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Homeland Security Research Program Multi-Year Plan Preview

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Goals of this Presentation

- The Homeland Security Research Multi-Year Plan (MYP) is currently being written and reviewed
- We plan to provide a draft to the Subcommittee by the face-to-face meeting, if not earlier
- Today's presentation will
  - Brief you on the MYP
  - Give you some key MYP content

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Multi-Year Plan (MYP) Organization

- Purpose of the Document
- Relevancy and Design
- Research Plans
- Performance Metrics
- Relationship to other Research Programs
- Planning and Communicating
- Appendices

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Purpose of the Multi-Year Plan

- Describes what the Program plans address and accomplish over the next 3-4 years
- Shows how the Program is designed to contribute to meeting Agency strategic goals
- Communicates strategic research directions and planned major products
- Provides Information to assist and support resource decisions
- Describes how the Program's performance will be measured
- Describes the Program's planning and communication processes

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Relevancy and Direction of the Research Program

- Homeland Security Presidential Directives
- Legislation
- DHS Planning Scenarios
- National Response Framework
- Strategic Plans
- External Expert Advice

HSPDs and Legislation - EPA Tasking

EPA Tasking in Legislation / Directive
The Public Health Security and Bioterrorism Preparedness and Response Act ("Bioterrorism Act") **June 2002** Authorizes funding for national, state, and local efforts to address bioterrorism and other public health emergencies; establishes controls for dangerous biological contaminants and toxins; authorizes funding for food and drug safety; and mandates protections for the water industry--requiring that water systems serving more than 3,300 persons perform vulnerability assessments and that EPA review methods to protect water systems.
Provides the legislative mandate for much of EPA's water security work. EPA's responsibilities under the Bioterrorism Act include: • Providing information on potential adversarial actions that could threaten water supply systems and providing strategies and responses that utility operators could consider when conducting vulnerability assessments of their systems. • Protecting the security of vulnerability assessments submitted regarding drinking water systems, as well as any information in them, while in EPA's possession. • Conducting research studies in areas relevant to water security.
HSPD-7: Critical Infrastructure Identification, Prioritization, and Protection **December 2003** Designates the DHS Secretary as the lead for coordinating the overall national effort to enhance the protection of critical infrastructure and key resources in the U.S. Assigns specific agencies with responsibility for infrastructure protection activities in designated critical infrastructure sectors or key resources categories (e.g., mass transit, agriculture, banking and finance, energy, etc). Requires all Federal agencies to develop plans for protecting the physical and cyber critical infrastructure and key resources that they own and operate.
• EPA is given the "Sector-Specific Agency" lead for drinking water and water treatment systems. • EPA is tasked to collaborate with all relevant Federal agencies, State and local governments, and the private sector; conduct or facilitate vulnerability assessments of the water sector; and encourage risk management strategies to protect against and mitigate the effects of attacks against the water and waste water infrastructures.

EPA Tasking (cont.)

HSPD-9: Defense of United States Agriculture & Food **January 2004** Establishes a national policy to defend the agriculture and food system against terrorist attacks, major disasters, and other emergencies by identifying and prioritizing sector-critical infrastructure and key resources for establishing protection requirements; developing awareness and early warning capabilities to recognize threats; mitigating vulnerabilities at critical production and processing nodes; enhancing screening procedures for domestic and imported products; and enhancing response and recovery procedures.
• Develop robust, comprehensive, and fully coordinated surveillance and monitoring systems for water quality that provide early detection and awareness o f disease or poisonous agents. •Develop nationwide, interconnected laboratory networks for food, veterinary, plant health, and water quality that integrate existing Federal and State laboratory resources and utilize standardized diagnostic protocols and procedures.
HSPD-10: Biodefense for the 21st Century (classified) **April 2004** Directs agencies to develop standards, protocols, & capabilities to address the risks of contamination following a biological weapons attack & developing strategies, guidelines, & plans for decontamination of persons, equipment, & facilities.
• Directs EPA, in coordination with other Federal agencies, to develop standards, protocols, and capabilities for addressing the risks of contamination f ollowing a biological weapons attack and to develop strategies, guidelines, and plans for decontamination of persons, equipment, and facilities. • Tasks EPA with surveying the chemical, biological, and radiological/nuclear laboratory capacity and capabilities in the U.S.
HSPD-19: Combating Terrorist Use of Explosives in the United States **February 2007** Establishes a national policy and calls for the development of a national strategy and implementation plan, on the prevention and detection of, protection against, and response to terrorist use of explosives in the United States.
EPA, as the sector-specific lead for water infrastructure, is directed to provide assessments/inventories of resources, capabilities, research, development, testing, and asked to make recommendations for improvements for water systems.
HSPD-22: Domestic Chemical Defense (classified) **2008**

