Training:

Historically Applied Pesticide Site Technical Guidance

March 3, 2016, 9:00am

Tessie Fields, Moderator
Co-Chairperson, DEP/SRWMP Training
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SRWMP 1

WELCOME

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

SRWMP 2

Continuing Education Credits (CECs)

An application has been made to the
SRP Professional Licensing Board to receive
2.0 Regulatory 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)

SRWMP 3

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)*

SRWMP

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Test Your Knowledge !
For webinar participants

EXAMPLE WEBINAR QUIZ SLIDE

Sky diving without a parachute may be hazardous to your health

- ❑ True
- ❑ False

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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" and can then type in question

SRWMP

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NJDEP TECHNICAL GUIDANCE UPDATE

George Nicholas, Chairperson
SRWMP Technical Guidance Development
George.Nicholas@dep.nj.gov

Presentation for: Technical Guidance Document Training: Historically Applied Pesticide Site
Thursday, March 3, 2016

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Technical Guidance

- 23 documents completed
- 6 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 Comment START	Draft Issued Comment END	Final Doc. Posted	Revised	Training Conducted
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		Final Doc. Posted	Revised	Training Conducted
		Comment START	Comment END			
10	**Landfill Guidance**	4/12/2011	5/24/2011	2/7/2012	ver 1.1 8/1/2012	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

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Round II Technical Guidance Committees *(February 2016)*

	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		
Commingled Plume	Sept. 2012	Est. Mar 2016			
Performance Monitoring	Sept. 2012	Est. Apr 2016			
Additional Guidance To Support Remediation Standards					
EPH Protocol	August 2015	Est. Mar-Dec 2016			
ARS Ingestion-Dermal	August 2015	Est. Mar-Dec 2016			

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Tech Guidance Updates

(To Support Remediation Standards)

- Vapor Intrusion Technical Guidance
- Impact to Ground Water (IGW) Related Documents:
  - 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 1.2, issued 9/2015)*
- Soils SI/RI/RA: *(Version 1.2 issued 3/2015)*
- Preliminary Assessment Guidance *(version 1.2 issued 10/2015)*

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Training on the
Historically Applied Pesticide Site
Technical Guidance

March 3, 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 "<u>PROGRAMS</u>":**
- **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 "<u>ACTIVITIES</u>":** **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

- **<u>Dispute resolution</u> - LSRPA listing of willing members to serve as a technical arbitrator/mediator in disputes between LSRPs working for adversarial parties.**
- **<u>Sounding Board</u> - Provides a forum for questions / concerns with no clear-cut solution in regulation or guidance. Responses based on collaborative input from the Sounding Board subcommittee and are verbal / non-binding. Legal disclaimer agreement required and confidentiality is maintained.**

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

- **March 8th** – LSRP Ethics Class Montclair State U. **(3 Ethics CECs)**
- **March 15th** – Member Breakfast, Livingston **(CECs pending)**
- **March 31st** – Child Care Regulatory Training, Livingston **(4 Reg. CECs)**
- **May 18th** – Remedial Action Permit Training, Bordentown **(3.5 Reg. CECs)**

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

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Thank You

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Historically Applied Pesticide Site Technical Guidance

Some background…

Tess Fields, Co-Chair -DEP/SRWMP Training
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Historically Applied Pesticides
It's not new news

In 1999 the Department Published a report

Findings and Recommendations for the Remediation of Historic Pesticide Contamination

written by the Historic Pesticide Task Force

This was used as guidance before the LSRP program

Findings and Recommendations for the Remediation of Historic Pesticide Contamination

"The agricultural community has routinely and consistently applied pesticides to control pests and increase crop yield over the past 100 years."

"…arsenical pesticides may have been applied to approximately 240,000 acres statewide."

These practices are consistent with those in other states and other countries.

