81	\$ 106,512.81	\$ -	Dec-00	
2	Security System - [REDACTED]	12009746	1202000H	\$ 19,796.90	\$ 19,796.90	\$ -	Dec-00	
3	[REDACTED] - Security Sys	12009748	1202000H	\$ 25,905.67	\$ 25,905.67	\$ -	Dec-00	
4	[REDACTED]	12010129	1202000H	\$ 19,575.75	\$ 19,575.75	\$ -	Dec-00	
5	[REDACTED]	12010164	1202000H	\$ 23,554.76	\$ 23,554.76	\$ -	Dec-00	
6	[REDACTED]	12010170	1202000H	\$ 10,008.73	\$ 10,008.73	\$ -	Dec-00	
7	Security Office Building	12011378	12020101	\$ 17,702.44	\$ 7,445.26	\$ 10,257.18	Nov-01	
8	Security System - [REDACTED]	12011379	12020101	\$ 11,660.81	\$ 11,272.15	\$ 388.66	Jul-01	
9	Security System - [REDACTED]	12011380	12020101	\$ 165,298.88	\$ 106,960.66	\$ 58,338.22	Dec-01	
10	Security System - [REDACTED]	12011381	12020101	\$ 99,022.75	\$ 25,756.30	\$ 73,266.45	Dec-01	
11	Security System - [REDACTED]	12011382	12020101	\$ 15,780.21	\$ 295.35	\$ 15,484.86	Dec-01	
12	Security Fence - [REDACTED]	12011383	12020101	\$ 52,837.53	\$ 50,231.34	\$ 2,606.19	Sep-01	
13	Security Fence - [REDACTED]	12011384	12020101	\$ 15,894.83	\$ -	\$ 15,894.83	Sep-01	
14	Security Phone Line - [REDACTED]	12011385	12020101	\$ 11,650.51	\$ -	\$ 11,650.51	Oct-01	
15	Monitoring Inst - [REDACTED]	12011762	12020101	\$ 69,283.70	\$ -	\$ 69,283.70	Dec-01	
16	Monitoring Inst - [REDACTED]	12011763	12020101	\$ 73,889.55	\$ -	\$ 73,889.55	Dec-01	
17	[REDACTED]	12012031	12020101	\$ 11,317.21	\$ -	\$ 11,317.21	Dec-01	
18	[REDACTED]	12012032	12020101	\$ 7,846.02	\$ -	\$ 7,846.02	Dec-01	
19	[REDACTED]	12012033	12020101	\$ 14,214.98	\$ -	\$ 14,214.98	Dec-01	
20	[REDACTED]	12012034	12020101	\$ 5,316.57	\$ -	\$ 5,316.57	Dec-01	
21	[REDACTED]	12012035	12020101	\$ 4,437.46	\$ -	\$ 4,437.46	Dec-01	
22	[REDACTED]	12012036	12020101	\$ 6,695.13	\$ -	\$ 6,695.13	Dec-01	
23	[REDACTED]	12012037	12020101	\$ 7,683.96	\$ -	\$ 7,683.96	Dec-01	
24	[REDACTED]	12012038	12020101	\$ 12,264.98	\$ -	\$ 12,264.98	Dec-01	
25	[REDACTED]	12012039	12020101	\$ 4,904.15	\$ -	\$ 4,904.15	Dec-01	
26	[REDACTED]	12012041	12020101	\$ 11,157.17	\$ -	\$ 11,157.17	Dec-01	
27	[REDACTED]	12012042	12020101	\$ 3,704.01	\$ -	\$ 3,704.01	Dec-01	
28	Security Fencing Main Office	12012051	12020101	\$ 19,040.39	\$ -	\$ 19,040.39	Dec-01	
29	Concrete Planters Office Complex	12012060	12020101	\$ 6,068.39	\$ -	\$ 6,068.39	Dec-01	
30	[REDACTED]	12012061	12020101	\$ -	\$ -	\$ -		
31	[REDACTED]	12012062	12020101	\$ 25,140.74	\$ -	\$ 25,140.74	Dec-01	
32	[REDACTED]	12012063	12020101	\$ 21,488.86	\$ -	\$ 21,488.86	Dec-01	
33	[REDACTED]	12012064	12020101	\$ -	\$ -	\$ -		
34	[REDACTED]	12012065	12020101	\$ 5,237.44	\$ -	\$ 5,237.44	Dec-01	
35	[REDACTED]	12012066	12020101	\$ 5,237.44	\$ -	\$ 5,237.44	Dec-01	
36	[REDACTED]	12012067	12020101	\$ 5,784.76	\$ -	\$ 5,784.76	Dec-01	
37	[REDACTED]	12012076	12020101	\$ 5,237.44	\$ -	\$ 5,237.44	Dec-01	
38	Security Charges (former account P0118)	50005793	120205	\$ 2,731,262.57	\$ -	\$ 2,731,262.57	Present	See next tab for further breakdown
39	Planters Concrete	50010494	1202000H	\$ 1,616.84	\$ -	\$ 1,616.84	Apr-02	
40	Planters Concrete	50010495	1202000H	\$ 2,681.68	\$ -	\$ 2,681.68	Apr-02	
41	[REDACTED]	50013613	1202000H	\$ 14,335.44	\$ -	\$ 14,335.44	May-02	
42	INS Guard Post - [REDACTED]	50015162	1202000H	\$ 14,573.27	\$ -	\$ 14,573.27	Aug-02	
43	INS Guard Post - [REDACTED]	50015163	1202000H	\$ 13,789.10	\$ -	\$ 13,789.10	Aug-02	
44	[REDACTED]	50029452	1202000H	\$ 4,701.04	\$ -	\$ 4,701.04	May-03	To isolate tank from cell phone equipment
45	INS Guardhouse - [REDACTED]	50044848	12020101	\$ 19,992.00	\$ -	\$ 19,992.00	on going	Estimated Charges in 2004
				\$ 3,724,104.87	\$ 407,315.68	\$ 3,316,789.19		
				Amount Planned in last rate case	\$ 280,000.00			
				Difference between amount spent and planned	\$ 127,315.68			