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DHS Planning Scenarios

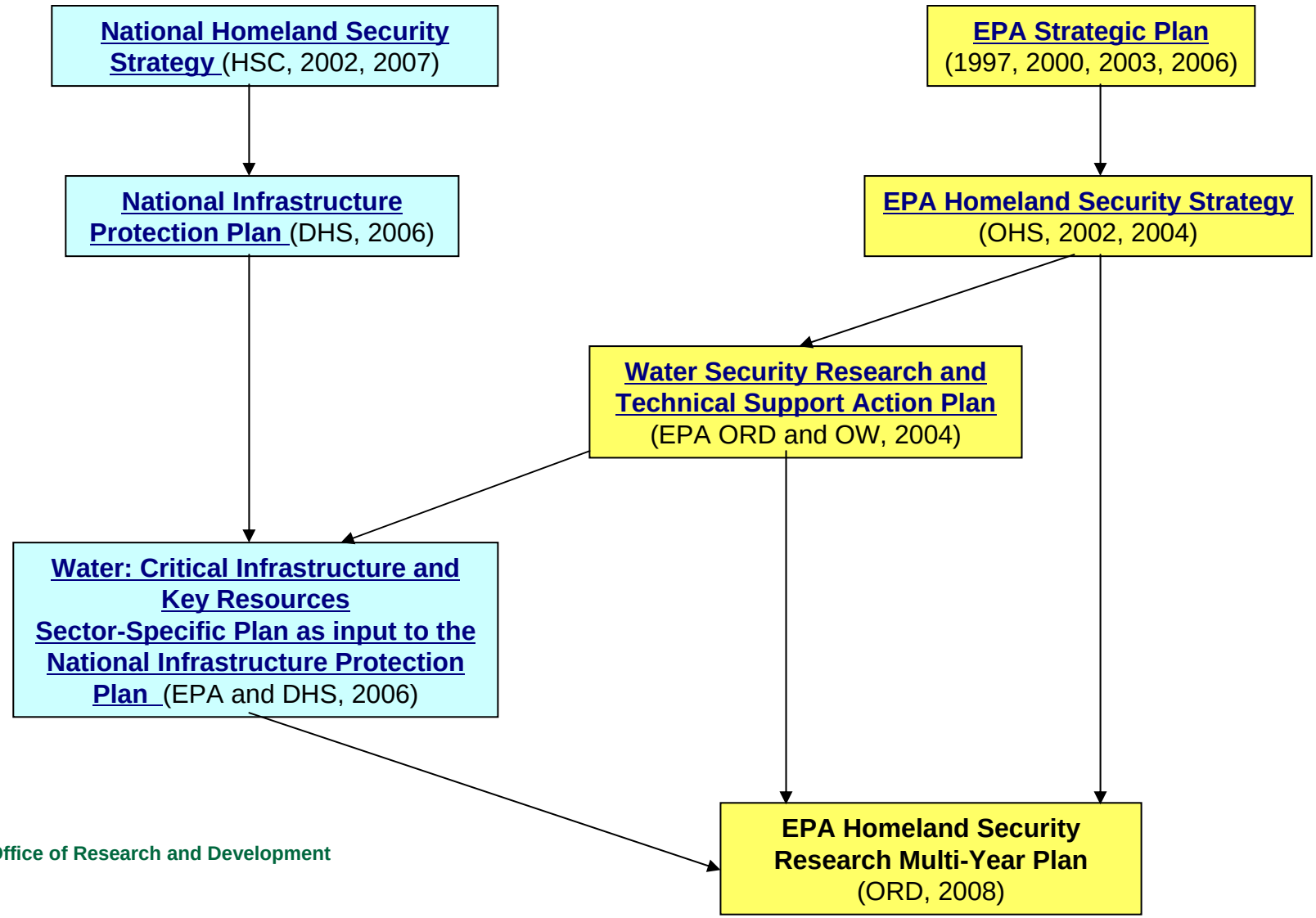
15 standardized disaster scenarios for Federal, State and local planning. These scenarios are designed to be the foundational structure for the development of national preparedness standards from which homeland security capabilities can be measured. The HS Research Program has used many of the scenarios to help identify science gaps.

National Response Framework

The National Response Framework is a guide that details how the Nation conducts all-hazards response from the smallest incident to the largest catastrophe.

Its Emergency Support Function (ESF) Annexes assign primary and support responsibilities to various categories of challenges. EPA holds primary responsible for: ESF #10 – Oil and Hazardous Materials Response - Oil and hazardous materials (chemical, biological, radiological, etc.) response; environmental short- and long-term cleanup

Major Strategic Plans and the MYP



EPA Roles and Responsibilities Responding to Terror Events

Event Chronology	**Water Infrastructure** To provide the EPA response community and water/wastewater utilities guidance, methods and tools so that they may effectively:	**Outdoor and Indoor Areas** To provide the EPA response community guidance, methods and tools so that they may effectively:
Protect against attacks	√	
↓		
Monitor, detect, and confirm CBR attack	√	√*
↓		
Minimize exposure of the public to the contamination	√	√
↓		
Characterize the nature and extent of contamination	√	√
↓		
Assess the risk to human health and establish cleanup goals	√	√
↓		
Clean up the site	√	√

