

DER-10

NYSDEC Guidance on
conducting acceptable
investigations and remediation



PURPOSE

for today's training

Familiarize

What the Guidance is / is not

Clarify

Answer questions



Overall Agenda

- Chapter by Chapter
 - Presentation by DEC staff
 - Real-life experiences from the private sector
 - Questions and Answers



Why DER-10 is important to you

Multiple benefits to anyone
involved with SSF, BCP, ERP,
VCP projects



Chapter 1

Applicability

Definitions

General requirements



Scope of DER-10

- Effective Date: May 3, 2010
- Any site where there is an agreement/oversight document
- Incorporates but does not supercede laws and regulations
- Replaces some previous guidance



Definitions

Historic Fill

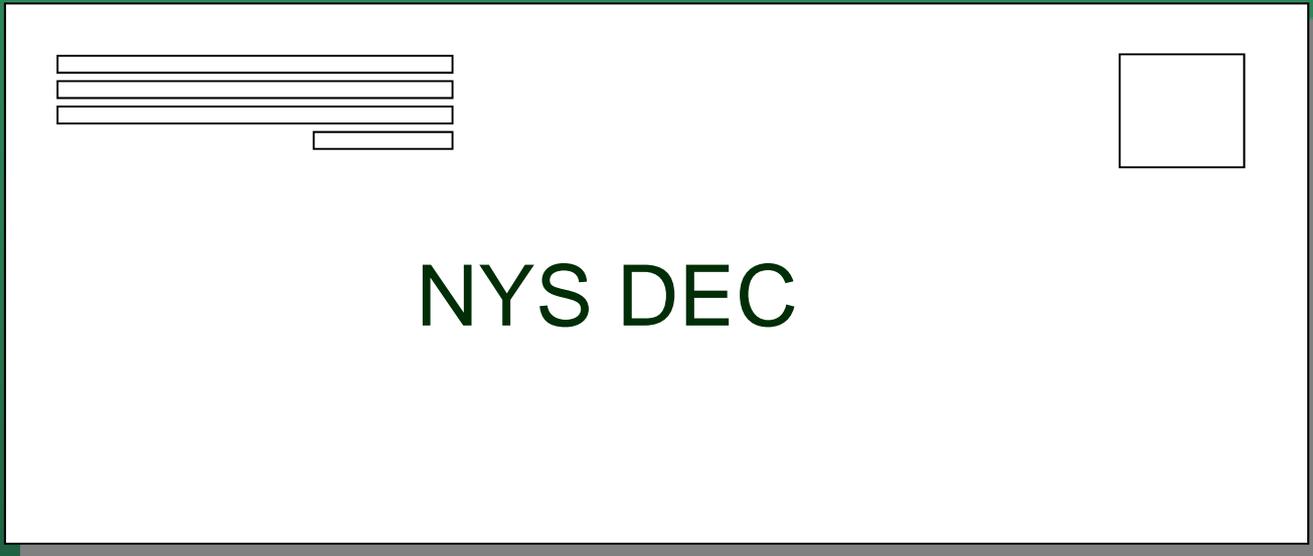
Engineering Controls

Final Engineering Report

Qualified Environmental Professional (QEP)



Notification



NYS DEC

Required for:

Change in Use

Start of field Activities

Site Management

Emergency Actions

Biota Sampling



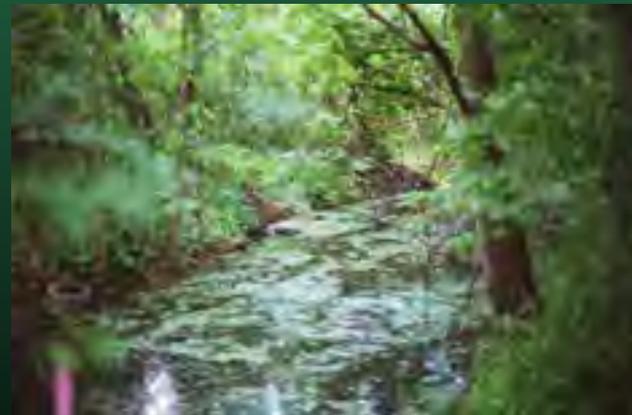
Certification



Documenting Compliance with and going beyond the Guidance



Areas of Concern



Health and Safety

HASP

CAMP

CHASP



Appendix 1A has
a generic CAMP



Permits

Identify permits needed
And those expected to be waived

Appendix 1C includes a list of
permits subject to exemption

FORM 30 (2011) STATE OF NEW YORK DEPARTMENT OF TRANSPORTATION HIGHWAY WORK PERMIT APPLICATION FOR NON-UTILITY WORK PREPARE 3 COPIES (photocopies acceptable)

Application is hereby made for a highway work permit: For Joint Application, name and address of Second Applicant below:

Name _____ Name _____
Address _____ Address _____
City _____ State _____ Zip _____ City _____ State _____ Zip _____

Federal I.D. No. or Social Security No. _____
Applicant Telephone No. _____
Contract person in case of emergency _____
Telephone No. of contract person _____

Project Identification No. _____
Highway Work Permit No. _____

RETURN PERMIT TO (or affixed from above): RETURN OF DEPOSIT/OND TO (complete only if affixed from permittee):

Name _____ Name _____
Address _____ Address _____
City _____ State _____ Zip _____ City _____ State _____ Zip _____

1. Estimated cost of work being performed in state highway right of way \$ _____
2. Anticipated duration of work: From _____ AM _____ PM _____ to _____ AM _____ PM _____ to apply to the operational checklist on the reverse side.
3. Protective Liability Insurance covered by Policy No. _____ expires on _____ 20 _____
4. A \$25.00 fee will be charged for checks returned by the bank.

PROPOSED WORK (brief description): _____

ATTACHED: Plans _____ Specifications _____ LOCATION: State Route _____ State Highway _____
Intersection/Reference Marker _____ and Reference Marker _____
Town of _____ County of _____

SEQR REQUIREMENTS (attach appropriate form):

Type 11 _____ EIS or DEIS _____ Lead Agency _____

If project is identified to be categorical, exempt, or TYPE 11, no further action is required.
If project is determined to be other than categorical, exempt, or TYPE 11, refer to N.Y.S.P. 12.0, Appendix A SEQR REQUIREMENTS FOR STATEWORK PERMITS.
Acceptance of the requested permit subjects the permittee to the restrictions, regulations and obligations stated on this application and on the permit.

Applicant Signature _____ Date _____ 20 _____
Second Applicant Signature _____ Date _____ 20 _____

Approved/Recommended _____ 20 _____ By Regional Engineer _____ Permittee No. _____
Approved _____ 20 _____ By Regional Traffic Engineer _____ Permit No. _____

PERMIT IS ISSUED CONTRACTOR UPON LOCAL REQUIREMENTS BEING SATISFIED.



Use of a Site/Land Use



Final Items on Chapter 1

- Sustainability and Green Remediation
 - DER-31 (Green Remediation) is now final
- Electronic Submissions
 - The requirements for submission of data and documents can be found at:

Electronic Warehouse Standard -

<http://www.dec.ny.gov/chemical/62440.html>

Electronic Document Standards -

<http://www.dec.ny.gov/regulations/2586.html>



Use of DER-10

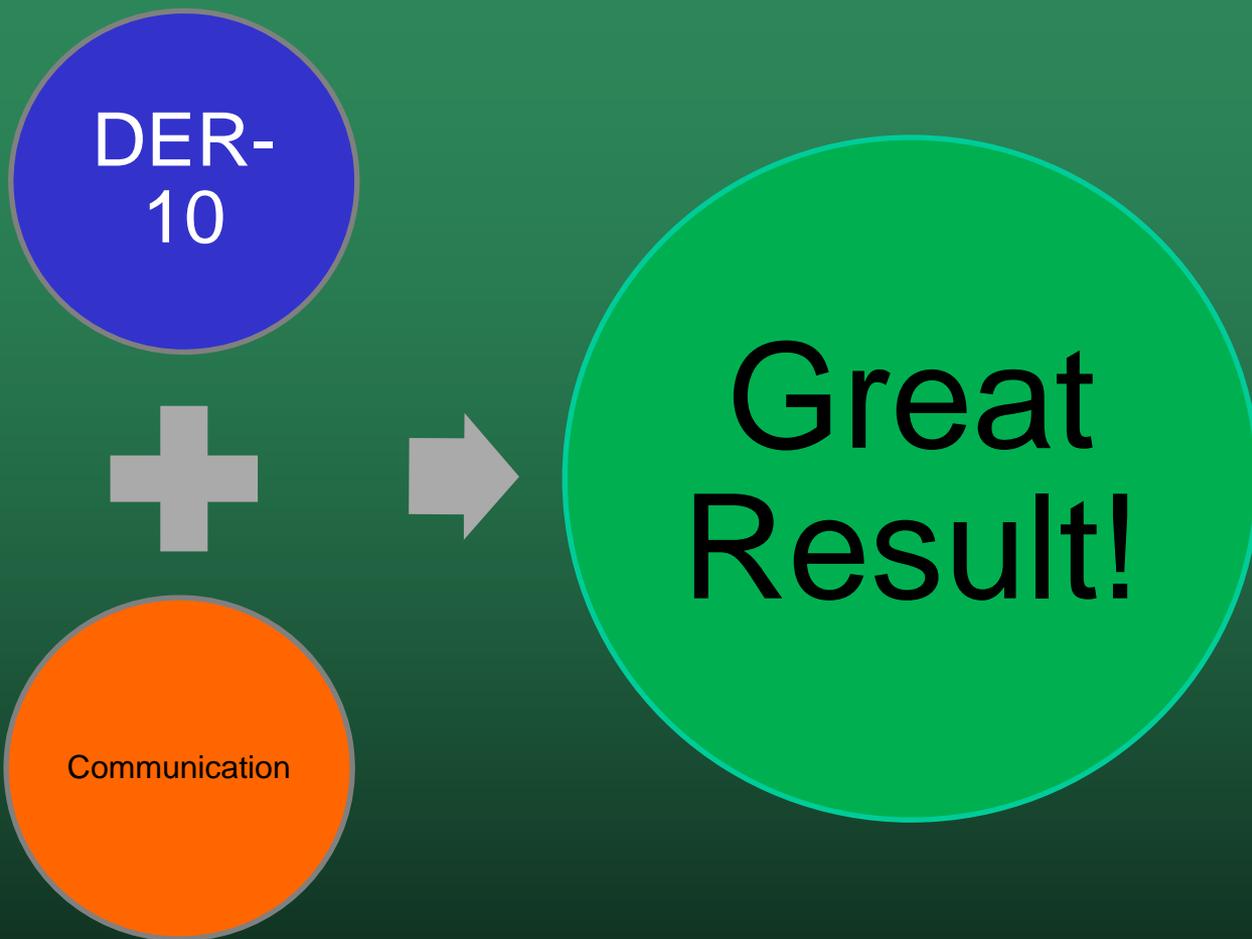
Saves Time

Saves
Aggravation

Saves Money

APPROVABLE
WORK
PRODUCT!!!!





Next Up

- Real-life scenarios



DER-10

Chapter 1 General Information

A PRACTICAL PERSPECTIVE



Presented by
Damian Vanetti, P.E.
S&W Redevelopment of North America, LLC

Perspective as:

- Owner of BCP sites – Obtained 12 COCs
- Partner on BCP site development
- Consultant for ERP projects
- Consultant for BCP projects
- Consultant for oil spill site

Final DER 10

- Consistent guidance across Regions
- Comprehensive guidance in one document
- Clarifies past ambiguities
- Continuity between DER programs

Scope/Applicability (Ch. 1.1/1.2)

- DER-10 does not apply to emergency interim remedial measures (Ch 1.11 (b))
 - However, if the emergency IRM is completed under DER oversight, DER may determine that DER-10 is applicable (Ch 1.2 (b))
- ** Use DER-10 to the best practicable extent.

Definitions (Ch 1.3)

- Confirmation Sample
- Documentation Sample
- “End Point” Sample

Use appropriate terminology consistent with DER-10 in Workplans and other documents based on Remedial objectives

Source area or source

...Contaminants in sufficient concentrations to migrate in that medium, or to release significant levels of contaminants to another environmental medium, which could result in a threat to public health and the environment.