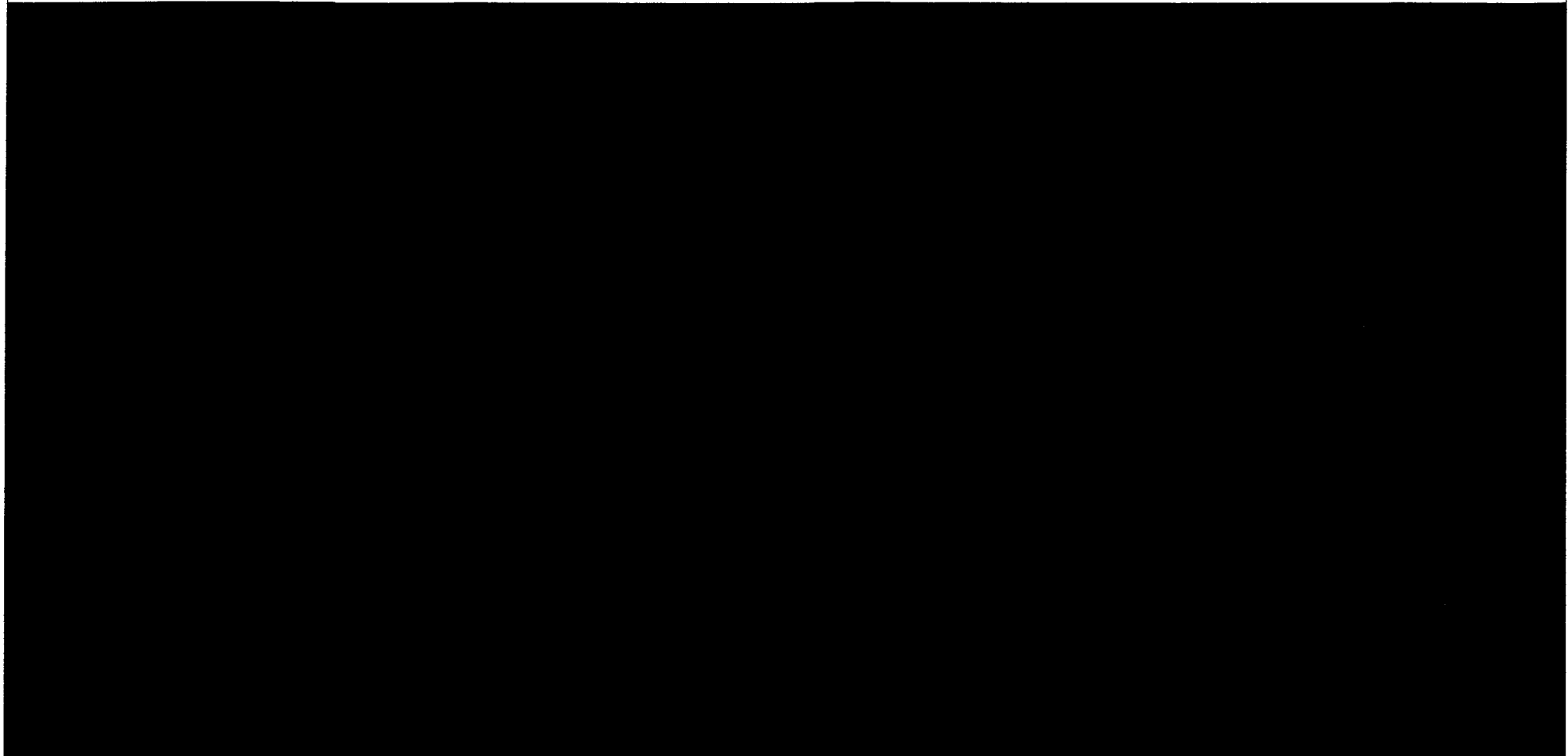
In 1999 Rate Case: \$280,000 was budgeted for Dec. 00 to Nov. 01 forward looking test year IP was written for \$350,000 prior to 9-11.