* Responsibilities distributed among several agencies

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Clients of the HS Research Program

Primary Clients

- ***EPA Office of Water*** - responsible for carrying out water sector-specific lead agency duties
- ***EPA Office of Solid Waste and Emergency Response*** - broad responsibilities in response to indoor and outdoor areas incidents of national significance

Other important stakeholders

- EPA Regions
- EPA Office of Prevention, Pesticides and Toxic Substances
- EPA Office of Air and Radiation
- States and local authorities
- Water utilities

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Homeland Security Research Program
Long Term Goals

Long Term Goal 1: The Office of Water, water utilities and other clients use homeland security research program products and expertise to improve protection from and the capability to respond to terrorist attacks on the nation's water and wastewater infrastructure.

Long Term Goal 2: The Office of Solid Waste and Emergency Response and other clients use homeland security research program products and expertise to improve the capability to respond to terrorist attacks effecting buildings and the outdoor environment.

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Annual Planning of the Program

Long Term Goal 1 - Water Security

Office of Water
Regular communication with OW Water Security Division
Thematic workgroups (e.g., Water Security Initiative, decon)

Long Term Goal 2 - Buildings and Outdoor Areas

TRIO advisory group
OEM and OSW
On-scene coordinators, removal managers, regional risk assessors
Special teams - ERT, RERT, NDT, NEIC
Semi-annual meetings

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External Expert Advice

- Board of Scientific Counselors
  - 4-5 year review with mid-term check in
- Science Advisory Board
  - Annual strategic directions consultation
  - Reviews/consults on key research areas/products
- National Academies of Science
  - Reviews of major components of the Program

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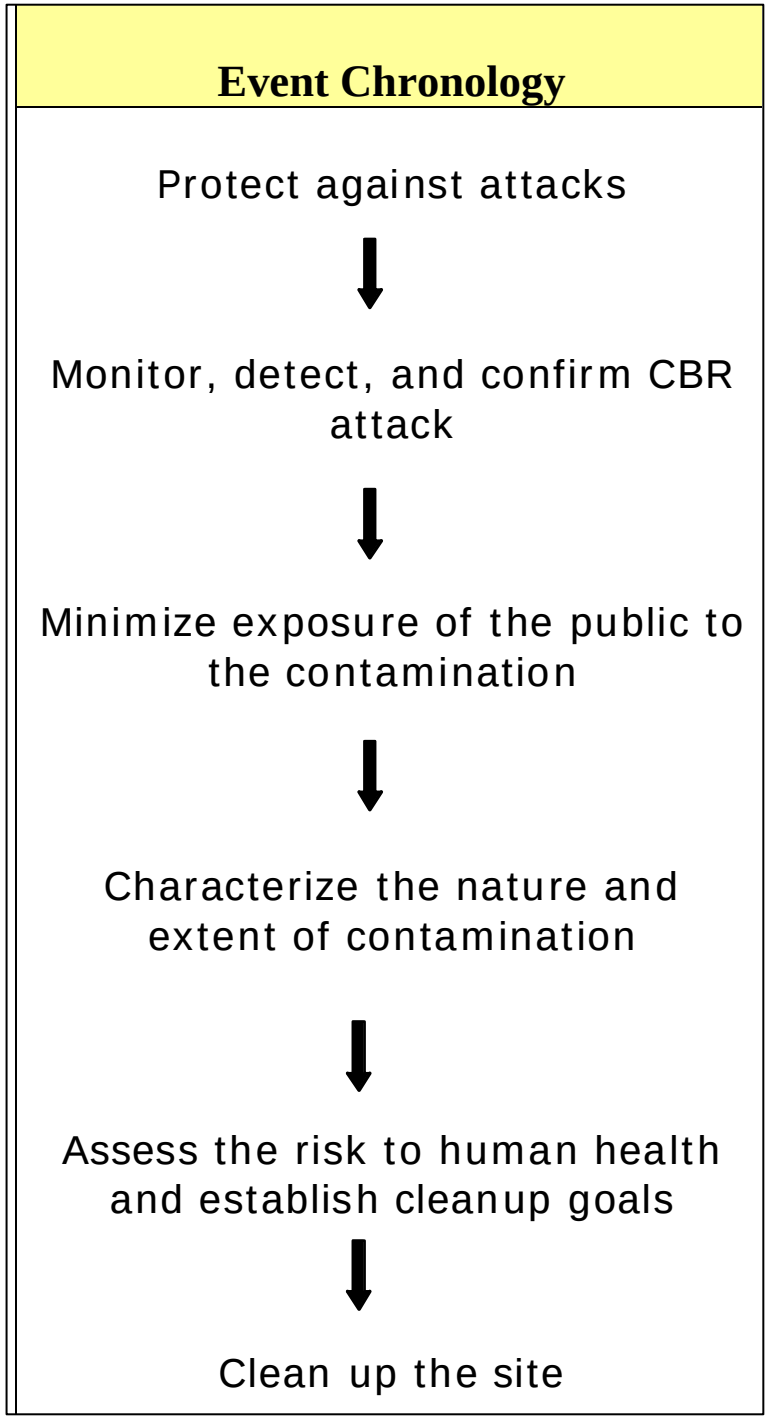
Research Plans

The program addresses EPA research needs for preparing for and responding to terrorist attacks. Priority is given to projects that result in products that have multiple benefits.