Be aware of the implication of identifying a source and priorities for remedial actions.

Notifications (Ch 1.4)

- Notification prior to tank closure or RA
30 days (calendar)
- Notification prior to field activities
7 calendar days (instead of 5 days?)

Caution: be clear on lines of Communication

- Requirements for BCP site change in use
notifications

Certifications (Ch 1.5)

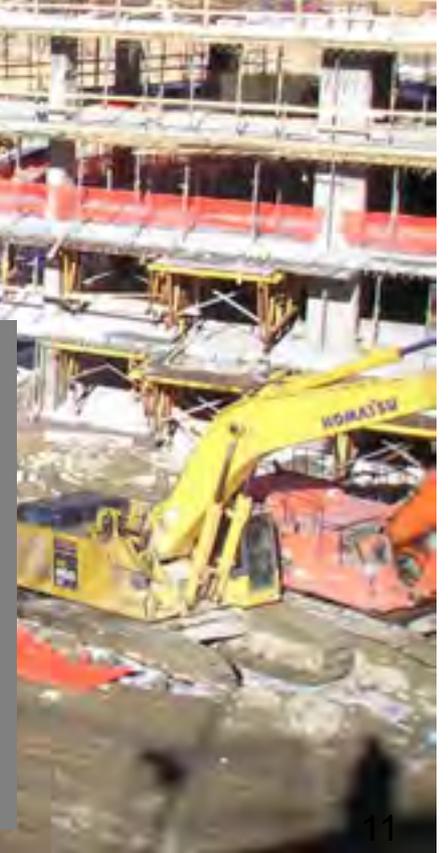
- QEP or NYSPE

Owners need to be aware in advance whether a NYSPE will be needed and whether their consultant is licensed in NYS.

- Review roles/responsibilities on development projects (BCP) between the building design engineer and the engineer certifying the RD, FER, and SMP.



- Site reviews during construction
- Documentation/Confirmation
- As-builts
- OM&M Documents



Areas of Concern (Ch 1.8)

Clarify with project manager whether the characterization is needed beyond AOCs to obtain a COC.

Use of Site (Ch 1.12)

Clarifies what is acceptable for different use restrictions.

[Refer to Draft CP/Soil Cleanup Guidance.]

Active Recreation, Grass fields:
Restricted Residential

Passive Recreation, artificial/paved
surfaces: Commercial

Sustainability and Green Remediation (Ch 1.14)

Green remediation concepts will be applied to the clean up of contaminated properties...

DER-31 Green Remediation

Measurables and Documentation are yet to be specified –

What's more “Green” than site remediation

Section 1.15

“Save the trees”

Suggestions

- Read and Comprehend
- Provide copies to all staff
- Training for Consultants, DEC Staff, DOH Staff
- Provide feedback to DER

DER – 10 CHAPTER 2

Sampling, Analysis and Quality Assurance

Tim LeBarron
DER Training and Technology



QA

versus

QC

- Proactive
- Preventative
- Error avoidance

- Reactive
- Corrective
- Error detection



Selection of Analytical Parameters

- NYSDOH ELAP certification
- TCL +30
- TAL
- Limited contaminant list
- Known petroleum releases use CP Soil SCOs
- Non-petroleum storage and discharge use analysis appropriate for the material



Laboratory Analytical Methods

- Use lab methods included in current NYSDEC Analytical Services Protocol (ASP)
- Proposal of alternate analytical methods
- Appropriate minimum detection limit
- Lloyd Kahn method is preferred for TOC in soil
- Analysis of semi-volatiles requires use of MS (except pesticides, herbicides and PCBs)



Field-testing Technologies and Methods

- Field-testing technologies are acceptable for intermediate analyses – see Appendix 2A
- Approval of SOP and test method including QA/QC required
- Operator/technician qualification required
- 10% duplicate sample analysis
- 10% correlation analysis with fixed lab ELAP ASP test method (every tenth sample)



Tissue Analysis

- Test methods require specific approval
- SW846 methods are not appropriate for biological material
- Lipid content required analysis for all organochlorine compounds



Soil Vapor Intrusion Sampling

- Follow the current NYSDOH *Guidance for evaluating Soil Vapor Intrusion in NYS*
- Re-evaluated canister vacuum requirement:
- less than 1.0 inch of mercury, contact the project manager to determine if the sample should be analyzed. Flag the results as estimated (J or UJ).
- greater than 10 inches of mercury, this must be noted by the laboratory in the case narrative.



Determination of NAPL Presence

- Use methods acceptable to DER
- In GW, DNAPL present at 1% of contaminant water solubility
- In Soil, DNAPL present at 10,000 mg/kg



Ground Water Samples for Metals Analysis

- DER approval required for alteration i.e. filtering, settling, decanting or centrifuging
- Justification required
- Precipitates must be dissolved
- Both filtered and unfiltered samples collected
- Analyze the unfiltered, acid preserved sample first for comparison to SCG



Reporting Requirements

- A “complete or full” data deliverable; AKA a NYSDEC ASP Category B data deliverable, is required for final delineation, correlation samples and confirmation samples
- A Data Usability Summary Report can only be developed from a Category B data deliverable (data package)



Data Usability Summary Report

- DUSR preparer must be independent from the laboratory producing the data and must not have direct involvement, EG. The Project Manager or property owner
- The resume of the DUSR preparer must be pre-approved by DER using criteria in Appendix 2B



Definition of Data Deliverables

- Category B – the whole thing
- Category A – just the answers
- Category Spills – the answers and some QA/QC with a choice to get the picture (chromatogram) if you want
- TICs analysis is required for final delineation, when identified as a COC, correlation samples and confirmation samples and relevant treatment systems



Submission of Data

- Final data table summaries must contain data qualifiers
- Results below MDL or MRL should be reported as ND and include the MDL or MRL



Electronic Submissions

- Requirements given in DER-10 section 1.15
- Submit data in an electronic data deliverable (EDD) that complies with DEC's Electronic Warehouse Standards (EDWS) located at: <http://www.dec.ny.gov/chemical/62440.html>
- DER has implemented an Environmental Information Management System (EIMS)
- EIMS uses EQulS™ database software



Quality Assurance Requirements

- Requirement for a project Quality Assurance Officer (QAO)
- Role of the QAO
- QAO qualifications
- Data will be rejected if the lab doesn't have appropriate certification(s)
- Data may be rejected if it doesn't meet data quality objectives



Specific Sampling and Analytical Requirements

- Co-located duplicates, MS/MSD, lab duplicates at 1 in 20 frequency
- One trip blank per 20 aqueous volatiles samples
- Sample cleanup may be required
- Report soil, sediment and vegetation samples on a dry-weight basis
- SV and VI samples as per NYSDOH Guidance



Quality Assurance Project Plan

- Submit Work Plans and QAPPs for approval in advance
- Include project scope and goals and strategy
- Include project organization with the resumes of the Project Manager, the project QAO and field technicians
- Include sampling procedures, data quality objectives and de-con procedures



(QAPP continued)

- Include a site map with sample locations
- Include an Analytical Methods/QA Table outlining matrix type, sample number, analysis method(s), QA/QC samples, preservation, holding times, field storage conditions etc.
- For tissue samples follow USEPA guidance EPA/600/8-91/003



TABLE B-1
SAMPLE TOTAL SUMMARY

<i>Subtask</i>	<i>Analytical Parameters</i>	<i>Matrix</i>	<i>Number of Samples</i>	<i>Blind Field Duplicates</i>	<i>MS/MSD Pairs ²</i>	<i>Field Blanks</i>	<i>Trip Blanks</i>	<i>Sample Totals</i>
2-hour Soil Gas Samples (7 locations) and two ambient air samples including Summa Canisters and Flow controllers.	TO-15 (Summa Canisters + Flow Controllers)	Air	9	1	0	0	0	10
Groundwater Samples from Temp Wells (7 locations, DUP, MS/MSD, FBs, TBs)	TCL VOCs by OLC03.2	Aqueous	7	1	1	2	2	14
24-hour First Floor/Basement/Sub-Slab Air Sampling from 3 occupied residences	TO-15 (Summa Canisters + Flow Controllers)	Air	9	0 ⁵	0	0	0	9
Supplemental Soil Gas Sample points/Sub Slab vapor samples from three (3) occupied residences (if necessary)	TO-15 (Summa Canisters + Flow Controllers)	Air	5	1	0	0	0	10
Supplemental Groundwater Samples from contingency temporary wells	TCL VOCs by OLC03.2	Aqueous	7	1	1	2	2	14

Notes:

1. Duplicates are generally collected at a minimum frequency of five percent (1 per 20 field samples). More frequent collection may be warranted based on field conditions/observations and/or at the discretion of the Field Team Leader.
2. MS/MSD Pairs (two samples) will be collected at a minimum frequency of five percent (1 per 20 field samples). More frequent collection may be warranted based on field conditions/observations and/or at the discretion of the Field Team Leader.
3. Field Blanks will be collected at a minimum frequency of one per day for aqueous samples. More frequent collection may be warranted based on field conditions/observations and/or at the discretion of the Field Team Leader.
4. Trip Blanks will be collected at the rate of one per aqueous sample shipment when VOCs are collected.
5. Associated blind field duplicate will be collected with the soil gas samples.



Final Points

- Use ELAP certified labs and DER acceptable methods of analysis
- Plan in the QAPP and compile in a summary table for project use
- Get a Category B data deliverable if you need a DUSR
- Contact the Training and Technology Section for additional information or assistance.



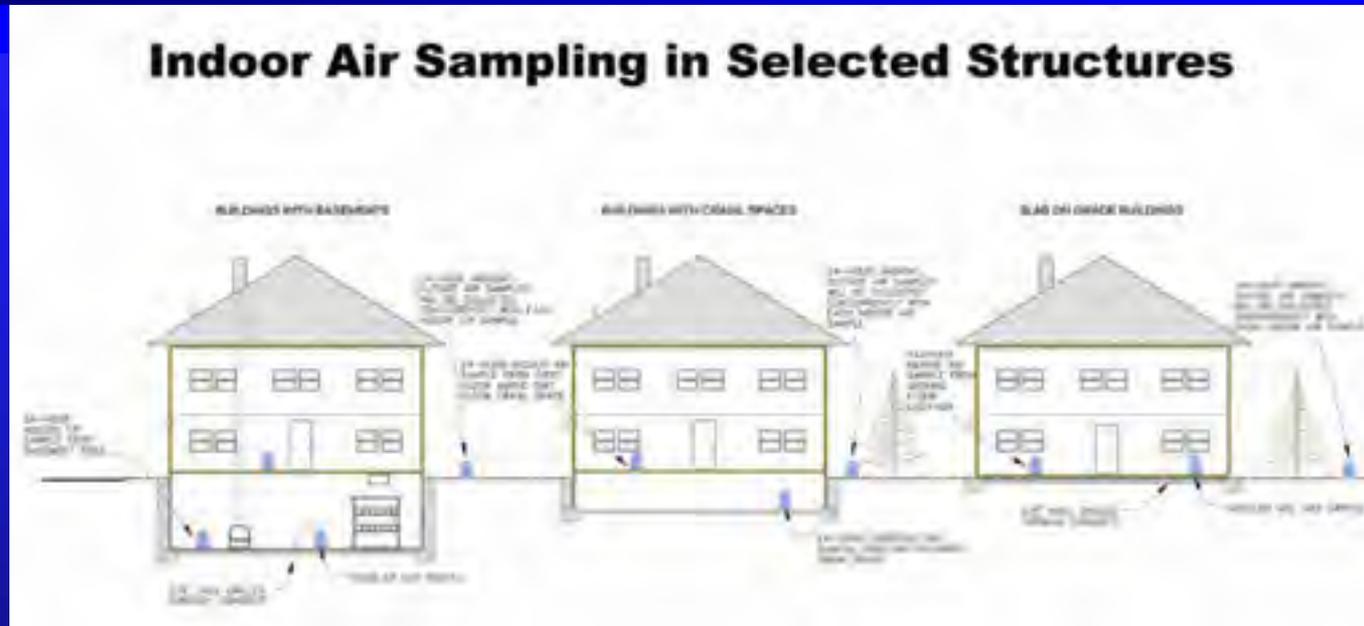
Soil Vapor Intrusion Investigations In New York State: Summary of Quality Issues Encountered and Lessons Learned

Richard M. Watt, P.G.