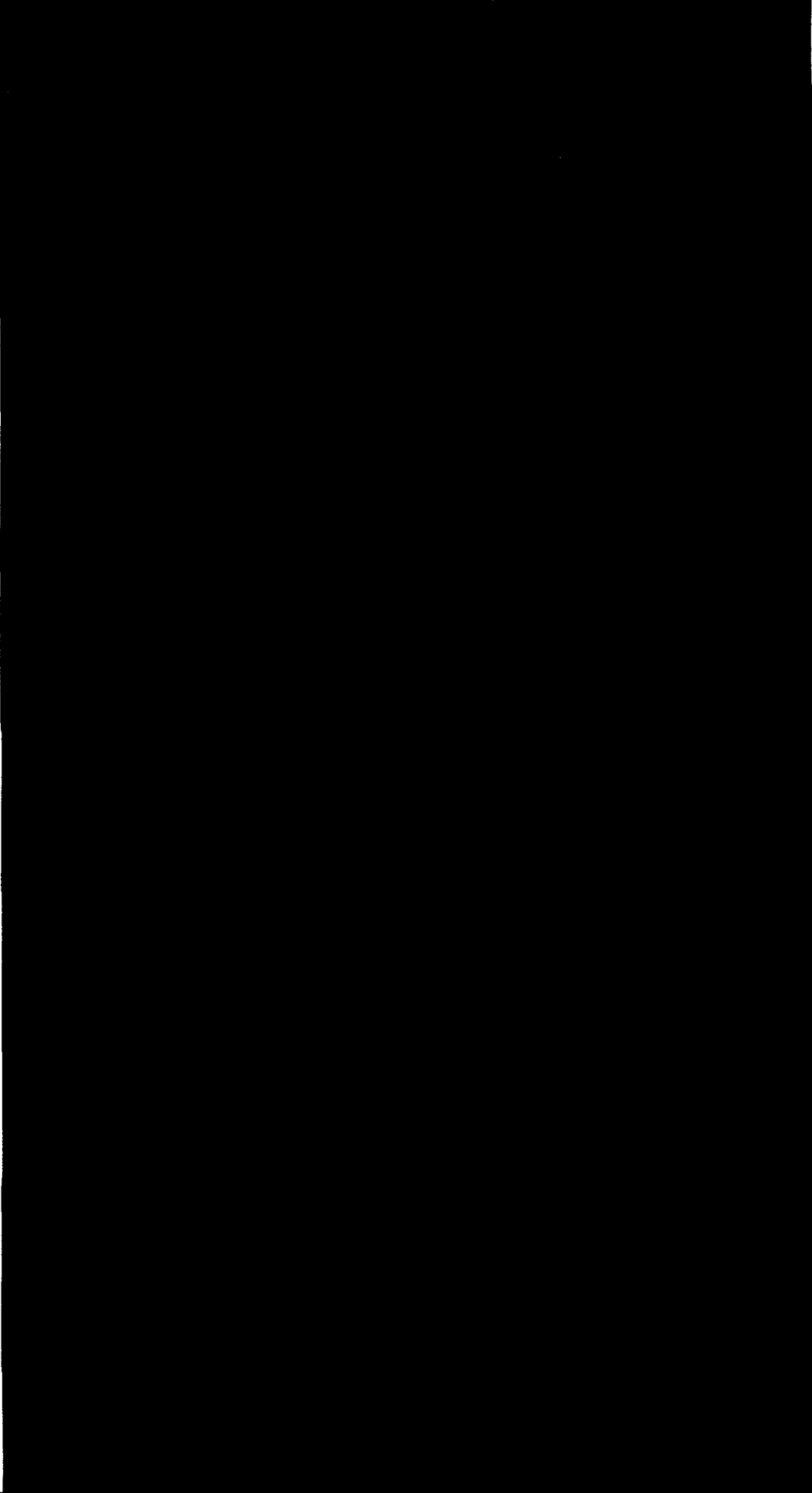
**Kentucky American Water
Breakdown of Item 38**

