Training:

Planning for and Response to Catastrophic Events at Contaminated Sites

June 14, 2016 - 9:00am

George Nicholas, Moderator
Chairperson, DEP/SRWMP Guidance Development
Co-Chairperson, DEP/SRWMP Training
George.Nicholas@dep/nj/gov

WELCOME

- *In-Person Attendees*
- *Webinar Attendees*

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Continuing Education Credits (CECs)

An application has been submitted to the
SRP Professional Licensing Board to receive
2.0 Scientific/Technical CECs
for this Training Class

Attendance Requirements:

- **In-Person Attendance**: Must sign-in / sign-out: May not miss more than 45 minutes of the training
- **Webinar participants**: must be logged-in for entire session and answer 3 out of 4 test questions (randomly inserted in the presentation)

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Attendance Certificates
(Issued by the LSRPA)

After todays training, DEP will compile a list of "in-person" and "webinar" participants eligible for CECs

- DEP will send an email to those who registered and checked the box to receive a "Training Certificate"
- Email will contain a "Link" to a LSRPA webpage, which will have instructions on how to access certificates *(LSRPA - $25 processing fee)*

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Test Your Knowledge !
For webinar participants

EXAMPLE WEBINAR QUIZ SLIDE

Quartz is harder than calcite.

- ❑ True
- ❑ False

True

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Important reminders

- **Please mute cell phones**
- **Phone calls / conversations**
  - Please take outside of the meeting room
- **Question/Answers**
  - Taken at end of presentations
  - Please wait for the microphone
  - Webinar participants, wait for question period to "open up"; then type in question

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NJDEP TECHNICAL GUIDANCE UPDATE

George Nicholas, Chairperson
SRWMP Technical Guidance Development
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Technical Guidance

- 24 documents completed
- 5 currently in development
- Technical Guidance Available at http://www.nj.gov/dep/srp/guidance

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ROUND 1 Technical Guidance Committees

Document Status

	COMMITTEES	Draft Issued		Final Doc. Posted	Revised	Training Conducted
		Comment START	Comment END			
1	**Alternative and Clean Fill**	1/28/2011	3/11/2011	8/26/2011	ver 2.0 12/29/11	11/16/11
2	**Analytical Methods**	3/18/2013	4/29/2013	4/2014		6/24/14
3	**Compliance - Attainment**	4/4/2012	5/16/2012	9/24/2012		11/27/12
4	**Conceptual Site Model**	4/13/2011	5/25/2011	12/16/2011		1/30/12
5	**Ecological Evaluation**	4/19/2011	5/31/2011	8/30/2011	ver 1.2 8/29/2012	12/12/11
6	**Ground Water SI/RI/RA**	7/18/2011	8/29/2011	4/3/2012		4/10/12
7	**Historic Fill**	6/1/2011	7/13/2011	10/24/2011	ver 2.0 4/29/2013	11/16/11
8	**Immediate Environmental Concern (IEC)**	2/16/2011	3/30/2011	8/26/2011	ver 1.1 3/2015	9/8/11
9	**Investigation of Underground Storage Tank Systems**	4/12/2011	5/24/2011	4/12/2012		4/24/12

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ROUND 1 Technical Guidance Committees

Document Status

	COMMITTEES	Draft Issued Comment START	Draft Issued Comment END	Final Doc. Posted	Revised	Training Conducted
10	**Landfill Guidance**	4/12/2011	5/24/2011	2/7/2012	ver 1.3 5/2016	4/24/12
11	**Light Non-Aqueous Phase Liquid (LNAPL)**	12/21/2010	2/1/2011	6/14/2011	ver 1.2 8/1/2012	6/15/11
12	**Linear Construction**	10/20/2011	12/1/2011	1/27/2012		1/30/12
13	**Monitored Natural Attenuation**	5/25/2011	7/6/2011	3/1/2012		3/6/12
14	**Preliminary Asssessment**	4/4/2011	5/16/2011	1/30/2012	ver 1.1 4/19/2013	2/29/12
15	**Presumptive and Alternate Remedy**	3/22/2011	5/3/2011	7/22/2011	ver 2.0 8/2013	7/26/11
16	**Receptor Evaluation**	10/25/2010	11/9/2010	1/12/2011		6/2011
17	**Soil SI/RI/RA**	4/12/2011	5/24/2011	2/21/2012	ver 1.1 8/1/2012	5/4/12
18	**Technical Impracticability**	3/13/2012	4/24/2012	12/3/2013		2/19/14
19	**Vapor Intrusion**	5/12/2011	6/23/2011	1/13/2012	ver 3.1 3/6/2013	2/13/12