Ecology and Environment, Inc.



VAPOR INTRUSION APPROACH



Source:
<http://www.dec.state.ny.us/website/der/projects/indicott/procedure.pdf>

Multimedia Sampling During the Heating Season:

- Sub-slab Vapor
- Indoor Air (Basement/First Floor)
- Outside Air

Composite samples are collected over a 24-hour period.

Method TO 15 - low level $<0.25 \mu\text{g}/\text{m}^3$ for TCE, PCE, CCl_4

Scope of Projects

- Samples collected from Nov to Mar
- Different Labs
- Coordination of lab, sampling crew, and homeowners
- 30-day TAT for data to homeowner
- Full data validation

Sample Type	Samples	Field Dupes	1-L Minican	6-L Summa
Indoor Air	383	40	262	121
Outdoor Air	164	0	106	58
Soil Vapor	394	11	390	0
SubSlab	215	0	130	85
Trip Blank	23	0	16	3

Lessons Learned



- Sampling Concerns
- Equipment Selection
- Laboratory Selection and Availability
- Method Variations
- Laboratory Subcontracting
- Quality Control Data

Sampling



- **Background**
 - Sample grout/tubing
 - Household Products
- **Quality Control**
 - Security of Samplers
 - Scheduling
 - Representative Samples
 - Field QC samples
 - Initial pressure -25 and -30 in. Hg
 - Sufficient final pressure as determined by lab
 - Control high levels of CO₂, methane, and water vapor



Equipment and Supply Selection



- **TO 15 Method Specifications**
 - **Flow Control** - consistent flow rate under changing temp. and humidity
 - **Tubing** – stainless steel for canister but what about other sampling tubing
 - **Canister Size** – Not Specified
 - 6-L difficult to handle and store
 - Smaller canisters – easy to handle and can still meet detection limits
 - Batch versus individual can certification
- **Materials** – grout/bentonite

Laboratory Selection and Availability

Concerns	Actions
Limited time period for sampling	Advanced planning – lock in capacity
Difficult to coordinate access to homes	Database scheduling – extra cans available
Experience and capabilities	Review SOPs, PE results
Meet project DQOs	Target compound MDLs, low level methods, equipment types
Capacity – homeowners expect data fast and correct first time	Quick TAT time and review process with regulators

Method TO-15 Variations

- Whole air samples vs. Dilutions
- Canister cleaning procedure
- Standard preparation techniques
- Low detection limits are below levels specified by the method
- LCS vs. MS/MSD
- Handling of CO₂, methane, and water vapor
- Humidified zero air versus nitrogen
- Different surrogates and internal standards
- Target compound list variations

Laboratory Subcontract Specs

- Data package contents – added records
- Specify batch or individual certification
- Include 10% additional cans
- Specified schedule for delivery of cans
- Specify performance standard for flow controllers
- 14 day TAT based on sampling date – not date received
- All parties agree to target compound list – low level and routine limits are specified
- Specify laboratory calculations performed on unrounded data and reported to correct sig figs



Quality Control Sample Results

- **Canister Check** – trace levels target compounds (acetone, ethanol, IPA, methylene chloride) have been detected in canister checks for 6-L cans.
- **Field Duplicates** – Overall, field duplicate reproducibility has been an issue.
- **Field Blanks** – Discontinued trip blanks. No trip blank detections that were not attributable to laboratory conditions.
- **Laboratory Blanks** – Correlates to canister certifications.
- **MS/MSD** – Discontinued MS/MSD analysis. It is not a method requirement. MS/MSD compounds were introduced by the lab using the same process as for surrogate spike and internal standard introduction.
- **Interlaboratory variability is high**
- **The traceability of the canister and regulator are important**

Field Duplicates



One canister had positive results and one canister was ND.

Analyte	Sample Type	Avg RPD	No. of Dups
Acetone	Indoor Air	20%	39
Benzene	Indoor Air	10%	47
Toluene	Indoor Air	14%	45
Tetrachloroethene	Indoor Air	30%	23
Trichloroethene	Indoor Air	35%	26

SVI Sampling and Analysis

Conclusions

- **Sampling Method and Equipment variations – some matter, some don't**
- **Very Detail Oriented – plan ahead**
- **Lab Method Variations – interpretation of TO-15 – talk to your lab**

Credits

- **Marcia Galloway, QA Director, E & E**
- **Russ Pellegrino, Technical Director, Centek Laboratories**



INSIDE OUT

DEC Project Managers

Joe White
Ed Hampston
Jason Pelton

OUTSIDE IN CONSULTANTS & PRPS

Jon Sundquist URS Corporation





laws / regulation / policies

Internal Website

GIS database

eDocs

pshark / google earth / Bing / Zillow

Cost estimating software

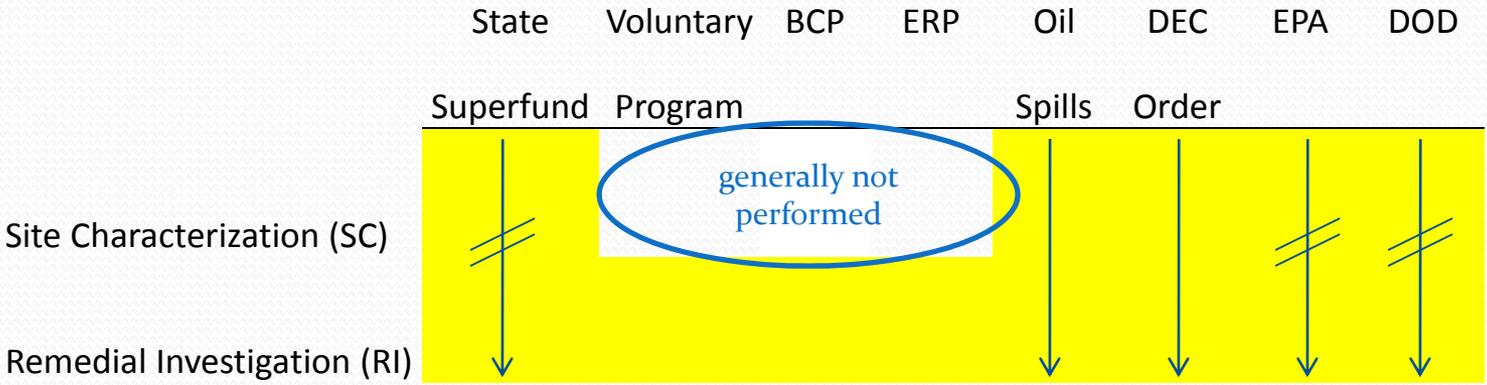
Quick start contracts

Callouts

DER 10

DER 10 is one of the many tools in the toolbelt.
Use it to help you do your job.

3. Site Characterization and Remedial Investigation Overview



BCP: SC --- looking a little more yellow these days

Site Characterization & Remedial Investigation -- Applied Science

What is the "scientific method"?

The scientific method is the best way yet discovered for winnowing the truth from lies and delusion.

- 1. Observe some aspect of the universe.
- 2. Invent a tentative description, called a *hypothesis*, that is consistent with what you have observed.
- 3. Use the hypothesis to make predictions.
- 4. Test those predictions by experiments or further observations and modify the hypothesis in the light of your results.
- 5. Repeat steps 3 and 4 until there are no discrepancies between theory and experiment and/or observation.

DER Method

1. Information indicates a chemical contamination problem exists
2. A Listing Package documents "potential" and actual threats to human health and the environment.
3. Workplan Development
Sources → Pathways → Receptors
4. Sampling & Results Evaluation
5. Significant Threat determination.

3.1 Site Characterization

Record Search – collect information

Field work --- data collection

DEC determination – potential threat?

Presence of Hazardous Waste – Pt 375 definition expanded to include hazardous substances (NYCRR Part 371, NYCRR Part 597 , specific list, non specific list, characteristic—RICE & PCBs)

Available Pathways to Receptors (Human Beings, Wildlife, Environmental)

Concentration and Mass of Contaminant are consequential (Written SCGs and DOH determinations)

3.1.4 Exit Early! ---- Interim Remedial Measures / Remedial Investigation
but not for State Superfund.



Day Care Center



GW

Day Care Center

Former Manufactured Gas Plant

Pappas Drycleaners





SITE INVESTIGATION INFORMATION

1. SITE NAME Pappas Drycleaning	2. SITE NUMBER 8-26- XXXX 012	3. TOWN/CITY/VILLAGE Dansville	4. COUNTY Livingston
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5. REGION 8	6. PROGRAM TYPE BCP <input type="checkbox"/> ERP <input type="checkbox"/> SPILL <input type="checkbox"/> SUPERFUND <input checked="" type="checkbox"/> If Superfund: Current ____ Proposed: 2 Modification ____
----------------	--

7. LOCATION OF SITE (Attach U.S.G.S. Topographic Map showing site location)

a. Quadrangle: Dansville, New York b. Site Latitude: 42° 33' 38" Site Longitude: _____
 c. Tax Map Number(s): 203.06-03-016 d. Site Street Address: 46 Ossian Street, Dansville

8. BRIEFLY DESCRIBE THE SITE (Attach site map showing disposal/sampling locations)

This potential site consists of a former dry cleaning facility located at 46 Ossian Street in the Village of Dansville (Site #012). During the remedial investigation, of the MGP site, soil and groundwater samples indicated the presence of contaminants in excess of Soil Cleanup Objectives and NYS Class GA groundwater standards, respectively.

a. Area: <1 acres b. Completed: () Env. Property Assessment () Site Characterization () Spill Response () Other _____

9. CONTAMINANTS DISPOSED (Hazardous Waste, Petroleum, Other. includes EPA Hazardous Waste Number) Tetrachloroethylene (PCE), F002

10. ANALYTICAL DATA AVAILABLE

a. () Air (X) Groundwater () Surface Water () Sediment (X) Soil () Waste () Leachate () EPA () Other _____
 b. Contravention of Standards or Guidance Values

From investigation of the former NYSEG Dansville MGP site (Site #0-26-012)

Year	Contaminant	Media	Concentration	NYS Groundwater and Drinking Water Standards
2004	PCE	GW (on-site)	83 ppb, 87 ppb	5 ppb
2004	PCE	GW (off-site)	3 ppb - 640 ppb	5 ppb

Year	Contaminant	Media	Concentration	NYSDEC Soil Cleanup Objectives
2004	PCE	Soil (on-site)	92,000 ppb	1400 ppb
2004	PCE	Soil (off-site)	11,000 ppb	1400 ppb

11. CONCLUSION

Concentrations of contaminants detected in groundwater and soil samples collected both on and off this site exceed Soil Cleanup Objectives. Shallow contaminated groundwater, above NYS Class GA groundwater standards, has migrated off-site and is moving under a residential neighborhood. Within this neighborhood is a child care facility located at 33 Franklin Street. A more thorough site investigation that would include more groundwater, soil and soil gas sampling is needed to identify and define the source area and to track the plume. Also, because this facility is located in a densely populated residential neighborhood, indoor air quality of the surrounding homes could be threatened.

a. Institutional Controls (IC) Required? () Y (X) N b. If yes, identify _____

12. SITE IMPACT DATA

a. Nearest Surface Water: Distance: 2000 ft. Direction: E Class: _____
 b. Groundwater: Depth: 9-13 ft. Flow Direction: NW () Saturated () Unsaturated
 c. Water Supply: Distance: 7500 ft. Direction: SE Use: _____
 d. Nearest Building: Distance: 0 ft. Direction: On site Use: _____

e. Documented fish or wildlife mortality? () Y (X) N h. Exposed hazardous materials? () Y (X) N
 f. Impact on special status fish or wildlife resource? () Y (X) N i. Site Priority Rating Score: _____
 g. Controlled Site Access? () Y (X) N j. Significant Threats: _____
 k. EPA ID# _____ HRS Score: _____

Concentrations of contaminants detected in groundwater and soil samples collected both on and off this site exceed NYS Class GA groundwater standards and NYSDEC Soil Cleanup Objectives. Shallow contaminated groundwater, above NYS Class GA groundwater standards, has migrated off-site and is moving under a residential neighborhood. Within this neighborhood is a child care facility located at 33 Franklin Street. A more thorough site investigation that would include more groundwater, soil and soil gas sampling is needed to identify and define the source area and to track the plume. Also, because this facility is located in a densely populated residential neighborhood, indoor air quality of the surrounding homes could be threatened.