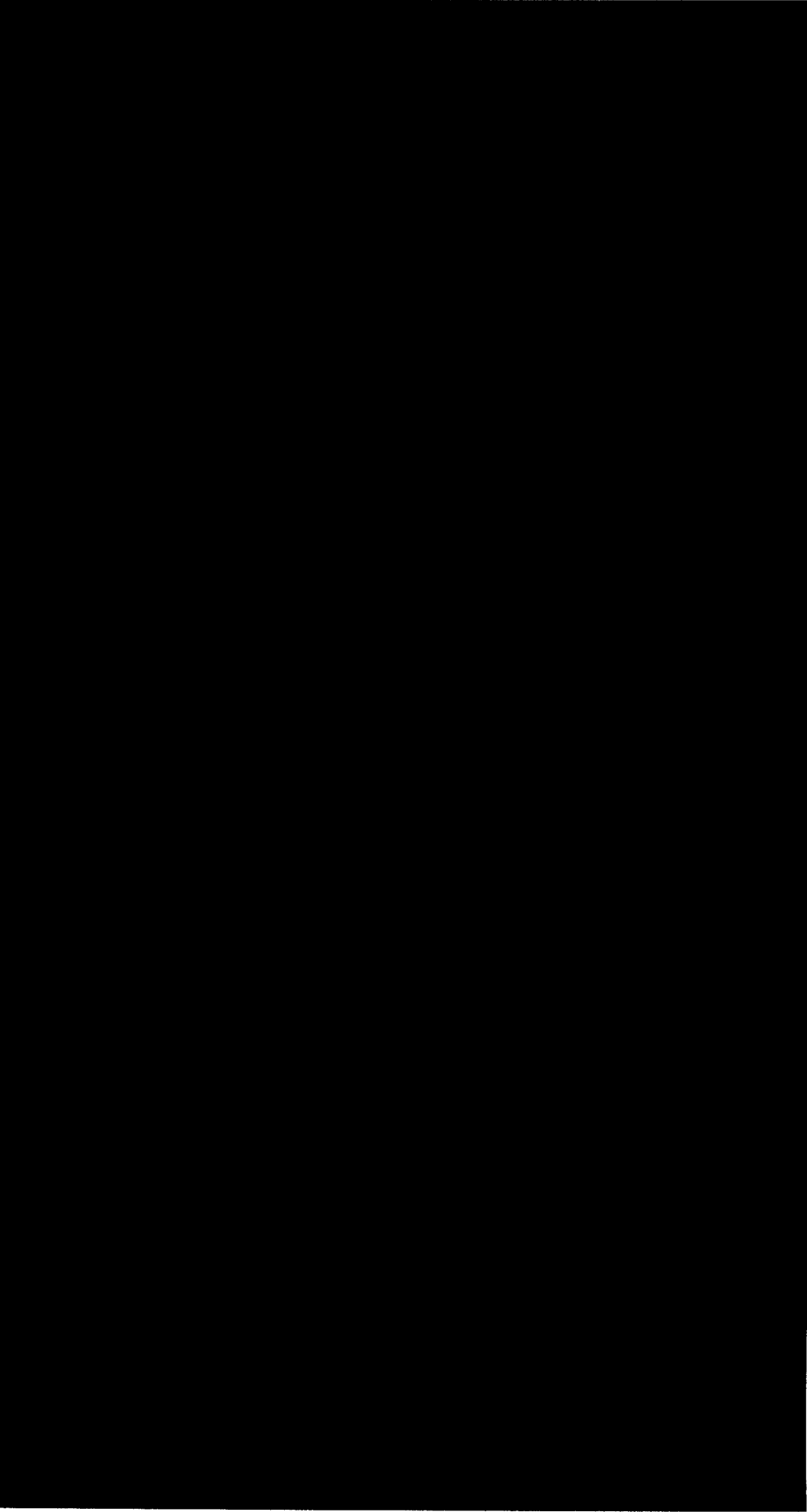
Item No.	Description	Task Order	Business Unit	Total Costs	Planned Pre 9-11 Cost	Unplanned Post 9-11-01 Costs	Comment
38-1	Murray Guard - Lobby & Gate	50005793	120205	\$ 88,355.94	\$ -	\$ 88,355.94	9-12-03 to Present
38-2	Alliance Staffing - LFUCG Police	50005793	120205	\$ 1,854,128.42	\$ -	\$ 1,854,128.42	4-01-02 to 8-19-03
38-3	LFUCG Police Direct	50005793	120205	\$ 326,130.61	\$ -	\$ 326,130.61	9-12-01 to 3-31-02
38-4	Porta Potty Rental for Police at Dam 9	50005793	120205	\$ 499.76	\$ -	\$ 499.76	
38-5	Securing Tanks	50005793	120205	\$ 152,581.00	\$ -	\$ 152,581.00	Ladders, hatches, vents for 21 tanks
38-6	Concrete Barriers	50005793	120205	\$ 15,918.90	\$ -	\$ 15,918.90	NJ Barriers at WTP's
38-7	Clearing Fence lines	50005793	120205	\$ 6,230.55	\$ -	\$ 6,230.55	at KRS / RRS
38-8	KAW Labor	50005793	120205	\$ 4,436.70	\$ -	\$ 4,436.70	Labor for distribution inactive accounts
38-9	SCADA Program Change	50005793	120205	\$ 8,156.92	\$ -	\$ 8,156.92	SCADA changes for Alarm Screens
38-10	Inactive account lockout	50005793	120205	\$ 45,847.93	\$ -	\$ 45,847.93	Lockout device for approx. 5000 settlers.
38-11	Security Lights	50005793	120205	\$ 9,171.49	\$ -	\$ 9,171.49	Replaced bulbs and defective lights.
38-12	Padlocks and Locksets	50005793	120205	\$ 3,163.04	\$ -	\$ 3,163.04	Replaced many padlocks and locksets around system
38-13	Survey work at Tank Sites	50005793	120205	\$ 9,300.00	\$ -	\$ 9,300.00	Determined Property line so fence could be installed
38-14	Attorney Fees	50005793	120205	\$ 12,675.90	\$ -	\$ 12,675.90	PSC Discussions on Security Costs
38-15	Misc	50005793	120205	\$ 194,665.41	\$ -	\$ 194,665.41	Misc. costs such as cell phone charges,
				\$ 2,731,262.57		\$ 2,731,262.57	