The LSRP Program
The Paradigm Shift

The need for more thorough guidance that LSRP's could use without the Department's involvement was identified as a priority

The Spill Compensation and Control Act definition

"**Discharge**" - any intentional or unintentional action or omission resulting in the releasing, spilling, leaking, pumping, pouring, emitting, emptying or dumping of a hazardous substance, hazardous waste or pollutant into the waters or onto the lands of the State, or into waters outside the jurisdiction of the State when damage may result to the lands, waters, or natural resources within the jurisdiction of the State.

HAP Presentation Overview

Lynne Mitchell
Historically Applied Pesticides and Conducting a Site Investigation

Chris Dwyer
Conducting a Remedial Investigation and Common Remedial Options for Historically Applied Pesticides

Kathi Stetser
ISRA Closure Scenarios Involving Historically Applied Pesticides

Rich Lake
Case Studies

Historically Applied Pesticides and Conducting a Site Investigation

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HAP Technical Guidance Committee

NJDEP

- **Chris Dwyer**, Co-Chair
- **Lynne Mitchell**, Co-Chair
- **Kevin Schick**
- **Kathy Kunze**
- **Jeff Griesemer**

Stakeholders

- **Joe Sorge** - J M Sorge, Inc.
- **Neil Rivers** - Langan
- **Rohan Tadas** - T&M Associates
- **Carrie McGowan** - EHS Support
- **Rich Lake** – Geo-Technology Assoc., Inc.
- **Kathi Stetser**, GEI Consultants
- **Barbara J. Koonz**, Wilentz, Goldman & Spitzer

What is HAP?

Historically Applied Pesticide(s)

- Include arsenic, lead, DDT (and its metabolites, DDE and DDD), dieldrin, aldrin and chlorodane
- Persistent in the environment
- Have not been widely used in many years


CITY OF WACO
DDT

What HAP is not…

- HAP is not a historic pesticide mixing area or spill
- HAP is not a new or recent pesticide discharge

Additional information on how to identify Areas of Concern can be found in the ***Technical Guidance for Site Investigation of Soil, Remedial Investigation of Soil, and Remedial Action Verification Sampling for Soil,*** available at:

http://www.nj.gov/dep/srp/guidance/#si_ri_ra_soils

HAP: How do we handle it differently?

- RAO insert – don't have to look for HAP, use the insert
- Active Farms: If HAP found, can defer cleanup until no longer an active farm
- Compare soil to RDCSRS instead of IGWSSL
- Functional area has no limit on size/shape during SI or RI
- Natural background can be based on arsenic to lead ratio
- Trigger to do a ground water investigation is different
- Can move HAP impacted soil to other parts of active farm w/out restrictions
- Can blend HAP impacted soil to achieve compliance
- CEA extent now equal to site boundary (like Historic fill)

How this applies to you

If sampling results indicate HAP is present and exceeds applicable standards:

- Must remediate (pursuant to 7:26C and 7:26E), using all relevant regulations and Guidance.
- However… at active agricultural properties, can defer remediation until property is no longer used for agricultural purposes.

How this applies (cont'd)

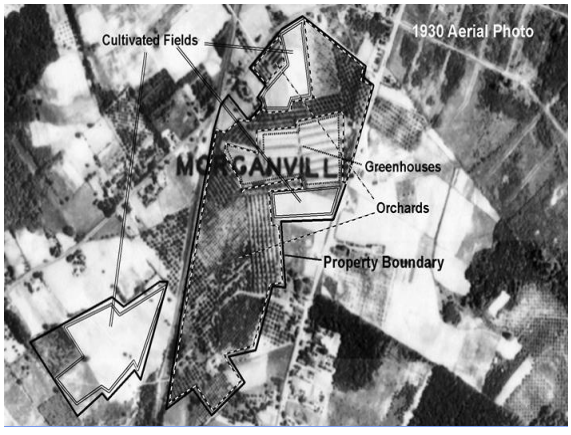
If HAP is assumed to be present at a site (because of prior/current use):

- If site use is changing to school, child care center, residence or playground, HAP must be investigated and remediated using all relevant regulations and Guidance (pursuant to 7:26C and 7:26E)
- If site use is not changing use to a school, child care center, residence, or playground, then the RAO insert may be used to indicate the property was not investigated for HAP.