3.2.1.(d) All sampling methods and laboratory analyses should be conducted in accordance with Chapter 2. The full Target Compound List/Target Analyte List and TICs, in accordance with subparagraph 2.1(a)1.11, should be sampled and analyzed for unless otherwise approved by DER.

What ??

3.2.2 Remedial Investigation

(a) A conceptual site model should be used, at the outset of a RI, to develop a general understanding of the site and to evaluate potential human exposure pathways and impacts to the environment. This will assist in identifying and setting priorities for the activities to be conducted. The conceptual site model should identify potential sources of contamination, types of contaminants and affected media, release mechanisms and potential contaminant pathways and actual/potential human and environmental receptors.

Regulatory and Compliance Issues at Perchloroethylene Drycleaners

Site List

1. Regulatory/Compliance Issues: Perchloroethylene Drycleaners
2. Purpose/Objectives
3. Drycleaning History
4. Drycleaning Process: What is Drycleaning?
5. Drycleaning Process: Drycleaning Cycle
6. Drycleaning Process Diagram
7. Drycleaning Process: Drycleaning Machine Evolution
8. Drycleaning Process: Drycleaning Machine Evolution
9. Drycleaning Process: Drycleaning Machine Evolution
10. Drycleaning Process: Drycleaning Machine Evolution
11. Drycleaning Process: Drycleaning Machine Evolution
12. Waste Streams
13. Waste Streams: Common Waste Streams
14. Waste Streams: Separator Waste
15. Waste Streams: Vacuum Waste
16. Waste Streams: Other Waste
17. Waste Streams: Spent Filters
18. Waste Streams: Still Bottoms
19. Waste Streams:

Regulatory/Compliance Issues at Perchloroethylene Drycleaners



State Coalition for Remediation of Drycleaners

State Coalition for Remediation of Drycleaners
www.drycleancoalition.org
July 2007



drycleaner coalition.mht

3.3 Investigation Work Plans

(a) This section provides the basis for the preparation of any investigation work plans including those associated with SCs, RIs, pilot testing, pumping tests, predesign investigations/delineations or confirmatory/documentation sampling undertaken pursuant to this guidance.

1. Investigation work plans, once approved by DER, are used in the field to govern the identification of all field investigation aspects of a site remedial program. At a minimum, the work plan **must include the elements identified in this section** and the investigations must be supervised by a qualified environmental professional.

3.13 Site Characterization Report

4. Findings/recommendations which should include, by area of concern, a summary of the following items:

i. any changes in sampling protocols, locations, etc. due to field conditions, from that set forth in the work plan;

ii. a description of each area of concern identified, including dimensions, suspected and actual contamination and suspected source of discharge or disposal;

iii. recommendations for either additional investigation in the RI, remediation or no further action for each area of concern;

3.14 Remedial Investigation Report

i. exposure pathways, which is how an individual may come into contact with a contaminant. The five elements of an exposure pathway are the:

- (1) source of contamination;
- (2) environmental media and transport mechanisms;
- (3) point of exposure;
- (4) route of exposure; and
- (5) receptor population;

ii. the elements of an exposure pathway identified in subparagraph i. above, are based on past, present or future events; and

19. Conclusions and recommendations which summarize the extent of the areas of concern, identifies any unacceptable exposure pathways, and recommends any future work (e.g., none, additional investigation, or an evaluation of remedial alternatives). This should include an updated conceptual model of the site and may also include remedial action objectives selected from those provided on the DEC website identified in the table of contents.



- Guidance: Provides direction or advice as to a decision or course of action

- Before heading down the highway know your destination and have a good map

- DER- 10 : An encyclopedia of information on items to be considered in mapping your way to the destination





The concentration of two SVOCs, benzo(a)pyrene and dibenz(a,h)anthracene, within the source area sample also slightly exceeded the commercial SCOs. Although these two SVOCs were detected in one sample at concentrations exceeding the applicable unrestricted and commercial SCOs, these compounds tend to be ubiquitous in soils at historic industrial properties and do not appear to be attributable to a specific release on site.

3.5 SOIL INVESTIGATION

OVERALL PURPOSE

- Identify the presence of hazardous waste/contamination
- Define areal and vertical nature and extent
- Bias toward contaminated/source areas but provide coverage
- Identify impacts to receptors/actual and potential exposure (ecological and human)
- Determine properties of the contaminants
- Collect data to evaluate cleanup alternatives
- Soil background evaluation

3.5 SOIL INVESTIGATION

- 3.5.3 Soil Background Evaluation

- Not for BCP sites
- To demonstrate contaminant due to background
- Two steps: understanding on-site and off-site
- Prescribed approach for site-specific evaluation



3.6 SOIL VAPOR (Intrusion)

- Use for Soil Vapor Intrusion
- NYSDOH Guidance (Means and Methods)
- Investigate pathway:
 - Volatile source in groundwater or soil, and
 - Buildings are present or may be constructed
- During site characterization phase investigate if necessary for listing or if further SVI work won't occur
- Investigation need and scope determined on a site-by-site basis

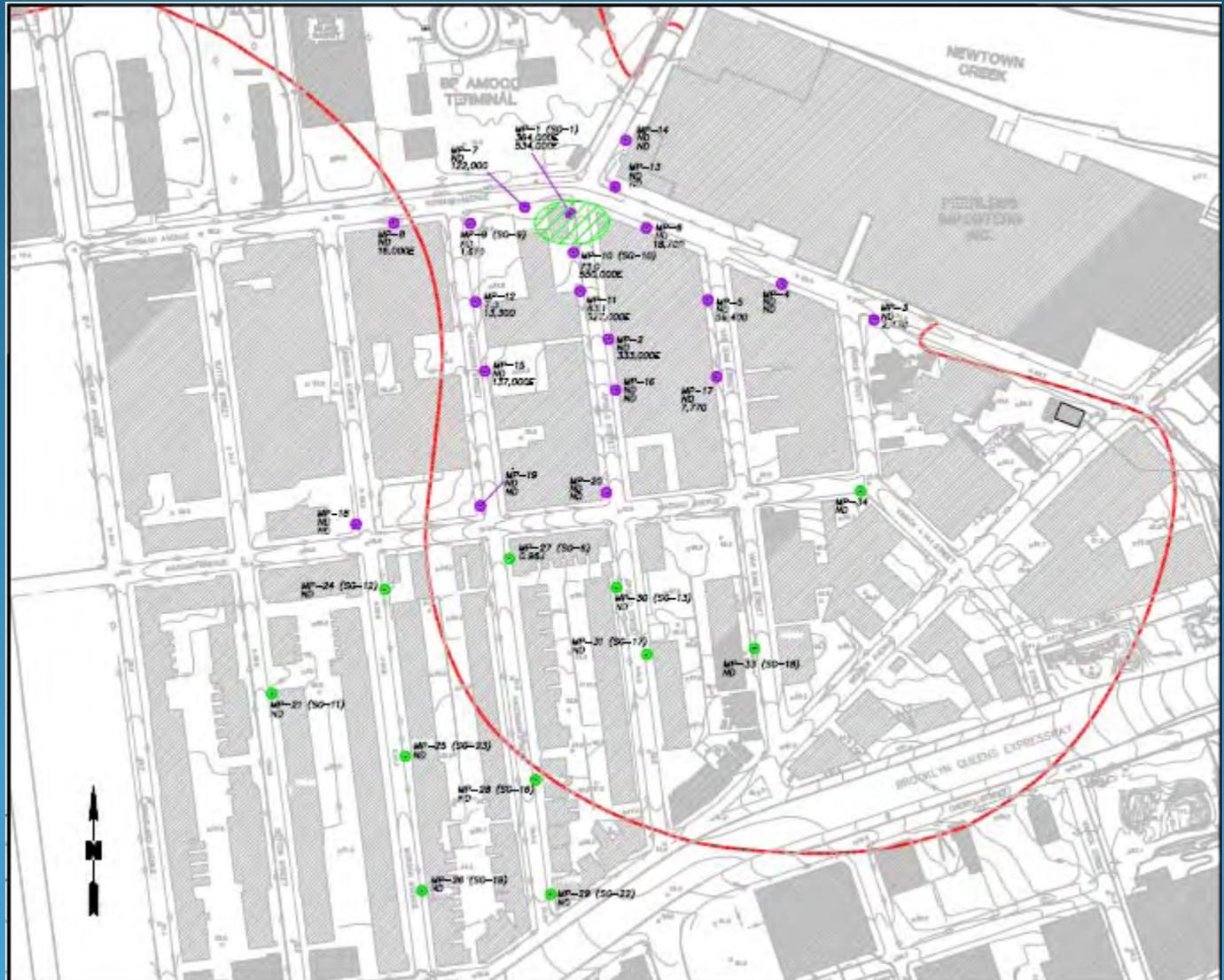


3.6 SOIL VAPOR (Case Study)



3.6 SOIL VAPOR (Case Study)

- Source VOCS in LNAPL
- Theory No VI due to nature VOCs
- Confirm
- Look at Soil Vapor
- Elevated Vapor near LNAPL
- Monitor SV and Utilities



3.6 SOIL VAPOR (Case Study)

- Divide the site (Commercial & Industrial vs. Residential)
- SV and IA work iterative



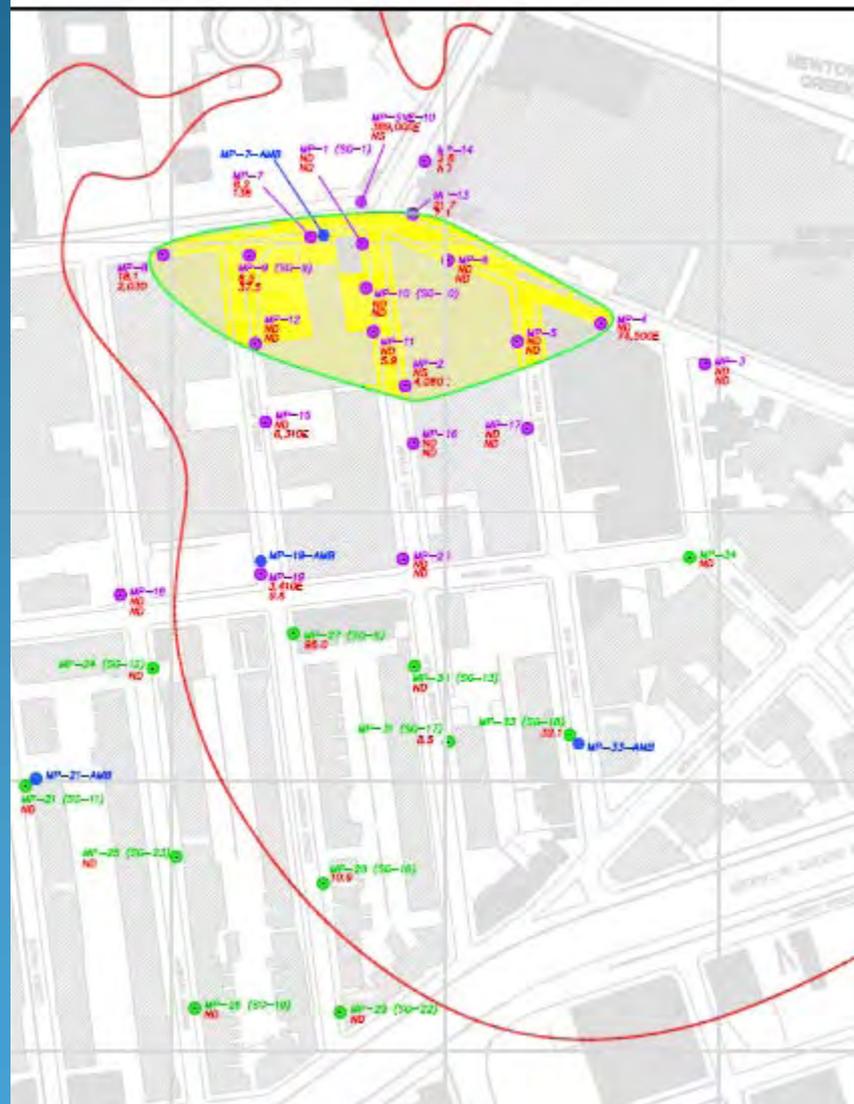
3.6 SOIL VAPOR (Case Study)