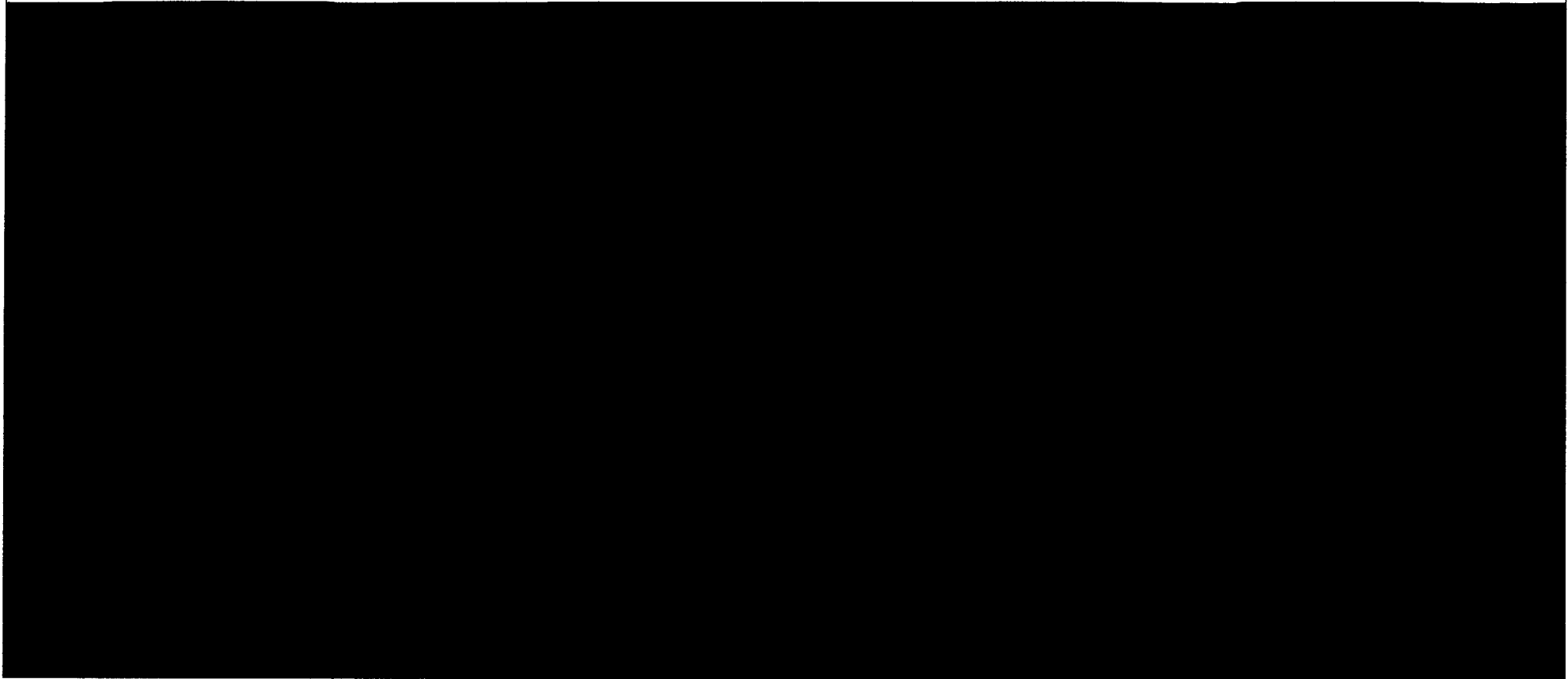
AMERICAN WATER THREAT RESPONSE MATRIX











**AMERICAN WATER SECURITY
MANAGEMENT FRAMEWORK**

Water Sector Coordination Board Good Practices Working Group

Discussions on a Security Risk Management Framework

February 2004





Project Objectives

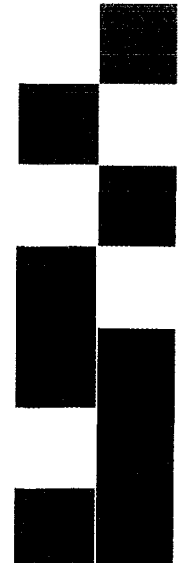
- **To provide an industry roadmap to drive a consistent, agreed and defensible approach to the management of water and waste water utility security which ensures that:**
 - security controls are effective and relevant
 - the cost of security is agreed with stakeholders
 - responses are consistent and sustainable
 - the industry maintains a responsive posture synchronized with changing threat environment
 - the industry establishes and maintains a partnership with key stakeholders including Government and peer sector coordinators