Research plans (below) are described in the context of the chronology of a terrorist event.



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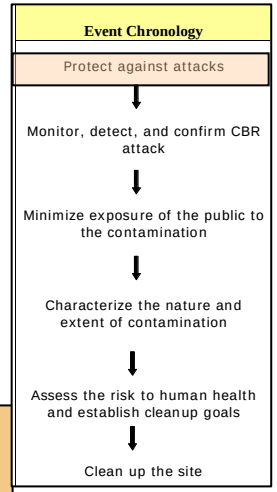
Protect Water Systems



Primary Research Questions

- What security measures can be developed, or adopted from methodologies used by other stakeholders, to improve the physical security of water supplies and systems, vulnerability assessment methodologies and the incorporation of security measures into the design or retrofit of water systems?

Research Plans

- Support OW with DHS Risk Analysis and Management for Critical Asset Protection (RAMCAP) process
- Complete Blast Vulnerability tool
- Assemble a Vulnerability Assessment toolkit

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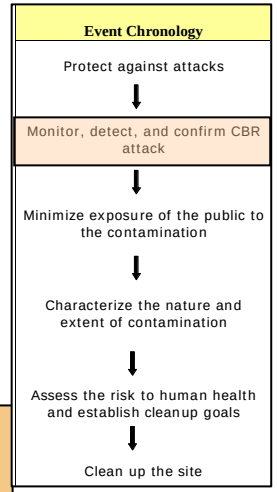

Monitor, Detect and Confirm an Attack

Primary Research Questions

- What are the most effective strategies to monitor and detect purposeful contamination of drinking water distribution and wastewater collection systems?
- What methods are needed to confirm a CBR attack to support an appropriate response?
- What is the performance of commercially-ready detectors? and what additional detection technologies need development?

Research Plans

- Refine components in OW's Water Security Initiative early warning system including on-line water quality sensors, software tools for sensor placement and detection, and public health surveillance
- Develop presumptive analytical methods to confirm an attack
- Develop and test rapid-response detectors to confirm CB contamination in the buildings and outdoors

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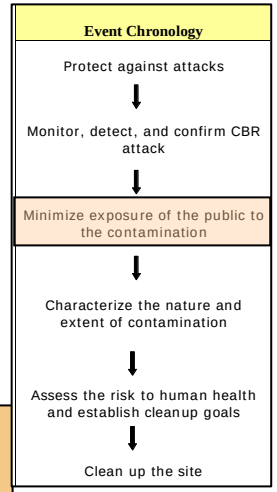

Minimize Exposure

Primary Research Questions

- What is the fate and transport of CBR agents released into buildings, outdoors, and water systems?
- What strategies can be developed to minimize contact of the public with CBR contamination in water and inside and outside buildings?
- What are acceptable exposures to CBR agents?

Research Plans

- Develop real-time software tools to locate source, current spread and strategies to to flush or isolate contaminated water in distribution systems
- Study the spread and reaerosolization of anthrax spores
- Develop provisional advisory levels for exposure to CBR agents

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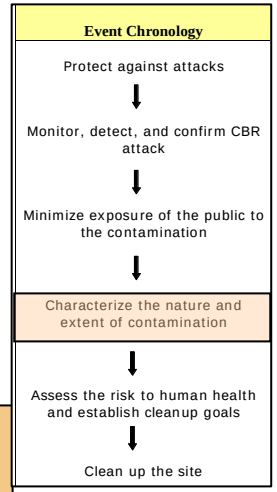
Characterize the Nature and Extent of the Contamination



Primary Research Questions

In support of the EPA's Environmental Response Laboratory Network (ERLN),

- What sampling, sample preparation and analytical methods should be used to (1) characterize the level and extent of CBR contamination following an act of terrorism, and (2) confirm successful decontamination?
- How can scientifically-sound laboratory capacity be established in prepare for response to a CBR attack?

Research Plans

- Identify standardized analytical methods for CBR agents and publish revisions annually
- Validate the standardized methods
- Develop methods as needed, focusing on biological agents
- Help establish reference laboratory for the ERLN
- Increase the capacity of the ERLN by shortening methods run times

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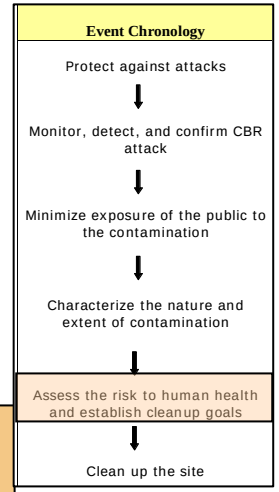

Assess Risks and Establish Cleanup Goals

Primary Research Questions

- How can risk assessment methodologies for CBR contamination be improved?
- What are the risk-based cleanup goals for CBR agent-contaminated water infrastructure, and indoor and outdoor areas?
- What additional exposure, hazard and effects data is needed to reduce uncertainties in risk assessments and risk-based clean up goals?
- What improvement can be made in our understanding of communicating risks and risk management alternatives?