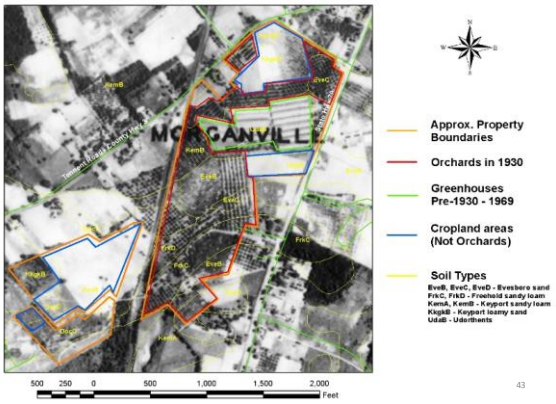
How to Identify HAP at a Site

Use historical information to identify areas that were used for agricultural purposes and may have used pesticides

- Aerial photographs
- Old maps of the area
- Interview previous property owners and workers



1930 Aerial Photographic Base Map



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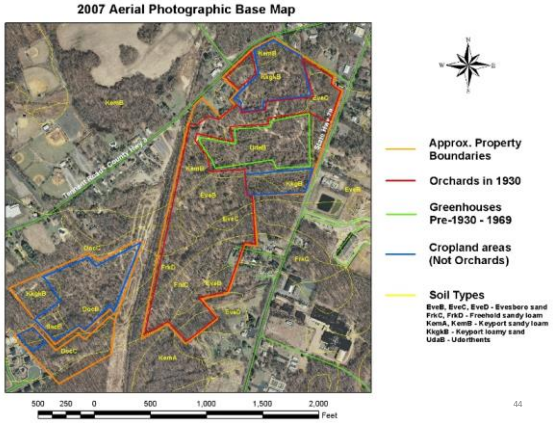
2007 Aerial Photographic Base Map



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What remediation standards should be used?

- Soil samples - compare to
  - Residential Direct Contact Soil Remediation Standards (RDCSRS)

Note: Impact to Ground Water Soil Screening Levels should not be used (*However, an exception for this will be discussed later in the presentation*)

Soil Sampling during the Site Investigation

- Bias sample locations toward suspected or known areas of highest contamination
  - Such as low-lying areas, orchards, drainage features and cultivated fields
- The highest concentrations are likely to be in surface soils
  - Collect discrete samples at the 0-6 inch interval
- Analyze samples for arsenic, lead and Target Compound List (TCL) pesticides

Soil Sampling Frequency

Depends on the size of the HAP area

- **For sites up to 10 acres**:
  - collect 1 sample for every 2 acres (min. 2 samples)
- **For larger HAP areas (up to 100 acres)**:
  - collect 5 samples for first 10 acres, plus 1 additional sample for every additional 5 acres
- **For HAP areas over 100 acres**
  - A reduced sampling frequency may be appropriate

Attainment of Remediation Standards during the Site Investigation

(Differs from Attainment Guidance)

Compliance averaging may be appropriate when the data identify a relatively uniform application across the area

- Appropriate: widespread application - only a few samples across the site exceed the applicable remedial standard
- Not Appropriate: localized area - when an exceedance is detected in only one area
  - Must determine if exceedance was caused by a spill/mixing area, which would require remediation as an AOC.