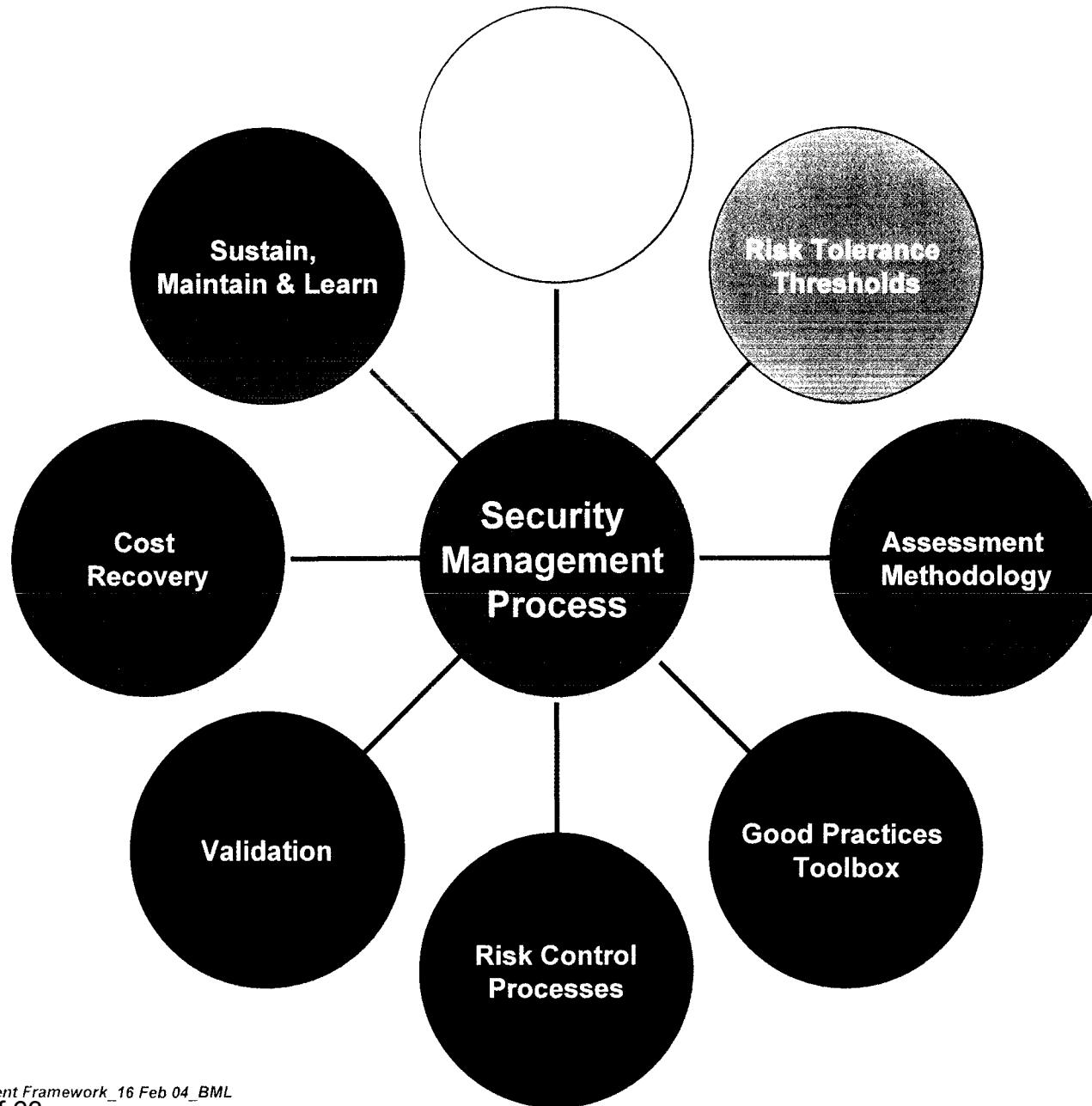
Discussions on the Framework



- **Security Management Framework and Lifecycle Roadmap will:**
 - drive pervasive awareness and ownership of security management processes - *“Security is everyone’s responsibility”*
 - provide outcome-oriented guidelines that are purposefully non-prescriptive
intentionally drive solution flexibility through fostering innovation in providing local solutions to local problems
 - involve all key stakeholders throughout the process
 - offer the most expedient and least costly path to reaching an enhanced consistent security posture across the Water Sector
 - embed a lifecycle risk management process within utilities that sets flexible security postures adaptive to changes in threat
 - force iteration of the formal assessment process to ensure risk controls remain effective and appropriate to the environment
 - validation of the process will support cost recovery mechanisms across diverse governance models



Security Management Framework



Risk Management Lexicon



- Framework
- Roadmap
- Good Management Practices
- Standards
- Guideline
- Tolerance Threshold
- Risk Assessment
- Validation
- Lifecycle
- Outcome-Oriented
- Performance-Based
- Risk Controls
- Toolbox
- Posture
- Stakeholders





Sector Threat Environment

- Agreed threat scenarios from Government (assumed valid by industry)
- Industry development of local threat scenarios – direct and indirect
- Communication lines with government, within water sector and cross-sector to provide timely & effective alert of security status change.