Round II Technical Guidance Committees

	Committee Start	Draft Issued Comment Period Start	Comment Period End	Final Doc posted	Training Date
Capping	Sept. 2012	3/11/2014	4/22/2014	7/14/2014	11/20/2014
Off-Site Source	Sept. 2012	9/17/2014	10/29/2014	4/28/2015	6/2/2015
Child Care Centers	April 2013	6/17/2015	7/29/2015		
GW Discharge to SW	Sept. 2012	6/9/2015	7/21/2015	1/19/16	2/23/16
Pesticides	Sept. 2012	7/16/2014	8/27/2014	12/2015	3/3/16
Catastrophic Events	Jan. 2014	12/29/15	2/09/16	6/2016	6/14/16
Commingled Plume	Sept. 2012	Est. Jun 2016			
Performance Monitoring	Sept. 2012	Est. Jun 2016			
To Support Remediation Standards					
EPH Protocol	August 2015	w/ Remed. Stds.			
ARS Ingestion-Dermal	August 2015	w/ Remed. Stds.			

On-Going Tech Guidance Updates

(To Support Remediation Standards)

- Vapor Intrusion Technical Guidance
  ITRC Training: September 26-27 Somerset NJ
- Impact to Ground Water (IGW) Documents (combine)
  - Synthetic Precipitation Leaching Procedure (SPLP) Guidance Document.
  - SESOIL guidance
  - Soil-Water Partition Equation guidance document
  - SESOIL/AT123D guidance

Can be found on the Soil Remediation Standards Webpage:
http://www.nj.gov/dep/srp/guidance/rs/

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Other Tech Guidance Updates:

- ECO Guidance: *(Version 1.3, issued 2/2015)*
- Fill Guidance: *(Version 3.0, issued 4/2015)*
- **Landfills Guidance**: *(Version 1.3, issued 5/2016)*
- Soils SI/RI/RA: *(Version 1.2 issued 3/2015)*
- Preliminary Assessment Guidance *(version 1.2 issued 10/2015)*

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Technical Guidance Training on Planning for and Response to Catastrophic Events at Contaminated Sites

June 14, 2016

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LSRP Continuing Education Requirements

36 Continuing Education Credits (CECs) over 3 year LSRP license renewal period:

Minimum no. of CECs must be satisfied in these categories:

- 3 CECs Ethics
- 10 CECs Regulatory
- 14 CECs Technical
- 9 CECs Discretionary

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Continuing Ed Programs vs. Activities

Proposed Rules LSRP Continuing Ed. NJAC 7:26I Subchapter 4

- **Continuing Education "PROGRAMS":**
- **1 CEC for 1 hour of instruction at universities, colleges, DEP, LSRPA and other organizations**
- **Includes "Alternative Verifiable Learning Formats" (AVLF)**
  - ***Webinars*** **- Exam required**
  - **No more than 18 CECs allowed for AVLFs / 3-year cycle**
- **Continuing Education "ACTIVITIES":** **Applications for each activity**
  - ***Teaching a course***
  - ***Preparing and giving presentations***
  - ***Presenting a paper***

"Activities" limited to 18 CECs / 3 year renewal cycle

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Recent LSRPA Initiatives

- **Resume Portal – Free service to all LSRPA members who are graduating or will graduate from a degree program. Association members who are looking for positions with member companies can post their resumes through our LinkedIn Page. Resumes are then linked/uploaded onto the LSRPA website.**
- **Next Generation of LSRPs and Aspiring LSRPs – LSRPA Member Breakfast on June 17 (Blue Swan Diner, Oakhurst, NJ). LSRPA will provide a short presentation on the "Responsibilities and Obligations of the LSRP," followed by an open forum to discuss issues and questions that affect the practices of environmental professionals in NJ.**

Visit *LSRPA.org > Member Services* for details

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WANTED - VOLUNTEERS

GET INVOLVED !