Determining a Horizontal Functional Area

A horizontal functional area must be determined to conduct compliance averaging

- Base the functional area on:
  - Patterns in the data
  - The configuration of historic crop areas
  - No limitations on the shape or size of the functional area (not based on future site use)
  - Data from uncontaminated areas should not be included when compliance averaging

Investigation of Naturally Occurring Arsenic

- Elevated levels of arsenic are common in some New Jersey soil types
  - e.g., Kresson, Marlton, Freehold, Collington, Holmdel, Shrewsbury, Keyport, Adelphia and Tinton
- Application of HAP in areas of elevated arsenic background concentrations may make it difficult to differentiate
- Determine site specific natural background

Approaches for Investigating Naturally Occurring Arsenic

- Surface and subsurface sampling at locations not affected by pesticide applications
- Sampling at depth within HAP areas
- Arsenic to lead ratio evaluation

Surface and subsurface sampling outside of HAP areas

- For agricultural properties, identify surface and subsurface sampling locations not affected by pesticide applications *(can use historic aerials)*
  - e.g., Wind breaks, wooded areas, wetland margins, roadways or on residential portions of the property

Investigation of Natural Background cont.

- Sample soils for arsenic that are deeper than where soils are likely to be impacted by normal agricultural use (typically >2 feet deep)
- Can look at the lead to arsenic ratio
  - A ratio of lead to arsenic of approximately 4:1 is indicative of HAP

Questions?

Conducting a Remedial Investigation and Common Remedial Options for Historically Applied Pesticides

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Remedial Investigation - Soil

What is the goal?

- Delineate
  - Determine the nature and extent of HAP identified in the SI that exceeded the Department's Soil Remediation Standards (RDCSRS)
- Identify potential receptors
- Determine the need for remedial action
- Collect information to evaluate potential remedial alternatives

Delineation- Horizontal

Use multiple lines of evidence, which may include:

- Historical Aerial Photography
- Interviews
- Site Drainage Patterns (both current and historical)
- Soil data

Delineation - Vertical

- The highest concentrations of HAP are typically found in the cultivated zone (0-18 inches bgs)
- Collect samples in 6-inch intervals
- Begin vertical delineation in the 6-inch interval below the cultivated zone

Is soil blending a feasible remedial option?

- Requires a thorough understanding of HAP distribution/concentrations (horizontal and vertical delineation)
- Generally requires more analytical data compared to other remedial options
  - Must account for variability across the site
  - Must mitigate the potential for inconsistent blending
- Lets look at some examples…

Is Blending an Option?
Example 1

Inches below grade	Dieldrin Results ppm	Running Avg. ppm
6"	0.070	NA
12"	0.070	0.070
18"	0.021	0.054
24"	ND(0)	0.04
30"	ND(0)	0.033
Soil Standard 0.04 ppm		Avg 0.033 ppm

Is Blending an Option?
Example 2

Inches below grade	Arsenic Results ppm	Running Avg. ppm
6"	62	62
12"	25	43.5
18"	12	33
24"	17	29
30"	22	27.6
36"	21	26.5
42"	10	24.1
48"	7	22
54"	5	20.6
60"	3	18.3
Soil Standard: 19 ppm		Avg 18.3 ppm

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Attainment of Remediation Standards at HAP Sites (RI)

- Define the horizontal functional area based on historic land use (crop patterns)
  - Based on review of historical aerial photographs or other historical data source
- There are no limitations on the shape/size of the functional area when compliance averaging RI data

Ground Water Remedial Investigation at HAP Sites

A groundwater investigation is recommended when:

- Potable wells will be installed at the site;
- HAP exceeds the Impact to Ground Water Soil Screening Levels (IGWSSL) and intersects the water table; or
- HAP are above the RDCSRS within 2-feet of GW table, and not on the immobile chemicals list

http://www.nj.gov/dep/srp/guidance/rs/immobile_chemicals.pdf

Ground Water RI at HAP Sites (cont'd)

- Concerns with use of temporary well points:
  - Samples typically have high turbidity resulting in false positives
  - For metals and/or where HAP exceed RDCSRS and are in close proximity to the water table
- Possible solutions:
  - Use low-flow sampling methodology recommended to minimize sample turbidity
  - Use of monitoring wells
  - Use temporary wells with pre-packed screens