Defined Risk Tolerances

- **Basic assumptions:**
 - Severity and probability can be reduced
 - They cannot be eliminated
 - Can reduce probability of a “*successful*” attack
- **Industry will define risk tolerances appropriate to local operational environment**
- **The risk tolerances must be related to societal expectations**
- **All key stakeholders are involved in setting the tolerance threshold limits – drives validation assumptions**



Risk Assessment Methodology

- **Robust but simple methodology using:**
 - Simple scales for probability and threat
 - Defined thresholds and tolerances
 - Heuristic performance-based assessment methodology
 - Supportive of prioritization
 - Supportive of risk communication





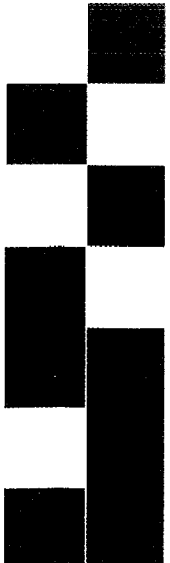
Good Practice – “Toolbox”

- Assumption is that there is no “one size fits all” solution given the diversity of operating environments across the water sector
- Deliver an outcome oriented result
- Develop baseline standards from which the industry will deploy solutions appropriate to the local operating environment
- Create a modular “Toolbox” of solutions to support the security response model
- Establish a community to share good practice and support continuous improvement



Risk Controls

- The industry aims to establish “*reasonable*” guidelines for risk controls
- Seeking optimal balance between:
 - Security response and physical security.
 - Cost and benefit to stakeholder community
- Physical security measures will be commensurate to vulnerability and ability to respond to attack on model of:
 - Detect
 - Delay
 - Assess
 - Respond
 - Recover
 - Learn & Sustain



Validation



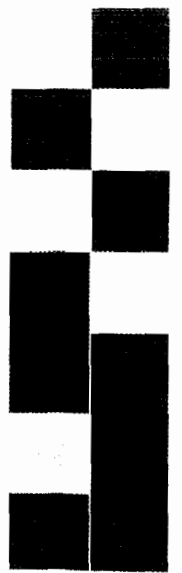
- **Establish a process to:**
 - verify that responses are effective, sustainable, just and prudent as viewed by the key stakeholders
 - support cost recovery
- **Validation via recognized experts**
- **Demonstrated societal responsibility**



Cost Recovery



- The agreed risk tolerances and validated security management process will provide the basis for cost recovery