- **LSRPA Committees –**

Bylaws	**Communications**
Continuing Education	**College Outreach**
Membership/Next Generation	**Finance**
Risk Management/LP	**Legal/Legislative**
Mentoring	**Nominating**
External Stakeholders	**Regulatory Outreach**
SRRA 2.0	**Sponsorship**

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UPCOMING LSRPA EVENTS

- **June 28th** – Converting Contaminated Properties in Your Municipality into Assets, Iselin **(2 Reg. CECs)**
- **September 13th** – LSRPA Ethics Course, Bordentown **(3 Ethics CECs)**
- **September 27th** – Due Diligence Continuing Education Course (location TBD) **(5.5 Reg. CECs)**
- **October 25th-26th** – Fundamentals of Contaminant Chemistry and Applications in Subsurface and Contaminant Transport and Remediation, E. Windsor **(13 Tech. CECs)**
- **October 27th** – Emerging Contaminants Workshop, E. Windsor **(6.5 Tech. CECs)**

➢ **Visit LSRPA.org for details and registration**

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Thank You

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Planning for and Response to Catastrophic Events at Contaminated Sites

Today's Presenters:

- **Neil Jiorle**, LSRP
  French & Parrello Associates
- **Nicholas Santella**, Ph.D.
  Brownfield Science & Technology Inc. "BSTI"
- **Gary Pearson**, Asst. Director
  NJDEP Emergency Management Program

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Training Objectives

1. Understand how to use the Technical Guidance
2. Identify relevant factors when planning/preparing for catastrophic events
3. Determine current extent of preparedness and whether additional planning is necessary

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The Committee

- Mike Burlingame, PE, PP, NJDEP - SRWMP
- Bill Hadsell, NJDEP - SRWMP
- **Janine MacGregor, NJDEP - SRWMP**
- George Nicholas, NJDEP - SRWMP
- Gary Pearson, NJDEP Emergency Management Program
- Neil Jiorle, LSRP, French & Parrello Associates
- Nicholas Santella, Ph.D., Brownfield Science & Technology Inc. "BSTI"
- Beena Sukumaran, Ph.D., Rowan University
- Robert A. West, R.A. West Associates

Additional assistance provided by:

- Kevin DeLange, HDR
- Ron Kurtz, Firmenich
- Tom O'Neill, NJDEP - SRWMP
- Alison Stidworthy, NJDEP - SRWMP

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Background

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Background

- Superstorm Sandy, October 2012
  - Evaluate lessons learned
  - Identify improvements to enhance remedial system resiliency
  - Establish communication networks

Extensive power line damage during Superstorm Sandy (courtesy NJ Task Force 1, 2012).

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Intended Use of these Guidelines

- **Who?**
  - Investigators: LSPRs, PRCRs, environmental professionals, property owners, facility managers
- **What?**
  - Presents best management practices to plan for and respond to catastrophic events
- **How?**
  - Take guidelines into consideration to help plan for catastrophic events at contaminated sites
- **Where?**
  - Contaminated sites: an entire parcel, single or multiple AOCs, or impacted media

ACRONYMS

AOC: Area of Concern

LSRP: Licensed Site Remediation Professional

PRCR: Person Responsible for Conducting the Remediation

Pirates of the Caribbean: The Curse of the Black Pearl, Disney 2003

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What is a Catastrophe?

- Natural or human-caused
- Limited duration (hours to days)
- Significant magnitude
- Adverse impact on infrastructure, public health, and/or the environment
- Scale: from municipal to multi-state region
- May or may not anticipate event

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Is this a "catastrophe"?

http://www.nj.com/bergen/index.ssf/2015/01/crews_battling_fire_at_edgewater_apartment_complex.html

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Purpose of these Guidelines

- Equip Investigators to
  - Assess vulnerabilities of contaminated sites and develop a plan **prior** to a catastrophic event
  - Maintain site conditions or operational continuity and to respond effectively **during** an event
  - Implement recovery steps to re-secure a site and resume operations **after** an event