Ground Water Remediation "DOs"

- Establish a CEA if HAP-related ground water contamination is found
  - Can be limited in size the extent of contamination or to the property boundaries
  - The duration of the CEA will indeterminate if the contaminants are left in place
- A Remedial Action Permit must be obtained in accordance with N.J.A.C. 7:26C-7 when ground water contamination will remain on the property

Ground Water Remediation "Don'ts"

- Don't establish CEAs without confirmation that ground water has actually been contaminated by site-related HAP
  - Don't rely on a ground water sample obtained from a temporary well point alone
- A CEA should not be established for naturally occurring arsenic detected in ground water

Remedial Actions

Options:

- Removal
- Engineering and institutional controls
  - capping in place
  - consolidation and capping
  - deed notice
- Soil blending
- Treatment

Removal

Excavate soil in excess of the applicable remediation standard

- Move to an area of a site where agricultural use will continue
- Use as alternative fill on site
- Use as alternative fill off site
- Transport off site to a suitably licensed disposal facility

Engineering and Institutional Controls

Contaminated soil **should not** be placed in close proximity to the water table during consolidation

- HAP above the RDCSRS can be consolidated on site and placed under a suitable engineering control to prevent direct contact exposure as long as the receiving area has similar levels of HAP.
  - buildings, roads, landscaping or aesthetic berms, or otherwise capped
- HAP above the RDCSRS can be capped in place

Soil Blending

- Remediation strategy applicable only to the remediation of HAP
- When HAP concentrations are greater than 5x the applicable remediation standard blending **is not** recommended
- Blending may be achieved using clean subsurface soils or imported clean soil from off site

Things to consider when blending

- Not feasible at sites when arsenic is the contaminant of concern and background concentrations are high
- Blending requires significantly more analytical data prior to selection as a remedial option
- A suitable blending methodology is required to ensure the desired blending is achieved
- Soil type and its ability to be blended
  - i.e., clay content, Wet Soils

Things to consider when blending
(cont'd)

- Blending not be used when the seasonal high water table is within the blending zone
- Evaluate the potential for blending to create ground water impacts based on
  - Mobility of the HAP of concern
  - The depth of the blending zone, and
  - The anticipated depth to ground water

Treatment

- The use of chemical additives or biological processes
- Not considered to be a practicable option at this time
- Cost prohibitive for HAP sites
- However, a feasible treatment method may be utilized with appropriate verification and any applicable permits.

Remediation Verification

For in-situ blending

- Collect 4 soil samples for each acre of soil remediated or blended from the surface interval (0-6 inches).
- One profile sampling location should also be evaluated for every four acres of soil to be blended (min. 1 location per site)
  - The profile location is sampled vertically in 6 inch increments through the blended zone
- Limit analysis to the HAP of concern

Example of Post-Blending Sampling

If 8 acres are blended to a depth of two feet:

- Collect 32 surface samples (0-6 inches)
- At two locations, obtain additional samples at 6-12 inches, 12-18 inches, and 18-24 inches
- Total of 38 samples

Attainment of Remediation Standards at HAP Sites (RA)

- No limitations on the size or shape of the functional area when compliance averaging the remedial verification data
- When evaluating post-blending remedial verification results, it is acceptable to establish a vertical function area that corresponds to the entire blended depth.

Response Action Outcome (RAO) Notice

- Use the notice when pesticides may have been historically applied at a site but were **not investigated** as part of the remediation
  - Example: Historical application of pesticides at an industrial facility not investigated

Response Action Outcome (RAO) Notice

- Do not use the notice for manufacturing, mixing, or other handling areas
- Do not use the notice when there is a change of use to residences, schools, child care centers, and/or playgrounds.