Research Plans

- Develop microbial risk assessment methodologies
- Conduct dose-response studies on selected agents
- Develop PBPK exposure models
- Construct a computational model of the respiratory systems to better understand exposure to aerosols and PM (anthrax spores)
- Determine of risk-based cleanup levels to inform risk management decisions
- Study the factors that effect communication about risk and risk management decisions, especially in the context of an emergency

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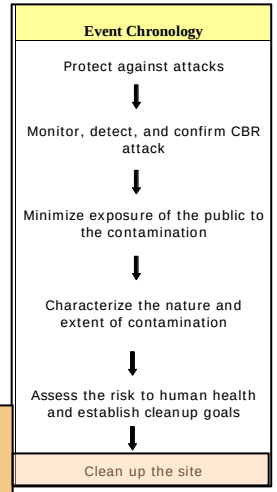
Clean Up the Site



Primary Research Questions

- How can CBR-contaminated water infrastructure, water, and indoor and outdoor areas be effectively cleaned?
- How can remediation efforts be monitored to ensure effective clean up?
- What is the performance of commercially-ready clean up technologies?
- What are effective options for disposal of the residuals associated with decontamination efforts?

Research Plans

- Develop and test methods to decontaminate water infrastructure and wide-areas contaminated with CBR agents
- Develop remediation monitoring tools including biological indicators and fumigation monitors
- Develop strategies to treat and dispose of contaminated water
- Develop approaches to dispose the residuals following remediation efforts

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Summary of Overarching Emphases

Changing Emphases:

- Based on needs and guidance from the White House Homeland Security Council, our primary clients, SAB and NAS, the program will:
  - Transition from development of **decon strategies** for buildings to "**wide-areas**" (train stations, stadia, outdoors) contaminated with **anthrax**
  - Increase development of tools and methods needed for **decon from a dirty bomb**
  - Increase emphasis on development of **decon approaches for water infrastructure** as event detection work matures
  - Initiate a modest research effort to enhance EPA's ability to **communicate about risk and risk management** during a crisis

Steady Emphases: development of advisory levels for exposure, standardized and validated sample prep and analytical methods, microbial risk assessment, and others.

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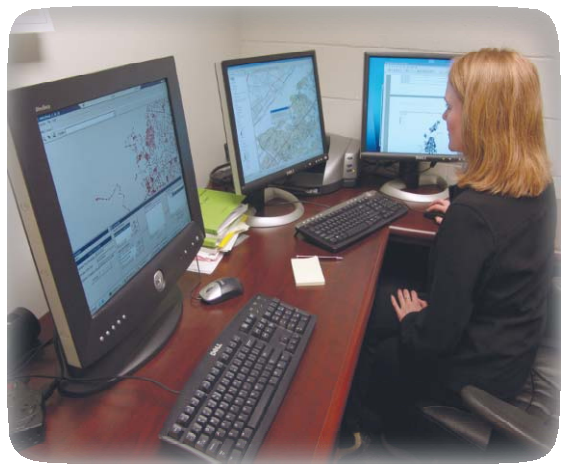
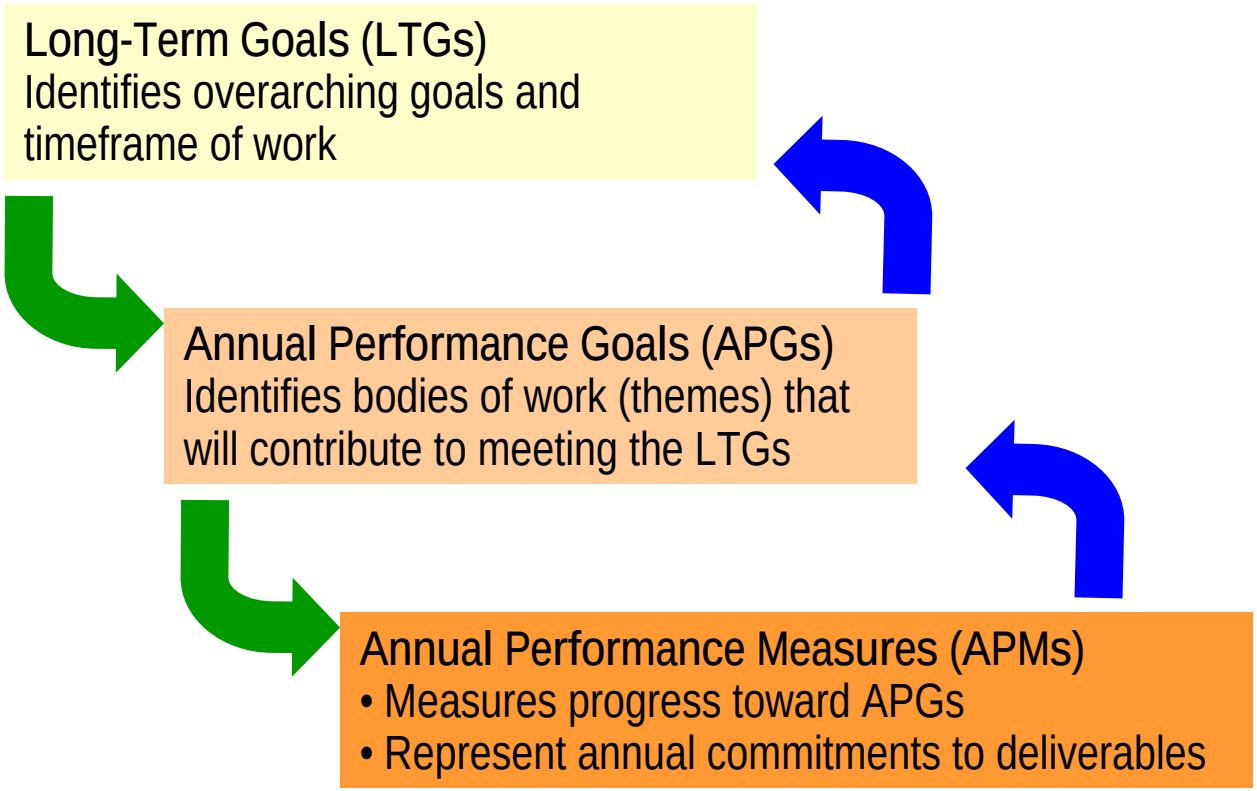
Performance Metrics