- Initiated IA
- Practicality
- Petroleum vapors not causing VI during sampling, but...
- Detected cVOCs
- Follow-up Monitor
- Expanded cVOC work



3.6 SOIL VAPOR (Case Study)

- Commercial/Industrial Area
- Expand SV Monitoring and Screening
- Determined mitigation advisable
- Implemented area wide SVE
- Performed limited IA monitoring
- Monitoring system performance & indoor air



3.9 Area Specific Requirements for Tanks, Storage Facilities, Water Treatment, Drainage Structures and Other Systems

- Prescriptive & Extensive Section
- Should!!!
- Consider complete investigation and goals in context with this section.
- Combine Elements
- Common Sense

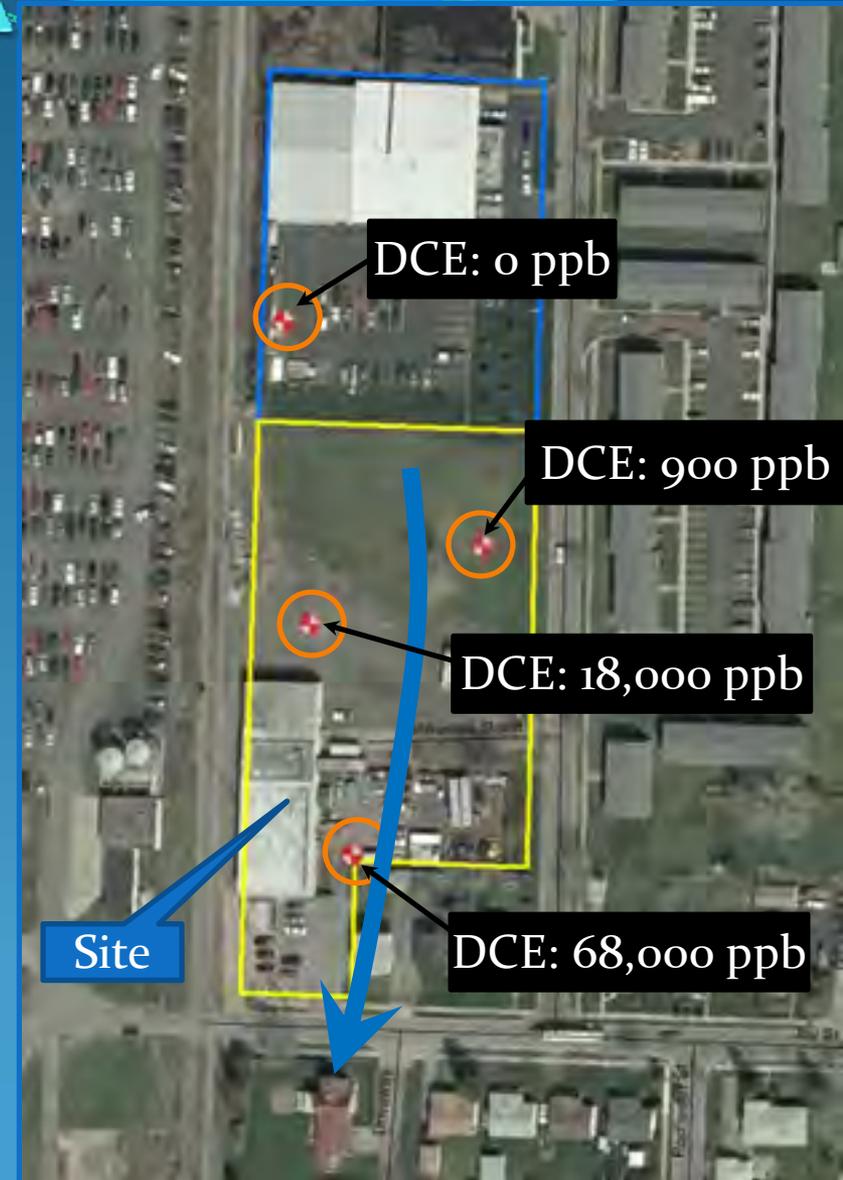
3.7 GROUNDWATER

Site Characterization

- At least 3 groundwater monitoring points.
 - Groundwater Flow
 - Groundwater Quality
- Possible bedrock monitoring wells if no overburden groundwater and contaminants present in soil.

DATA EVALUATION

- No further investigation if no contaminants above SCGs.
- Groundwater RI if contaminants in groundwater above SCGs.

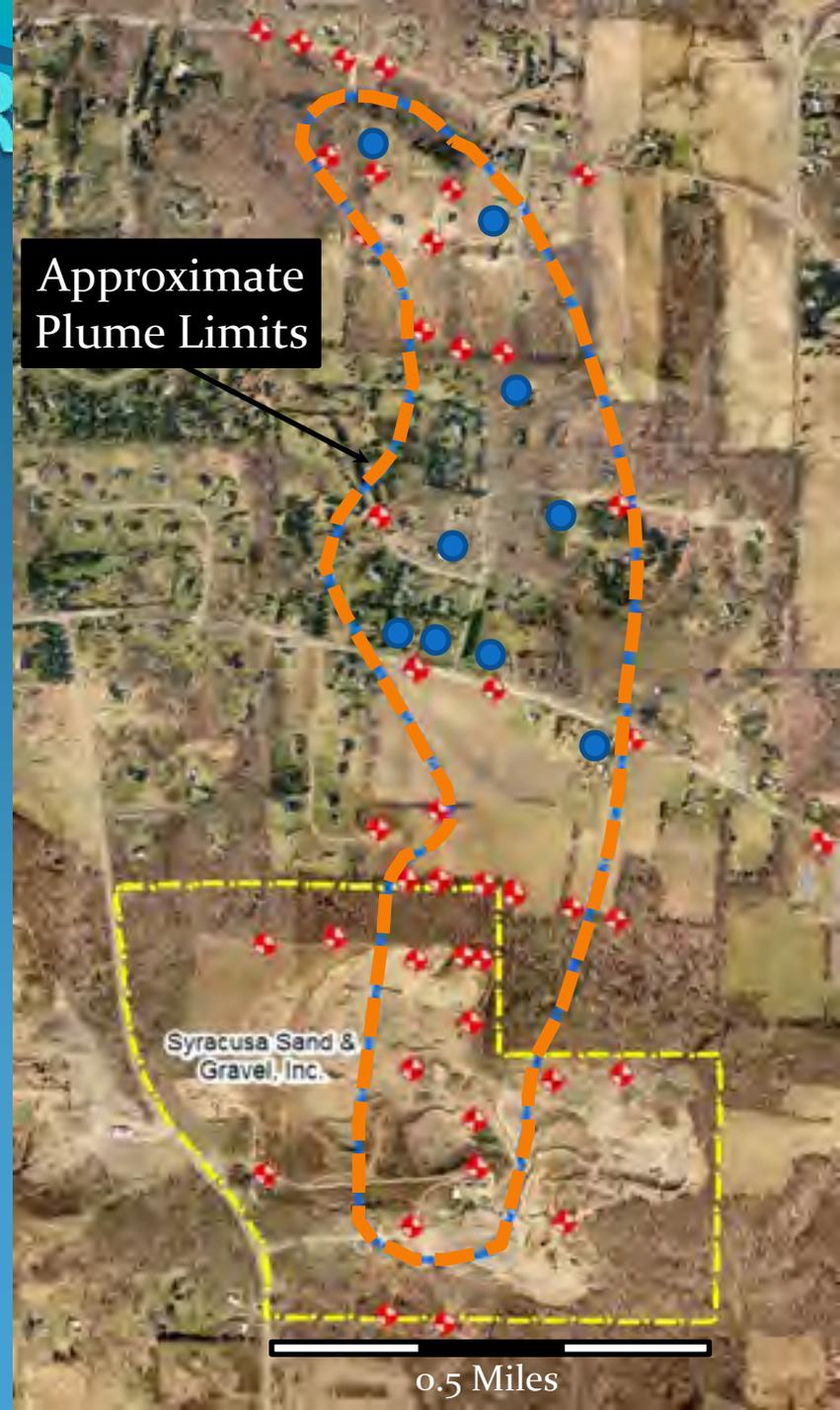


3.7 GROUNDWATER

RI

OVERALL PURPOSE

- Define nature and extent
- Identify impacts to receptors
- Determine properties of the contaminants
- Determine plume stability
- Collect data to evaluate cleanup alternatives

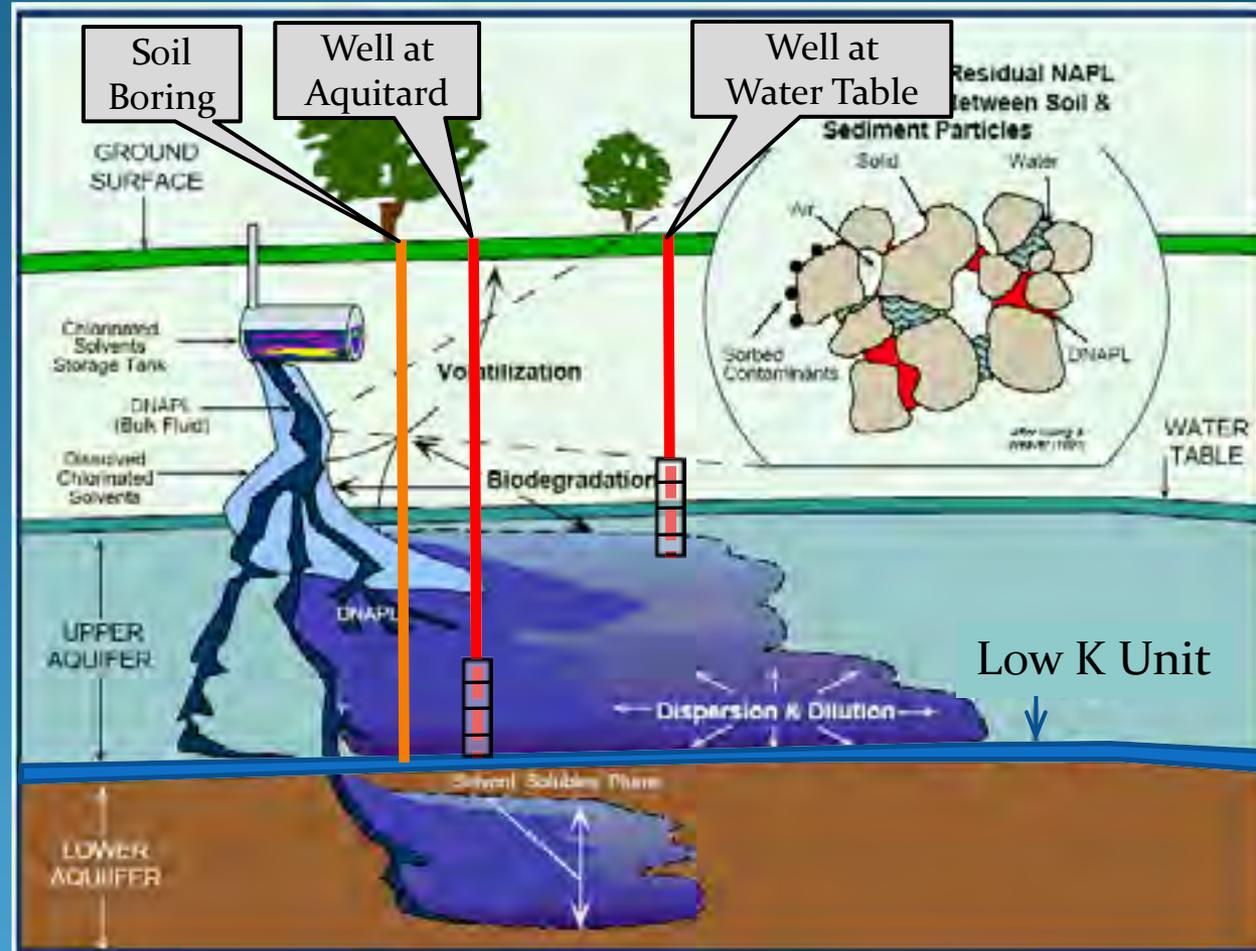


3.7 GROUNDWATER

RI cont'd

POTENTIAL NAPL

- Dissolved concentration $> 1\%$ aq. solubility.
- If NAPL suspected, ≥ 1 boring to underlying confining unit; unless it is LNAPL.
- If DNAPL is identified, a well should be installed on top of the underlying confining unit.
- If LNAPL, a well should be across water table.