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Factors to Consider

- Plan and prepare for the impacts of catastrophic events at contaminated sites
- Consider:
  - types of catastrophic events
  - site specific conditions
  - potential impacts
  - constraints (i.e. logistical, regulatory, etc.)
  - the current status of the remediation

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Receptors

- What is a "receptor"?
  - Definition
  - Examples
- Identify sensitive receptors
- Assess potential for impact
- Outline measures to protect the receptors
- Follows PA stage (AARCS, Tech Rules)
  - Review the IRE, Receptor Evaluation, or Risk Assessment
  - Consider potential contamination of ESNR

ACRONYMS

PA: Preliminary Assessment

IRE: Initial Receptor Evaluation

ESNR: Environmentally Sensitive Natural Resources

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Catastrophic Events and Contaminated Sites

- Discharges of contaminants that would **require notification** to the NJDEP and remediation (ARRCS, Tech Rules)
- **Disruption of remedial activities** or remedies at (formerly) contaminated sites
- Anticipated or unanticipated events
  - **Information and lead time** affect preparedness, ability to respond and recover
  - Proper planning and training

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Monitoring Wells

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Understanding Site Conditions

- Conceptual Site Model (CSM)
  - Not mandatory, but **helpful**
- Contaminants
  - Consider **physical, chemical, and biological** characteristics
  - Transport, migration, potential impacts to receptors
- Subsurface Conditions
  - **Known or suspected COC**
  - Document COC for sites at SI, RI, RA, or post-RA stage

ACRONYMS

COC: Contaminant(s) of Concern

SI: Site Investigation

RI/RA: Remedial Investigation/Action

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Understanding Site Conditions

- Hydrology and Topography
  - Assess **site vulnerability**
  - Nearby surface water bodies and topography
- Land Use
  - **Current and future land use** of site and area
- Remedial Systems
  - Design to **maximize resiliency**
  - Continue functioning or "batten down the hatches" during an event?

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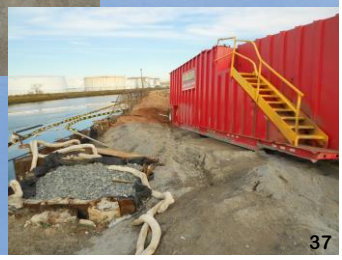
Storage Tank



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Regulations

- Consider **local, NJ, and federal** regulations regarding catastrophic events
- Recovery projects **may require permits or approvals** for work:
  - Floodplains - Meadowlands
  - Highlands - Protected ecological resources
  - Pinelands - Special habitat or use areas
  - Wetlands - Soil Conservation District

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Emergency Permits/Waivers

- Purpose: to prevent severe environmental degradation from occurring, and to address immediate and extraordinary risk to property or the public health, safety and welfare.
- See NJDEP main page during an event
  - www.nj.gov/dep
- Eligibility and permit duration restrictions apply
- Examples:
  - Flood Hazard Area
  - District Solid Waste Flow Control Requirements
  - Coastal Area Facility Review Act
  - Coastal Wetlands
  - Waterfront Development

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Status of Remediation

- This Guidance applies to sites at ANY remedial phase
- Planning for and responding to an event may differ depending on phase

Use all of this information to help in planning and site/system hardening

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Questions?

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Preparedness

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Preparedness

- ~~The Investigator should consider all possible events and their impacts and plan accordingly.~~
- "All Hazards Approach"
  - Consider variety of potential threats
  - Consider site conditions and complexity
  - Determine appropriate level of planning

"One disaster after another" by Marshall Ramsey
Posted in CARTOON on 6/21/2011

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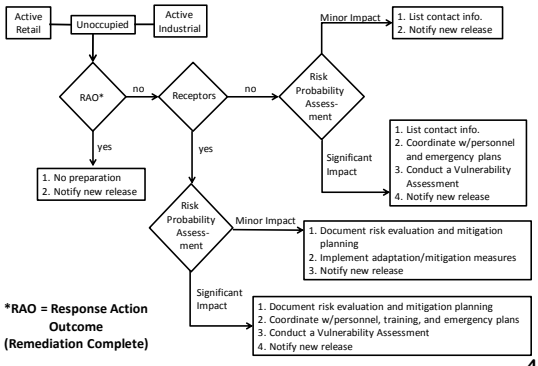
Decision Chart - Appropriate Level of Planning and Preparation