- Long Term Goals (LTGs)
- Annual Performance Goals (APGs)
- Annual Performance Measures (APMs)
- Other performance indicators



Relationship of Goals and Measures



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Long Term Goals

By 2012,

Long Term Goal 1: The Office of Water, water utilities and other clients use homeland security research program products and expertise to improve protection from and the capability to respond to terrorist attacks on the nation's water and wastewater infrastructure.

Long Term Goal 2: The Office of Solid Waste and Emergency Response and other clients use homeland security research program products and expertise to improve the capability to respond to terrorist attacks effecting buildings and the outdoor environment.

Progress toward LTGs is determined by the BOSC

Annual Performance Goals

Long Term Goal 1 Water Security

By 2012,

- Deliver prevention/detection techniques (sensors lab methods and models) to support water utilities in the **establishment of contamination warning systems**.
- Deliver reports and models to help water utilities understand the fate, transport and health effects of contaminants in water systems, to support the **development of effective consequence management plans.**
- Deliver reports on **techniques to effectively decontaminate water systems** and models to guide the implementation and predict the outcomes of these techniques on individual distribution systems.

Long Term Goal 2 Buildings and Outdoor Areas

By 2012,

- Deliver detection techniques (e.g. lab methods, detector evaluations) that will enable the **rapid characterization of threats and identification of specific contaminants** to protect workers and plan for recovery operations.
- Deliver reports and databases with information on the movement and the health effects of contaminants. The information is instrumental for **containing contamination and mitigating health effects**.
- Deliver reports **techniques and tools to support the recovery (decontamination and associated material disposal**) of buildings and outdoor environments following an incident of national significance.