3.7 GROUNDWATER

RI cont'd

Groundwater Flow & Quality

- At a minimum, 3 wells in each affected area.
- Monitoring of multiple water bearing zones may be necessary.
- ≥ 1 synoptic water level round for groundwater flow determination.
- Define characteristics of the groundwater system:
 - Hydraulic Gradient
 - Hydraulic Conductivity
 - Groundwater Flow Rate
 - Contaminant Flux



3.7 GROUNDWATER

RI cont'd

Groundwater Sampling

- Typically, 2 groundwater sampling events as part of RI.
- 1st event to include sampling for all suspected site contaminants.
- 2nd event may sample only select wells and for select parameters.
- Sampling events should factor in seasonal variations in water table.



Conventional Low Flow Sampling



DER Sampling Van



Passive Diffusion Bag Sampling

05/17/

3.8 SURFACE WATER, SEDIMENTS, & WETLANDS

RI

SIMILAR TO GROUNDWATER:

- Define nature and extent
 - Identify impacts to receptors
 - Determine properties of the contaminants
-
- Also want to factor in:
 - Seasonal variations
 - System hydraulics
 - Sediment transport



3.8 SURFACE WATER, SEDIMENTS, & WETLANDS

RI cont'd

- Locations should be adjacent to and downstream of the site with focus on:
 - Point discharge areas
 - Groundwater discharge areas
 - Depositional areas, etc.
- Sediment samples should be analyzed for TOC
- Should meet FWIA requirements
- Background evaluations if there may be other possible nearby sources



3.10 Fish & Wildlife Impact Analysis

RI

- **May not even be necessary:**

- No impacts to fish and wildlife resources
- No surface or groundwater impacts
- No nearby resources (urban setting)

- **Two Parts:**

- Part 1: Resource Characterization (initial assessment)
- Part 2: Ecological Impact Assessment (more detailed evaluation)



11/09/2006

Site Characterization/ Remedial Investigation Outside-In Perspective



Jon A. Sundquist, PhD

URS

Outside-In Perspective

- Comprehensive
 - Procedures for (almost) everything
 - 68 of 202 DER-10 pages + more in appendices!
- Mixture of prescriptive and general guidance
 - Prescriptive examples:
 - Sediment sampling locations
 - Tank soil sampling
 - General/Flexible example:
 - SC scope/completeness
 - Soil and groundwater sampling locations and techniques

Outside-In Perspective

- Integration with Section 2 (Sampling/Analysis)
- Planning detail variability among DER programs
 - State Superfund:
 - Quickstart
 - Brownfields/VCP/ERP
 - Greater plan detail

Perspective Through Example Site

- Dry cleaner site
- Urban environment
- Property transfer investigation
- Site characterization
- Remedial investigation

Site Characterization

- Direct push soil sampling
 - 10 locations
- Direct push groundwater sampling
 - 10 locations
- Soil gas
- Soil vapor intrusion

Direct Push Soil/Groundwater



Site Characterization

- Simple program
- Clear results
- Simple “data-dump” report
- Leads directly to
 - Listing
 - Remedial investigation

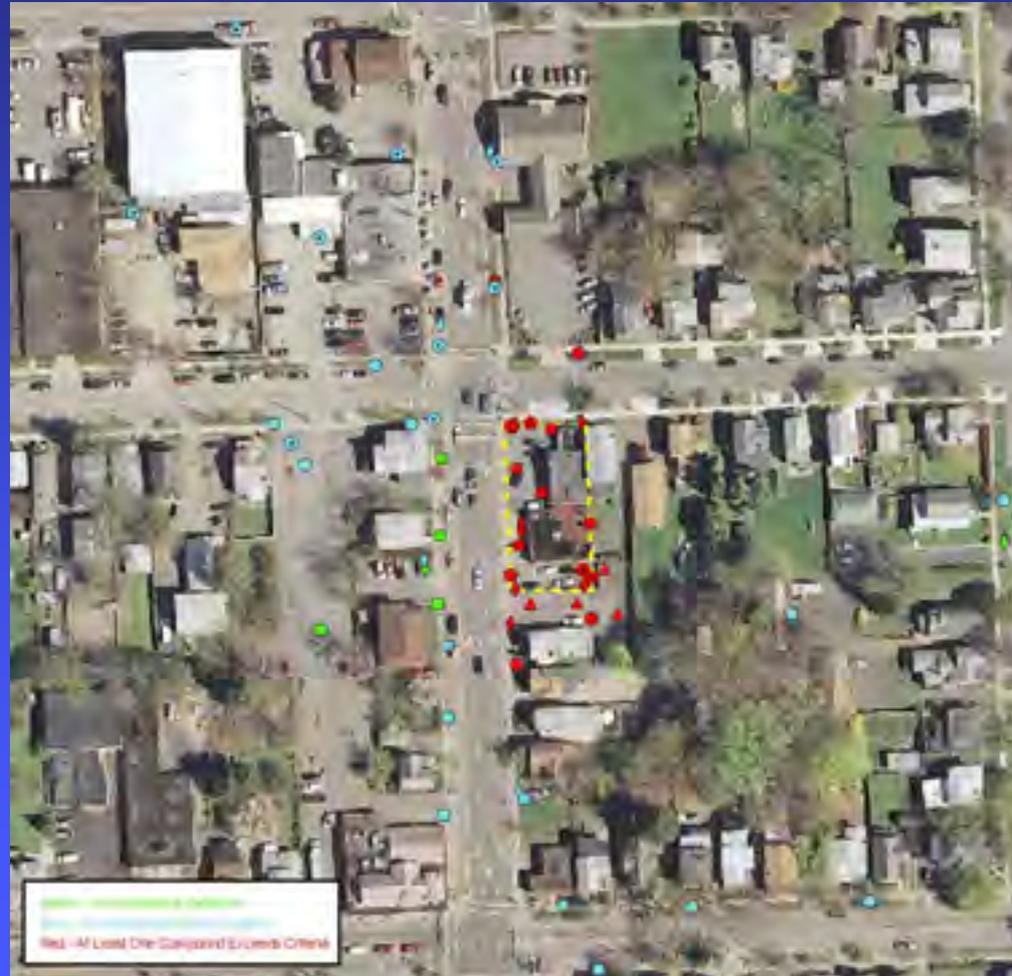
Soil Vapor Intrusion

- SVI program straddles programs
 - Start: SC
 - Continues: Through RI
- Direct existing exposure
- Flexibility allows DEC to take action separate from program schedules

Remedial Investigation

- Upgradient/Downgradient wells
 - Use existing upgradient wells
- Phased approach
 - Iterative approach within phases

Remedial Investigation



DER-10 CHAPTER 4

REMEDY SELECTION

- 4.1 Remedial Goals, Objectives and Factors to Consider
- 4.2 Remedy Selection Evaluation Criteria
- 4.3 Development and Evaluation of Alternatives
- 4.4 Remedy Selection Reporting Requirements
- 4.5 Remedy Selection Decision Documentation



**One of the most important
Chapters of DER-10
because it determines the
basis for how to conduct
the Remedial Investigation!**



4.1 Remedial Goals, Objectives and Factors to Consider

- (a) The purpose of remedy selection is to identify, evaluate and select a remedy or alternative remedies to address the contamination identified by the RI of the site or an operable unit of a site.



4.1 Remedial Goals, Objectives and Factors to Consider

- (b) Remedial Goals - The statutory or regulatory remedial action goals for remedial actions undertaken pursuant to this guidance are set forth in the applicable regulations identified in section 1.2. (ie: SSF, BCP, ERP, VCP, Spills etc.)



4.1 Remedial Goals, Objectives and Factors to Consider

- c) Remedial Action Objectives (RAOs)
RAOs are medium or operable unit-specific objectives for the protection of public health and the environment and are developed based on contaminant-specific SCGs to address contamination identified at a site. (ie: Ecological/Groundwater protection or use based)



Base Line considerations

- Protection of public health and the environment
- Sources of contamination
- Bulk storage tanks and containment vessels
- Groundwater protection and control measures



Other Baseline Considerations

- Soil vapor and soil vapor intrusion
- Adjacent residential properties
- Surface water and sediments
- Aquatic ecological resources
- Soil Cover



4.2 Remedy Selection Evaluation Criteria

Threshold criteria

- Overall protectiveness of the public health and the environment.
- Standards, criteria and guidance (SCGs). The remedy must conform to officially promulgated standards and criteria that are directly applicable or that are relevant and appropriate.



Groundwater Protection Criteria

- **USE WHEN:** Groundwater is impacted above standards or is so threatened.
- If groundwater is impacted by source to be addressed, an easement to prevent use of groundwater and

Department determines not migrating or otherwise controlled and will improve over time.... May waive GW Protection Criteria



Primary Balancing Criteria

- Long-term effectiveness and permanence.
- Reduction of toxicity, mobility or volume of contamination through treatment.
- Short-term impact and effectiveness.
- Implementability.
- Cost effectiveness.
- Land use.
- Community Acceptance



4.3 Development and Evaluation of Alternatives

- **Step 1.** - Identify the remedial goals for the site in accordance with the applicable program
- **Step 2.** - Establish RAOs
- **Step 3.** - Identify general response actions based on the RAOs
- **Step 4.** - Identify and screen technologies for effectiveness and implementability
- **Step 5.** - Assemble the technologies remaining after Step 4, into media-specific or site wide remedial alternatives.
- **Step 6.** - Analyze the alternative(s) pursuant to the evaluation criteria
- **Step 7.** - Recommend a remedy for the site.



4.4 Remedy Selection Reporting Requirements

- i. State or federal superfund programs. A feasibility study (FS) report
- ii. Other Programs: Environmental Restoration Program (ERP), Brownfield Cleanup Program (BCP), Voluntary Cleanup Program (VCP) and petroleum remediation site require and alternatives analysis (AA) report or the section of the remedial work plan presenting the alternatives analysis



Alternatives Analysis Report (AA)

- The AA is a report, or portion of a remedial work plan, which identifies one or more alternatives and evaluates the effectiveness of each with respect to the selection criteria and follows a similar criteria and evaluation as the FS



The AA for a BCP site will develop, at a minimum:

- i. one alternative, if the alternative proposed will achieve unrestricted use relative to soil contamination without the use of institutional/engineering controls (Track 1);
- ii. two or more alternatives, if the proposal is for restricted use (Track 2)
- iii. significant threat implications for the alternatives analysis:



Other Considerations

- Need to show treatment is effective for closeout – allow time in FER schedule
- As 2015 approaches, you will need to be conscious of the need for a COC by **March 31, 2015**; may impact remedy choices



4.5 Remedy Selection Decision Documentation

- For State Superfund and ERP sites. DER will prepare a Proposed Remedial Action Plan (PRAP)
- For BCP, VCP, petroleum remediation sites and bulk storage sites subject to this guidance, DER will prepare a draft DD



DER-10 TECHNICAL GUIDANCE SEMINAR

October 7, 2010

Section 4.0 Remedy Selection

Presented by: **Charlie McGuckin, P.E.**
Remedial Engineering, P.C.