Response Action Outcome (RAO) Notice

"Please be advised that the remediation that is covered by this Response Action Outcome does not address the remediation of contaminants that may exist from the historical application of pesticides. As a result, any risks to human health presented by the historical application of pesticides may remain. An evaluation of historical pesticides should be completed if there is a land use change to residences, schools, child care centers and playgrounds. This exclusion does not apply if the pesticide contamination is from a discharge due to manufacture, mixing, or other handling of these chemicals and not from application."

http://www.nj.gov/dep/srp/guidance/#rao

Questions?

ISRA Closure Scenarios Involving Historically Applied Pesticides

Kathi Stetser, GEI Consultants
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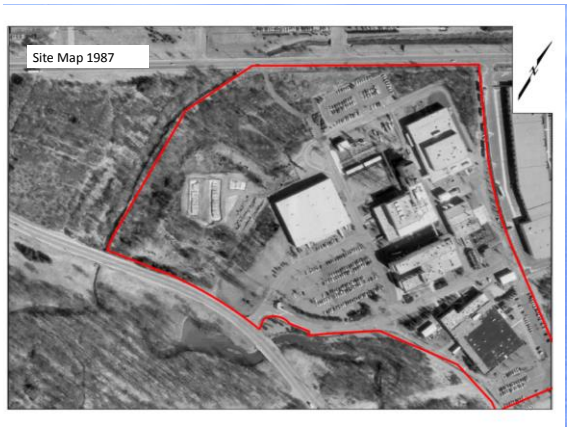
ISRA HAP Example

- Prior agricultural property
- Developed as a pharmaceutical plant in the 1970s
- Sold and redeveloped into a data center in 2010



ISRA Closure Scenarios

- Don't sample for HAP
  - Use RAO HAP notice
  - Defer HAP sampling until/if use change to residential/school/daycare
- Sample for HAP
  - Remediate if identified above standard
- Accidentally find HAP while sampling for other things (As, Pb)
  - Remediate if identified above standard

Questions?

Case Studies

Rich Lake, *Geo-Technology Associates*
rlake@gtaeng.com

Site Investigation

- 43 acre property
- Determine historic agricultural area
- 27 acres of historic agricultural use
- 5 samples for the first 10 acres
- 4 samples for the remaining 17 acres
- Total of 9 samples

Evaluating Site Investigation Data - Example 1

- Dieldrin in ppb
- RDCSRS: 40 ppb
- Arithmetic mean of samples: <40 ppb
- Compliance averaging demonstrates attainment of RDCRSR.
- **Remediation not required!**

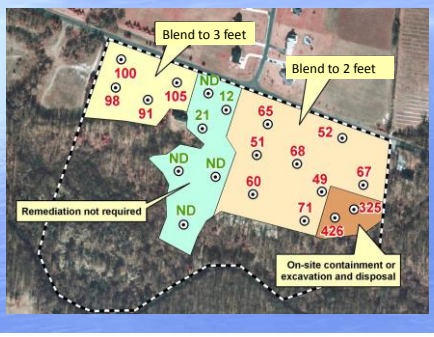
Evaluating Site Investigation Data - Example 2

- Dieldrin in ppb
- Dieldrin RDCSRS: 40 ppb
- ND: dieldrin not detected
- Arithmetic mean of samples: <40 ppb
- **But…contamination limited to one historic field.**
- **Additional action required!**

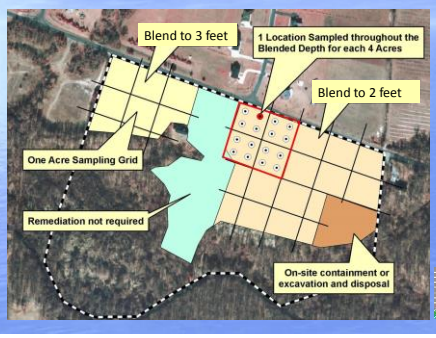
Evaluating Site Investigation Data - Example 3

- Dieldrin ppb
- Dieldrin RDCSRS: 40 ppb
- **Remediation required!**

Remediation Example



Post-Remedial Sampling Requirements



Questions?