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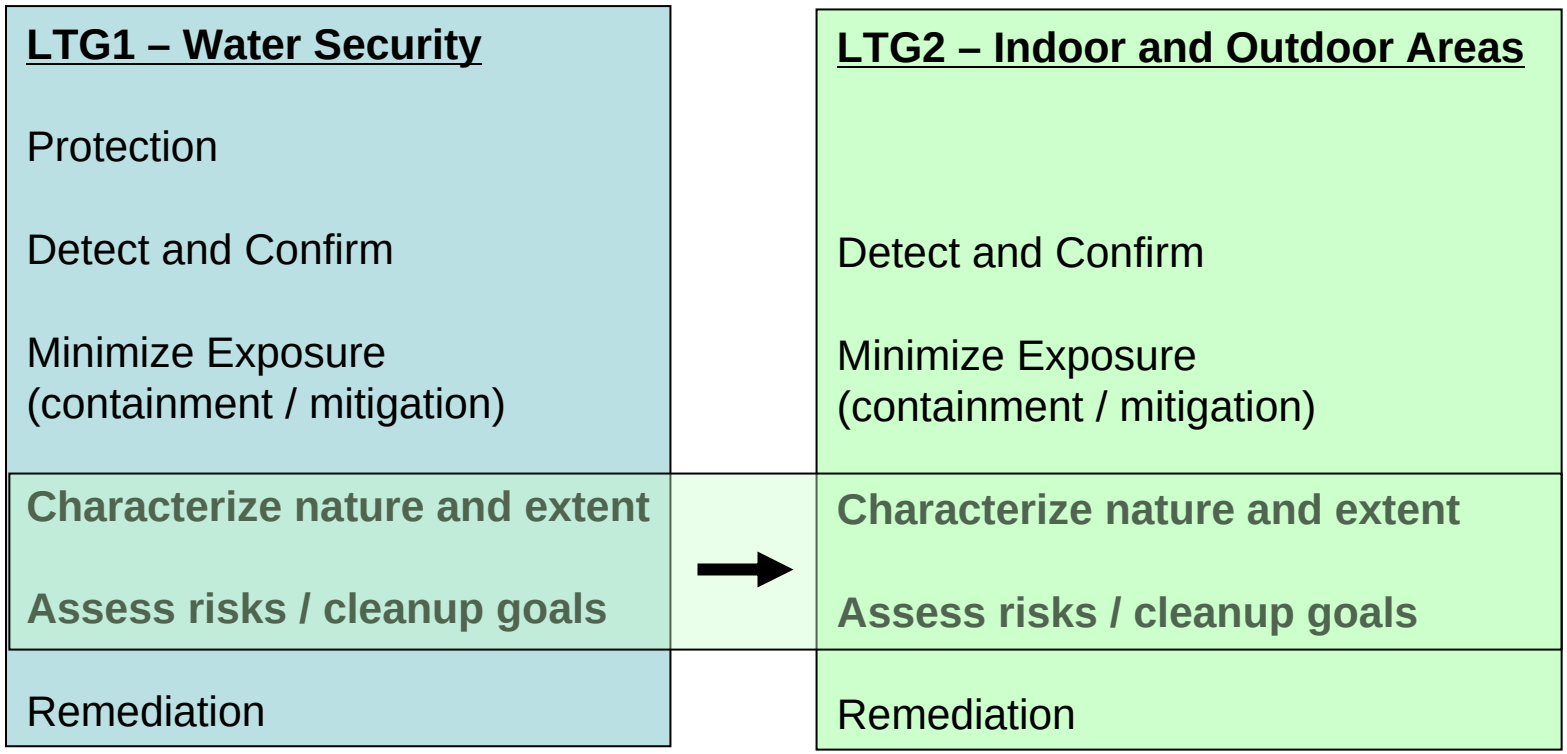
Location of APMs into LTGs for Reporting Purposes



Annual Performance Measures (APMs) 2008-2011

Long Term Goal 1 (2012)

The Office of Water, water utilities and other clients use homeland security research program products and expertise to improve protection from and the capability to respond to terrorist attacks on the nation's water and wastewater infrastructure.

2012 APG	**Deliver prevention/detection techniques (sensors lab methods and models) to support water utilities in the establishment of contamination warning systems.**
2008	In support of the Water Security Initiative, deliver updates to computer tools to enhance event detection
2009	Develop or improve water sampling and analytical techniques for 2-3 contaminants of concern
2009	Improve analytical methods for 2-3 contaminants of concern
2010	Report on development of at least one new technology for sampling and or sample concentration
2011	Deliver reports on water infrastructure planning and emergency preparedness

LTG1 APMs (cont.)

2012 APG	**Deliver reports and models to help water utilities understand the fate, transport and health effects of contaminants in water systems, to support the development of effective consequence management plans**
2008	Provide reports on the fate of contaminants in water distribution systems
2008	Deliver updates to computer tools to provide approaches to consequence management
2008	Complete reports on exposure due to boiling
2009	Release of additional modules and associated manuals for computer tools to optimally place sensors, interpret sensor readings, evaluate and improve mitigation strategies, and assess consequences of a contamination event
2010	Deliver updates to computer tools to optimize placement of sensors and provide approaches to consequence management including mitigation strategies and provide support to the Water Security Initiative.
2011	Under the TEVA program, deliver updates to computer tools to optimize placement of sensors and provide approaches to consequence management including mitigation strategies and provide support to the Water Security Initiative.
2012 APG	**Deliver reports on techniques to effectively decontaminate water systems and models to guide the implementation and predict the outcomes of these techniques on individual distribution systems.**
2009	Report on comparative efficacies of various decontamination protocols and technologies for drinking water and wastewater systems, including decontamination procedures for drinking water distribution systems and post-service connections.
2010	Report on comparative efficacies of various decontamination protocols and technologies for drinking water and wastewater systems, including decontamination procedures for drinking water distribution systems and post-service connections.
2011	Report on comparative efficacies of various treatment and decontamination technologies for drinking water and wastewater systems, including infrastructure and post-service connections.
2011	Reports on the transport and persistence of contaminants in distribution system for use in influencing decontamination decisions.

LTG2 APMs

Long Term Goal 2 (2012)

The Office of Solid Waste and Emergency Response and other clients use homeland security research program products and expertise to improve the capability to respond to terrorist attacks effecting buildings and the outdoor environment.