Section 4.0 - Remedy Selection

- Remedial Goals, Objectives, and Factors to Consider
- Remedy Selection Evaluation Criteria
- **Development and Evaluation of Alternatives**
- Reporting Requirements
- Decision Documentation

Site Plan



Case Study Background

- Dry Cleaner Site in the Brownfield Cleanup Program with the Site Owner as the Participant
- Located within a shopping center in New York City
- Onsite and offsite PCE contaminated soil and groundwater due to direct discharge to ground associated with historical use as a dry cleaner since 1976

Case Study Background

◎ RI Summary

• Geology

- **Fill** – 2 to 4 feet brown coarse to fine sand with brick, glass, concrete and wood
- **Sand and Silt** – 2 to 6 foot layer with variable amounts of gravel
- Silt – 8 to 13 foot layer of brown silt
- Silt and Clay – over 12 feet thick

• Hydrogeology

- Depth to Groundwater – **4.1 to 7.5** feet bls

Case Study Background

◎ Soil Quality

- Impacted zone limited to upper 2-5 feet
- Onsite soil: PCE impacted
- Offsite soil: PCE, TCE, and cis-1,2-DCE impacted

◎ Groundwater Quality

- PCE and degradation products both onsite and offsite groundwater

◎ Soil Vapor - PCE

- Below background level and outdoor ambient air concentrations

Areas of Impact to Soil



Area of Impact to Groundwater



Steps for Alternative Evaluation

FS	AAR
Identify Remedial Goals	Identify Remedial Goals
Establish RAOs	Establish RAOs
Identify GRAs	Assemble Technologies into Alternatives
Screen Technologies	Analyze Alternatives Using Evaluation Criteria
Assemble Technologies into Alternatives	Recommend a Remedy
Analyze Alternatives Using Evaluation Criteria	
Recommend a Remedy	

Remedial Goals

- ◎ Onsite Soil:
 - Restricted commercial criteria (Track 4)
- ◎ Offsite Soil:
 - Unrestricted criteria (Track 1)
- ◎ Groundwater:
 - Obtain mass reduction of VOCs in onsite groundwater and mitigate offsite impacts to NYSDEC Water Quality Standards for Class GA groundwater, the extent practicable

Standards, Criteria, Guidance (SCGs)

◎ Onsite Soil:

- 6 NYCRR Part 375 restricted commercial use standards

◎ Offsite Soil:

- 6 NYCRR Part 375 unrestricted use standards

◎ Groundwater:

- 6 NYCRR Part 703 and NYSDEC Ambient Water Quality Standards and Guidance Values (TOGS 1.1.1)

Remedial Action Objectives

◎ Soil

- Prevent ingestion/direct contact with impacted soil
- Source removal

◎ Groundwater

- Obtain mass reductions of VOCs in on-site groundwater
- Mitigate off-site impacts to NYSDEC Water Quality Standards for Class GA groundwater, to the extent practicable

Assemble Alternatives

◎ Onsite Soil:

- Alternative 1: Excavation and offsite disposal of soil exceeding the **unrestricted use** criteria above and below the water table and backfill with clean soils
- Alternative 2: Excavation and offsite disposal of soil exceeding the **restricted commercial use** criteria above the water table; clean soil backfill; and institutional/engineering controls

Comparative Evaluation

- ⦿ Overall Protection of Human Health and Environment
- ⦿ Compliance with Remedial Goals, SCGs, and RAOs
- ⦿ Long Term Effectiveness and Permanence
- ⦿ Reduction in Toxicity, Mobility, or Volume through Treatment
- ⦿ Short-Term Effectiveness
- ⦿ Cost
- ⦿ Compatibility with Land Use

Both Alternatives 1 and 2 are comparable for each of the above criteria

Comparative Evaluation

⦿ Implementability

- Alternative 1
 - Underground utilities, transformer and onsite building prevents implementability
- Alternative 2
 - Underground utilities are a concern but would not prevent implementability

Recommended Onsite Soil Alternative

- ◎ Alternative 2 – Restricted Commercial
 - Meets all evaluation criteria
 - Can be readily implemented
 - Compatible with existing and planned use
 - Will be coupled with groundwater remedy

Recommended Offsite Soil Alternative

- ◎ Track 1 cleanup approach
 - Excavation and offsite disposal
 - Meets all evaluation criteria

Groundwater Technology Screening

- ① Pump and Treat
- ① SVE/AS
- ① Enhanced Reductive Dechlorination
- ① In Situ Chemical Oxidation

Groundwater Technology Evaluation

- ◎ Pump and Treat, SVE/AS, ISCO
 - Not as effective in low permeable soil
 - Limited space for onsite equipment
- ◎ Enhanced Reductive Dechlorination
 - Anaerobic conditions and presence of degradation products are favorable for successful application of ERD

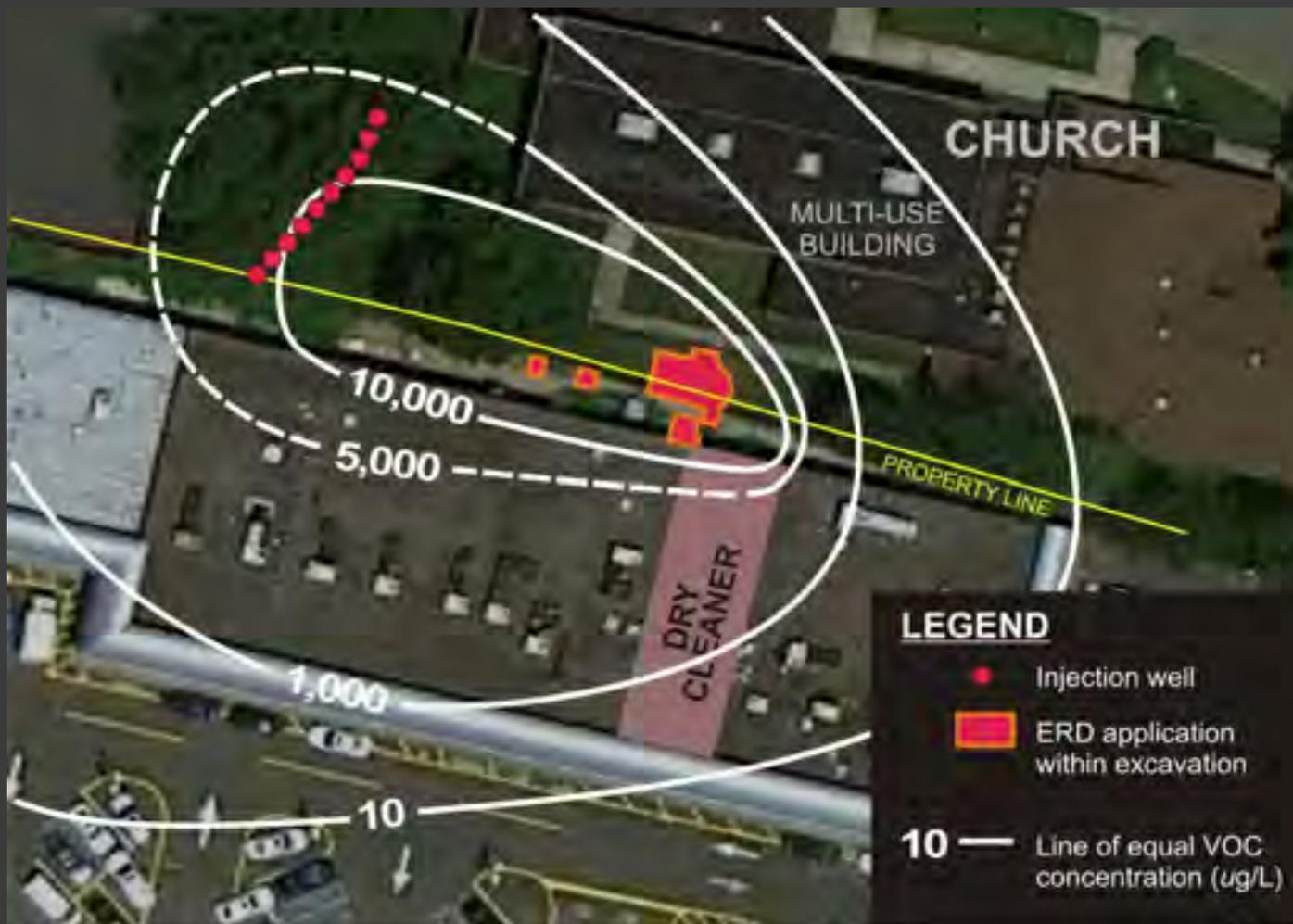
Recommended Groundwater Remedy

- ⦿ Enhanced Reductive Dechlorination
 - Onsite ERD Injections in Open Excavations
 - Offsite ERD Injections - Passive Permeable Barrier
- ⦿ Groundwater Monitoring

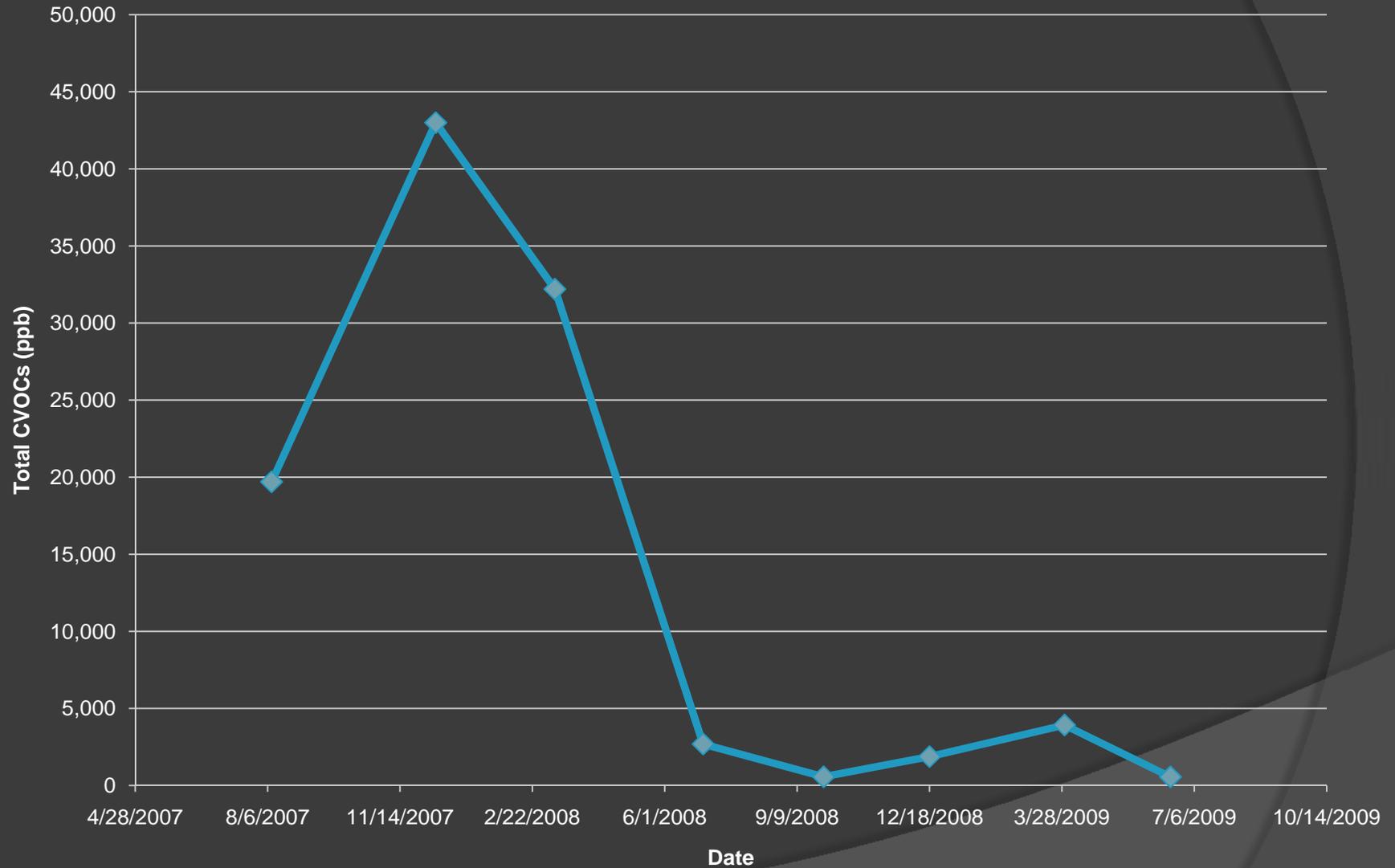
Final Remedy - Excavation Locations



ERD Injections Area



Post-ERD Groundwater Monitoring



Current Site Status Summary

- ⦿ Remedy Implemented
- ⦿ Final Engineering Report completed
- ⦿ Environmental Easement in place
- ⦿ Site Management Plan in place
 - Groundwater Monitoring Program
- ⦿ Certificate of Completion Issued by NYSDEC in 2010

DER10 Chapter 5

Remedial Design And Remedial Action



A Guidebook, Not a Cookbook

- Important Points to Ponder (and Respond To) as Project Moves Forward
- Not an Edict to “Do It My Way”
- BUT...
 - If You Do It This Way, It Is Much Easier and Quicker to Gain Approval



By The Numbers...