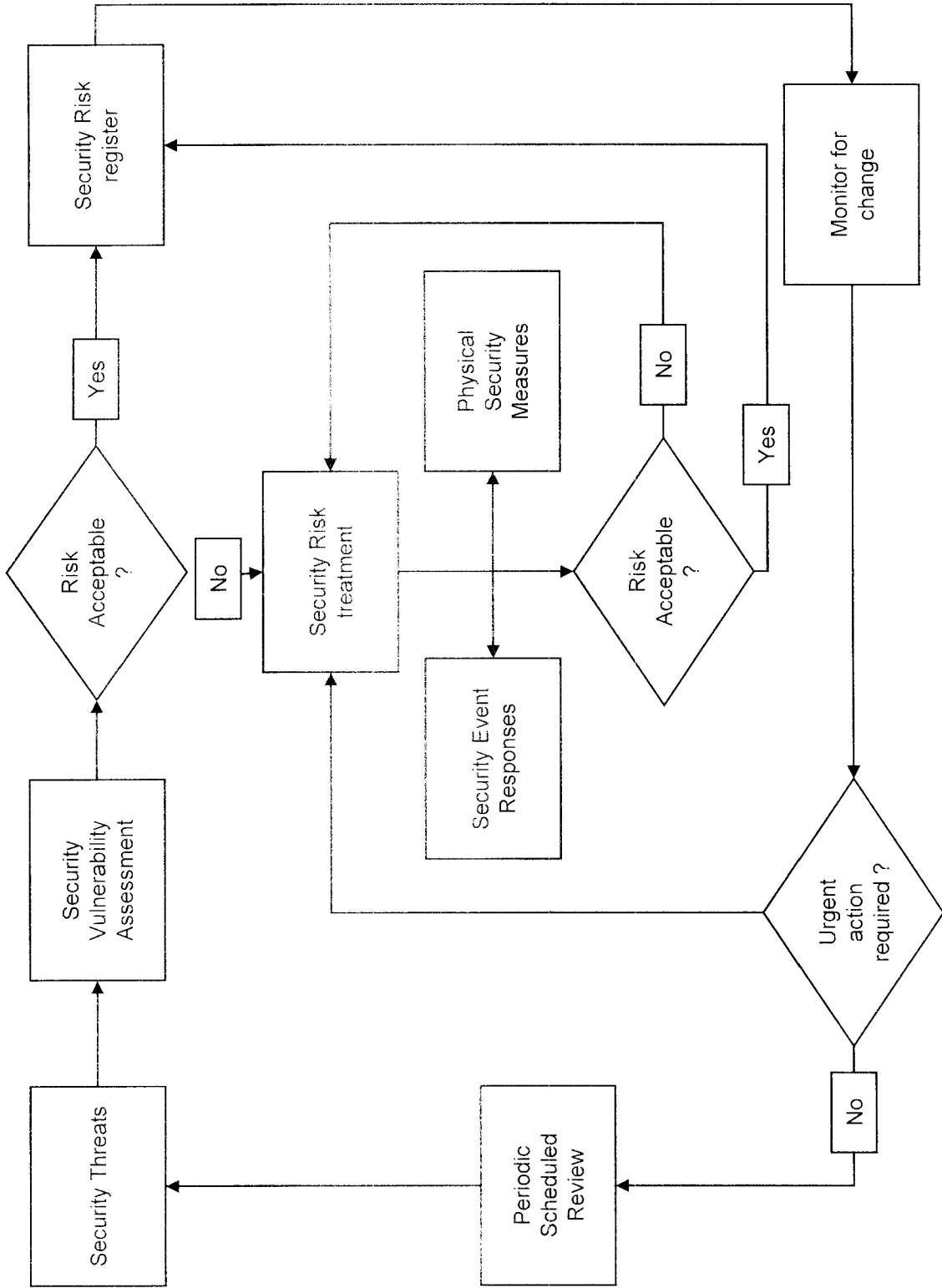


Sustain Maintain & Learn

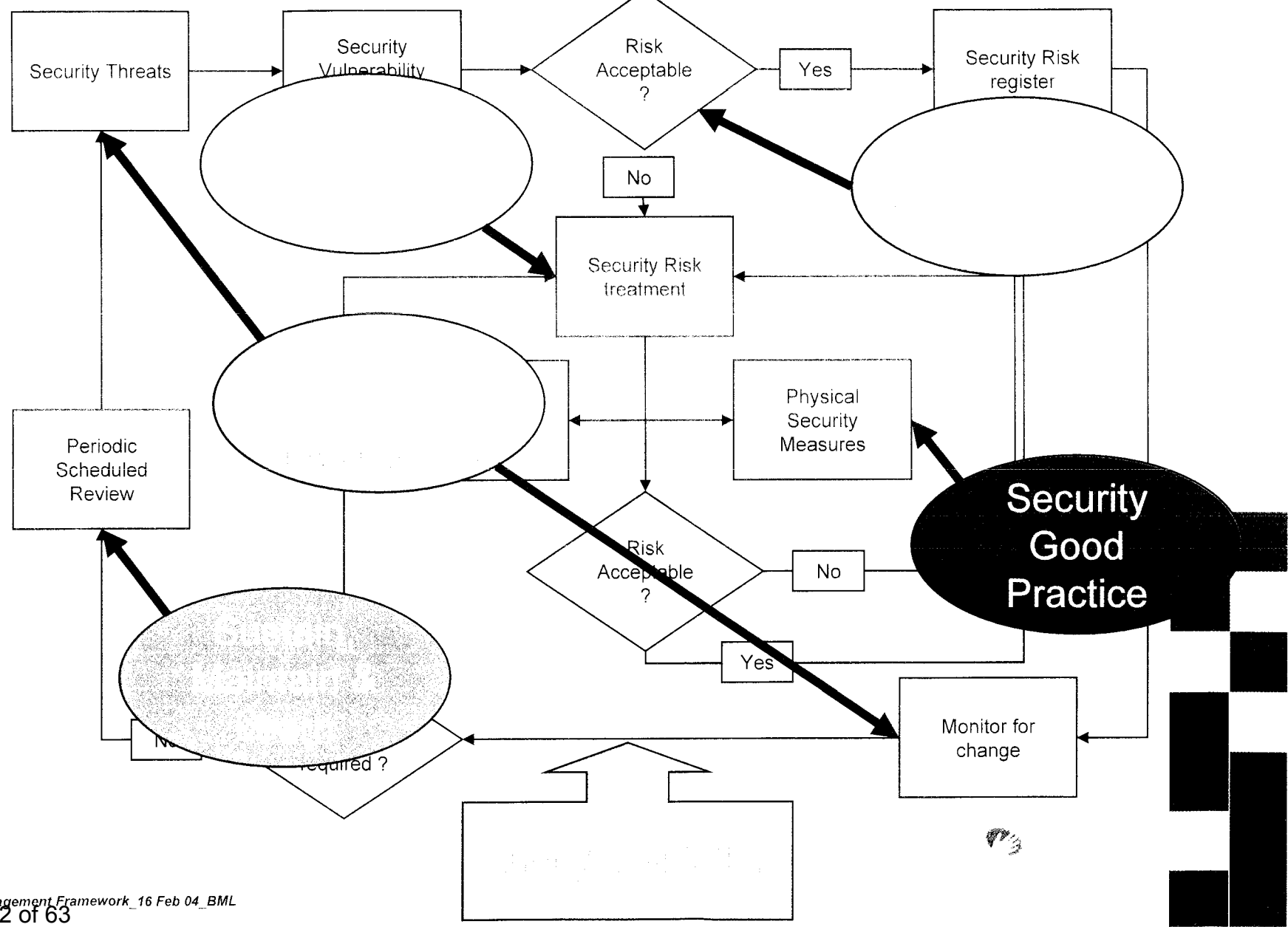
- **Processes & procedures to ensure the:**
 - sustainability of solutions
 - ongoing relevance of solutions in terms of threat
 - maintenance of systems
 - feed back & learning



Security Risk Management Process



Inputs to Security Risk Management Process



Security Roadmap Posture Evolution