***RAO = Response Action Outcome (Remediation Complete)**

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How to Plan

- Sites where remediation is complete:
  - RAO-E, RAO-A, NFAs
  - No recommendations
- Other sites:
  - Risk-Probability or Vulnerability Assessment
    - Site system inventory
    - Hazard evaluation
    - Risk or vulnerability assessment
  - Identify mitigation measures
  - Written plan for response

ACRONYMS

RAO-E: Entire Site Response Action Outcome

RAO-A: Area of Concern Response Action Outcome

NFAs: No Further Actions

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Risk and Probability Assessment Matrix

Example: Landfill with cap and leachate collection near tidelands and urban areas

Impact:	Insignificant	Marginal	Moderate	Critical	Catastrophic
Operational Definition / *Annual Probability of Occurrence*	• Minor disruption • No increase in risk	• Interruption of remedial operations • Minor releases	• Remedial operations halted • Moderate releases at site • Moderate damage	• Remediation halted longer • Large release • Significant damage	• Complete destruction, IDLH conditions • Significant ecological impacts & property loss
Definitely 100%	Annual Storms	None	None	None	None
Likely 10%	None	Strong Storm System or Wildfire	Lightning Strike	None	None
Occasional 1%	Earthquake MMI VI	Minor Flooding	Tropical Storm or Cat 1 Hurricane	None	None
Remote 0.1%	None	Earthquake MMI VII	Major Flooding	Cat 2-3 Hurricane	None
Unlikely <0.1%	None	None	None	None	Cat 4 Hurr., Earthquake MMI VIII

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Example of **Vulnerability Assessment** Results and Prioritized Hardening Measures

Potential Points of System Vulnerability		Potential System Disruption				Adaptation Measures for High-Priority Vulnerabilities
		Power Interr-uption	Physical Damage	Water Damage	Reduced Access	
Above Ground Components of the Treatment System	Electrical Controls	●	●	●	●	Power from off-grid sources Remote access
	Pumps	◐	○	◐		
	Pipe System		◐			
	Electrical Equipment	●	○	●		Power from off-grid sources
	Natural Gas-Powered Equipment	◐	○	◐		

● high priority ◐ medium priority ○ low priority

Adapted from USEPA, 2013

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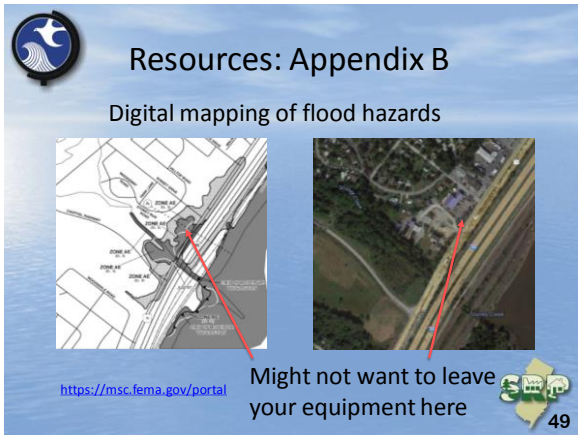

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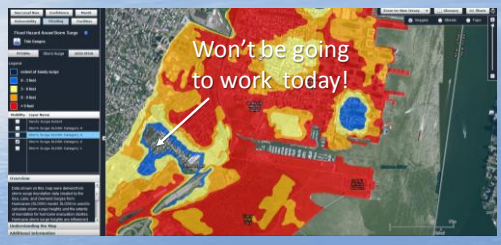
Resources: Appendix B



Interactive maps of sea level rise and flood hazards in NJ

http://slrviewer.rutgers.edu/

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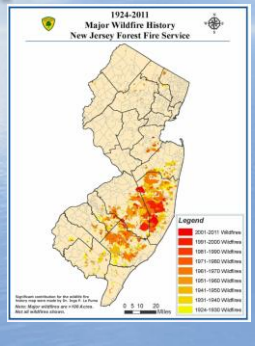
Resources: Appendix B