2012 APG	**Deliver detection techniques (e.g. lab methods, detector evaluations) that will enable the rapid characterization of threats and identification of specific contaminants to protect workers and plan for recovery operations.**
2008	Update the Standard Analytical Methods (SAM) manual based on ongoing method verification studies (5 per year) as well as review of new published methods
2008	Provide at least two least two draft sample collection protocols for high priority threat agents
2009	Verify up to 4 sample collection/analysis methods for high priority agents
2009	Update the Standard Analytical Methods (SAM) manual based on ongoing method verification studies as well as review of new published methods.
2010	Update the Standard Analytical Methods (SAM) manual based on ongoing method verification studies as well as review of new published methods.
2011	Update of the Standard Analytical Methods Manual based on ongoing method verification studies

LTG2 APMs (cont.)

2012 APG	Deliver reports and databases with information on the movement and the health effects of contaminants. The information is instrumental for containing contamination and mitigating health effects.
2008	Add 2 additional biological agents and virulence factors to the Support for Rapid Risk Assessment (SERRA) knowledgebase
2008	Microbial Risk Assessment (MRA) methods and case study
2008	Develop models to decrease the uncertainty associated with microbial risk assessment.
2008	Provide report(s) on the fate of particulate matter for the purposes of containment, decontamination and exposure assessment.
2008	Provisional Advisory Levels (PALs) for 10 chemicals
2009	Estimate toxicity values for persistent chemicals and warfare agents through animal studies or estimation technologies.
2009	Validate models used to reduce uncertainty of toxicity and exposure extrapolations.
2009	Provide report(s) on the fate of particulate matter for the purposes of containment, decontamination and exposure assessment
2009	Develop PALs for 10 chemicals
2010	Define toxicity estimates with animal studies
2010	Define Infectivity and Pathogenicity Factors thru Animal/Toxicity Studies
2010	Provide report(s) on the fate of particulate matter for the purposes of containment, decontamination and exposure assessment.
2010	Add additional agents to SERRA
2010	Develop PALs for 10 more chemicals
2011	Provide No (or Lowest) -Observable-Adverse-Effect-Level for one bio-threat agent via animal studies
2011	Provide report(s) on the fate of particulate matter for the purposes of containment, decontamination and exposure assessment

LTG2 APMs (cont.)

2012	**Deliver reports techniques and tools to support the recovery (decontamination and associated material disposal) of buildings and outdoor environments following an incident of national significance.**
2008	Conduct one workshop on advances in decontamination technologies and methods.
2008	Provide reports on the environmental implications of disposal of waste resulting from the cleanup of chemical/biological/radiological contamination events.
2008	Provide reports on the persistence of chemical and biological agents in indoor and outdoor events.
2008	Provide report on interactions of radiological contaminants with structural materials to inform decontamination and disposal decisions.
2008	Reports on the efficacy of at least six decontamination technologies
2009	Provide reports on the environmental implications of disposal, of waste resulting from the cleanup from and response to chemical/biological/radiological contamination events
2009	Provide reports on the persistence of chemical and biological agents in indoor and outdoor event scenarios
2009	Provide report on interactions of radiological contaminants with structural materials to inform decontamination and disposal decisions
2009	Reports on the efficacy of at least six decontamination technologies.
2010	Provide reports on the environmental implications of disposal of waste resulting from the cleanup from and response to chemical/biological/radiological contamination events.
2010	Provide reports on the persistence of chemical and biological agents in indoor and outdoor event scenarios.
2010	Provide report on interactions of radiological contaminants with structural materials to inform decontamination and disposal decisions
2010	Reports on the efficacy of at least two decontamination technologies.
2011	Deliver report(s) or journal article(s) related to Decontamination Engineering (e.g. process optimization, effects of decontamination agents on materials and equipment)
2011	Deliver reports/journal articles on the efficacy of Decontamination methods and agents
2011	Provide reports/update tools on the environmental implications of disposal of waste resulting from the cleanup from and response to chemical/biological/radiological contamination events.

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Other indicators of Performance

- Product downloads from our web site www.epa.gov/nhsrc
- Client satisfaction survey
- Bibliometric analysis of peer-reviewed journal articles
- Unsolicited feedback from clients and other stakeholders
- Program efficiency

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Relationship to Others' Research

HS Research Program coordinates with the following programs to ensure synergy:

- ORD Research
  - Interaction of National Program Directors
  - Drinking Water Research Program
  - Human Health Risk Assessment Research Program
- Interagency Research Coordination
  - Participation in major interagency R&D planning workgroups
  - See summary document

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Communication Goals

- Raise awareness and understanding of the HS Research Program's work and mission.
- Effectively track Program activities and products.
- Engage clients about activities and available products and tools.
- Disseminate products in a timely and effective way.
- Solicit feedback and measure success of activities, products, and dissemination methods

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Summary

- The MYP will describe planned research for 2008-2011
- The MYP establishes
  - Relevancy / drivers / clients for the program
  - Research questions and planned approaches
  - Performance metrics - LTGs, APGs, APMs, others
  - Commits to a planning process with clients
  - Commits to a communication process