NJ wildfire information and interactive map of fire history

http://www.state.nj.us/dep/parksandforests/fire/

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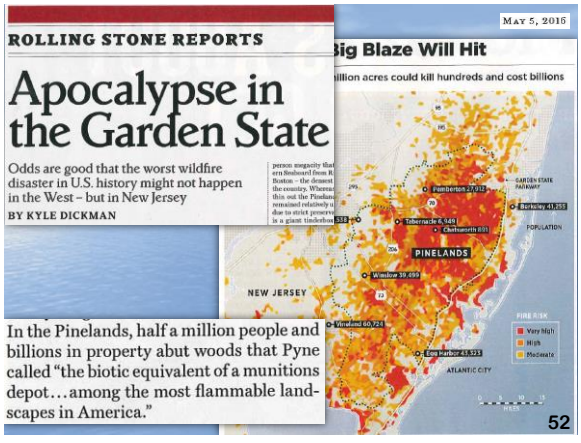

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Defensive or Adaptive Measures

- **Soil stabilization with vegetation or stone**
- Early warning monitoring systems
- **Secure remedial equipment**
- Secure storage areas
- Failsafe emergency shutdown
- Systems and safety interlocks
- Relief devices
- Fencing at the site to control access
- Repair or retrofit existing buildings
- **Elevate equipment or structures**
- Relocate equipment, structures or processes to less vulnerable location
- Design remedial processes with redundant components for greater resilience
- **Structural defenses**
- Maintaining spare equipment

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Contacts and Communication

Do you have Steve's cell number?

http://ofc24.com/

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Contacts and Communication

- **How?** Preferred method: phone
- **What?**
  - Redundant communication network
  - Chain of command, decision tree (who, when, why)
  - Default meeting location
  - National Incident Management System (NIMS), NJDEP Hotline, National Response Center, SRWMP Emergency Response Coordinator
- **Who?**
  - Investigator, Business/property owner/occupant
  - PRCR
  - Facility manager

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Assess Supplies and Equipment

- Inventory of available personnel, equipment, and materials
  - Keep hard copy on site
- Emergency response contractors and larger equipment suppliers
- List of local/state emergency responders

http://megalongvalley.rfs.a.org.au/images/survial%20kit.png

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Questions?

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Training and Exercises

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Training and Exercises

- Train personnel responsible for implementing a response at each site
  - Review the **contacts list**
  - May already have an emergency response plan
  - Conduct biennially
- Be familiar with National Incident Management System **(NIMS)**

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NIMS

- **National Incident Management System**
- Systematic standardized approach to incident management
- Developed by the United States Department of Homeland Security (DHS)
- Purpose to provide a common approach for managing incidents
- Awareness level IS-700 online certification course
- Essential foundation to the National Preparedness System (NPS)

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Response

- **Safety** first!
- Activity level at site determines appropriate nature of the response
- Designate the "**Person in Charge**" of the site
  - Facility manager
  - LSRP/project manager
  - Other?

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Who's in Charge?

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When an anticipated event…

Is imminent

- Assess the specific threat and current site conditions
- Review planning documents
- Investigator enacts planning procedures and actions

Has occurred

- Investigator travels to site ASAP to observe conditions
- Evaluate site conditions and risks for actual or potential contaminant discharge
- Coordinate with others to implement response plans

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Questions?

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Prioritize Response Actions

Hierarchy of conditions requiring response actions:

1. Emergency Response conditions
2. Immediate Environmental Concern (IEC) conditions
3. Containment of contamination from that site

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Prioritize among multiple sites

High

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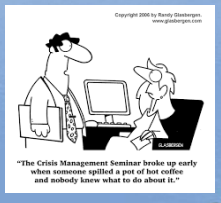
Evaluate and Respond

- Investigator evaluates resources and implements response
- Identify available response equipment
  - Gasoline
  - Electric generators
  - Spill response equipment
  - Laborers & technicians
  - Access to site
  - Water
  - Tools
  - Spare parts
  - Etc.



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Recovery

Recovery is the process of

- Returning a site to the **same operational condition** that existed prior to the catastrophic event
- Returning site to **pre-event conditions**
- **Document changes** to site conditions and efforts taken to stabilize conditions

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New Technologies and Guidance

- Consider new technologies or remedial approaches that would better protect human health and the environment in the event of changed site conditions
- Investigator uses most current, applicable NJDEP SRWMP technical guidance and regulations
  - **Opportunity to update remedial systems**

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Post-Event Reporting

- Event may cause a **"new" release** at the site
  - New Spill Act notification to the NJDEP Hotline
    - 877-WARN-DEP (877-927-6337)
- Event may trigger certain **regulatory requirements**
- **Document** post-event conditions compared to pre-event conditions

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Lessons Learned

- Identify elements that were **effective and ineffective**
  - Identify lessons learned
  - Modify the planning process
- Investigator re-applies steps in this Guidance
- Re-evaluate site conditions, receptors, constraints, vulnerability, and other factors

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Questions?

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Case Study

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"Zero-Hour" Schedule for Anticipated Events

- **Hour 96 – Hour 72 (4 to 3 days prior to event):**
  Begin to determine what sites may be impacted
- **Hour 72 – Hour 48 (3 to 2 days prior to event):**
  Review and coordinate emergency preparatory measures
- **Hour 48 to Hour 24 (2 to 1 day prior event):**
  Begin mitigating operations
- **Hour 24 to Hour 0 (1 day prior event):**
  All potential impacted sites should be secure

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Hypothetical Case Study

Holocong Manufacturing Site

- On the banks of the Manasquan River and adjacent to NJ Route 35
- Residential properties nearby
- On-site ground water is subject to tidal influence.
- Surface soils impacted by PCBs
- Subsurface soils and ground water impacted by volatile organic compounds (VOCs)
- On-site, trailer-mounted Air Sparge/Soil Vapor Extraction (AS/SVE) remediation system
  - Remote operation via cellular communication
  - SCADA (Supervisory Control and Data Acquisition) System
- RI has been completed delineating PCB impacts

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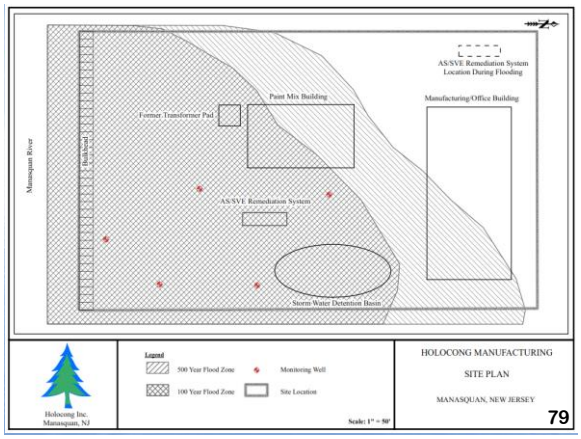

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Hypothetical Case Study

Vulnerability Assessment

- AS/SVE trailer and catalytic oxidation unit
  - Within flood zone
  - Not anchored to ground
- Could impact remedial operations for several months and result in costs up to $200,000
- Contaminated surficial soils vulnerable to erosion
- Significant contaminant transport would require post even assessment

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Hypothetical Case Study

Mitigation Measures

- Plans were made to:
  - Move the remediation trailer outside floodplain
  - Install temporary tie-downs prior to flood/storms
  - Drain the on-site detention basin prior to storms
- Improvements included:
  - Increase integrity of bulkhead
  - Transformer area reinforced with matting and seeded
  - Signing up for NOAA weather alerts

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Hypothetical Case Study

Tropical Storm Janine 2016

- Weather alert initiated move of AS/SVE remediation system 2 days prior to the storm.
- The detention basin was drained.
- Above-ground sections of AS/SVE piping damaged by flood-borne debris.
- Surface soils from transformer area eroded and dispersed in flood waters.
- The LSRP was not aware of the status of the Site until 4 days after the storm.
- On-site remedial systems restored 30 days later

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Response and Lessons Learned

- Receptor Evaluation updated
- Plans for protection of the AS/SVE system and catalytic oxidizer proved adequate
- Expedited remediation of transformer area *not* practical
- Further hardening of the transformer area
- Steepest portion reinforced with turf matting, re-stabilized with grass seed
- On-call contracts established
- Contact list expanded
- The SCADA system was valuable asset

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Questions?

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