- 5.2 Remedial Design
- 5.3 Remedial Design Lite (the RAWP)
- 5.4 RA Compliance and Reporting
- 5.5 UST Closure
- 5.6 Institutional Controls
- 5.7 RA Scheduling
- 5.8 Now We're Done
 - Construction Completion Reports
 - “This Part is Done”
 - Final Engineering Reports
 - “We're Done Done”



How Complicated Can It Be?



Remedial Design



Remedial Action Work Plan



Planning for Monitoring

- Sites Which Require a Lot of Monitoring Should Have a Remedial Action Monitoring Plan
- What Will You Measure, and How Will the Data Be Reported?



Potential RAMP Issues

- Odor/Vapor Issues
- Upstream/Downstream Monitoring for River Work
- Management of Storm Water
- Noise/Vibration Monitoring

- Audience is Primarily Technical



CERP

Community and Environmental Response Plan



Here The Audience Is The Public At Large

NYS Department of Environmental Conservation



Implementation Compliance

- Confirmation Sampling—“Did We Get To The Levels We Said We Would?”
 - ‘Vast Majority’ of Samples Meet Cleanup Objectives
 - Exceedances Are Minor
 - Demonstrate Statistical Compliance at 95% CL



Implementation Compliance

- Documentation Sampling—“So What Did We Leave Behind”
 - Generally Applied When Excavation Limits Are Pre-Set



Sampling Guidelines

- How Many Samples?
 - Tiny Holes (<20 ft circumference):
 - 1 bottom, 1 sidewall
 - Bigger Holes (circumference 20-300 ft)
 - Surface SCOs ?
 - 1 per 30 linear ft sidewall top
 - Bottom 1 per 30 ft square (900 sq ft)
 - Subsurface SCOs?
 - Same, But Sidewall Samples at Bottom



Really Big Holes?

- Can Propose Alternative Sampling Plan



What Goes In The Hole?



Rocks Are OK (Concrete & Brick, Too)

NYS Department of Environmental Conservation



What Goes in the Hole?

- How About Dirt?
 - Lowest Applicable SCO (Including Ecological SCO as Appropriate) **OK**
 - LT Background Levels, **OK except for BCP**
 - LT Site Cleanup Goals, **OK Only Below Cap**, Subject to Institutional Controls
 - **Export** is Generally **NOT OK**





NYSDEC DER-10 Training

Chapter 5 – Remedial Design/Remedial Action

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October 7, 2010



Summary

- Summary of Key Changes to Chapter 5
- Engineering Design Process
- DER-31 Green Remediation
- Remedial Design Example – Onondaga Lake Remediation
 - Interagency Coordination
 - Pre-Design Investigations and Bench Testing
 - Community Involvement and Protection
- Remedial Action Example – Former MGP Site Remediation, Sag Harbor, Long Island
 - Optimized Remedy Based on Site Constraints
 - Community Protection Monitoring

Summary of Key Changes for Chapter 5

- Certifications
 - Remedial designs and IRM designs
 - RD and IRM work plans, including PDI, pumping tests, pilot studies
 - RD and IRM Construction Completion Reports and FERs
- Notice requirements (or oversight document, RD WP)
 - 7 days for design field investigations
 - 30 days for RAs under DEC oversight and UST closures

Summary of Key Changes for Chapter 5

- Incorporation of sustainability concepts to minimize the environmental and energy footprint of a project.
- Community and Environmental Response Plan (CERP)
 - Supplements a CAMP for sites with a potential for short-term impacts to the community or resource.
 - Facilitates CP efforts
 - Provides info on required protective measures to all contractors
 - Provides control and compliance criteria to ensure exposures are eliminated or minimized
 - Used to develop contingency measures and controls

Summary of Key Changes for Chapter 5

- Compliance Monitoring
 - Documentation Samples (concentrations remaining)
 - Confirmation Samples (achieve soil cleanup levels)
 - Imported Fill/Soil
 - Allowable Constituent Levels (Appendix 5)
 - Soil Sampling Requirements (Table 5.4(e)10)
 - Reuse of Site Soils (without restriction or subject to IC)
 - Site Restoration
- Environmental Easements and Deed Restrictions

Summary of Key Changes for Chapter 5

- Construction Completion and Final Engineering Reports
 - Requirements specified and templates available
 - Replace RA Reports
 - CCR for IRMs and OUs
 - FER for complete remedial program as per ROD/order
 - SMP approved and easement/deed restriction executed
 - Certificate of Completion issued and SM phase begins (SSF, ERP, BCP)
 - Closure Letter issued and SM phase begins (VCP, CERCLA, others)

Engineering Design

- Preliminary Design (50-75% level)
- Draft Final Design (95% level)
- Final Design
- Consultant Engineer Design Manual
 - Provide standards for design documents
 - Explicitly states the design process
 - Ensures adequate reviews of design during development
 - Ensures adequate safety and constructability/operability
 - Provides an engineering database for specifications, standard drawings, engineering standards, and standard contract terms



AECOM Typical Design Documentation Matrix

Deliverable	30% Design	60% Design	90% Design	100% Design
Plans				
Cover Sheet			Draft Final	Final
Site Plan	Revised	Draft Final	Draft Final	Final
Civil Layout	Preliminary	Revised	Draft Final	Final
Sections		Preliminary	Draft Final	Final
Details		Preliminary	Draft Final	Final
Process Flow Diagram (PFD)	Revised	Draft Final	Draft Final	Final
Process and Instrumentation Diagram (P&ID)	Preliminary	Revised	Draft Final	Final
Mechanical Layout	Preliminary	Revised	Draft Final	Final
Details	List	Preliminary	Draft Final	Final
Electrical Layout		Preliminary	Draft Final	Final
Specifications				
Division 1		Outline	Preliminary	Final
Division 2-16	Outline	Preliminary	Draft Final	Final
Equipment/ Material List				
Major	Preliminary	Revised	Draft Final	Final
Minor		Preliminary	Draft Final	Final
Utility Requirements	Preliminary	Revised	Draft Final	Final
Cost Estimate Accuracy				
Construction	+30% /-20%	+20% /-15%	+15% / -10%	+15% /-10%

Incorporation of Sustainability and Green Remediation

- DER-31 Issued August 2010
- Applies to all phases of remediation
- Use of renewable energy and/or the purchase of renewable energy credits (RECs)
- Reduce vehicle idling
- Design cover systems to be usable for alternate uses such as habitat or passive recreation, require minimal maintenance (e.g. less mowing), allow for infiltration of storm water and/or be integrated with the next use of the site.
- Beneficially reuse materials that would otherwise be considered a waste (e.g. crushed clean concrete as fill)
- Use of Ultra Low Sulfur Diesel



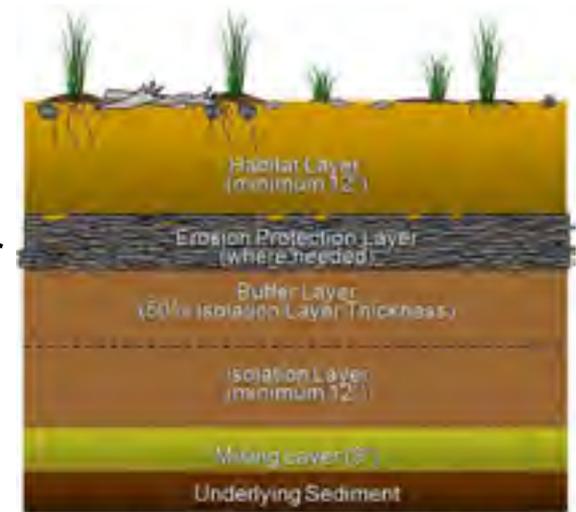
Application of DER-31 Green Remediation in RD/RA

- **Green remediation and sustainability efforts should be implemented to the extent feasible in the design and implementation of the remedy**
 - using renewable energy sources
 - reducing greenhouse gas emissions
 - encouraging low carbon technologies
 - fostering green and healthy communities
 - conserving natural resources
 - increasing recycling and reuse of clean materials
 - preserving open space and working landscapes
 - enhancing recreational use of natural resources
 - designing cover systems to be usable for habitat or recreation
 - designing storm water management systems to recharge aquifers



Remedial Design – Onondaga Lake Bottom Site

- NYSDEC/USEPA Issued ROD based on RI, risk assessments, and site-specific criteria developed by AECOM
- Combined remedy including dredging, capping, MNR, and habitat restoration
- Complex RD in progress with NYSDEC/AECOM oversight
- Multiple interagency Technical Work Groups established in RDWP
- Construction of sediment consolidation area and water treatment plant in 2010/11 with dredging/capping to begin in 2012



General Schematic of Cap

Source: NYSDEC, 2010

Data to Support Remedial Design – Onondaga Lake Bottom Site

- Extensive pre-design investigations
 - Sediment (chemical and geotechnical)
 - **Porewater**
 - Surface water
 - Groundwater upwelling
 - DNAPL extent
 - Geotechnical characterization and **settlement pilot study** for SCA
- Geophysical surveys
 - Bathymetry
 - Magnetometer surveying
- Baseline monitoring



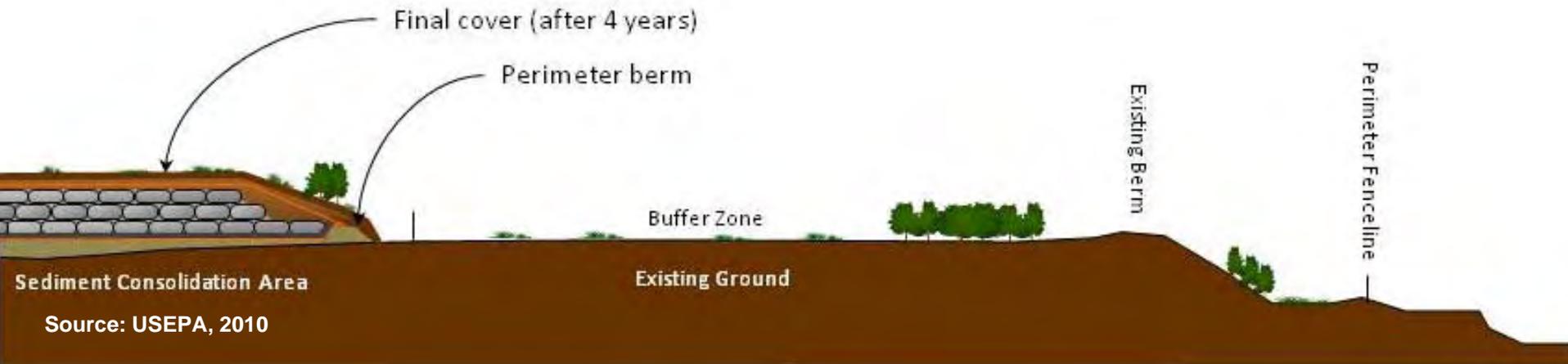
Data to Support Remedial Design – Onondaga Lake Bottom Site

- Bench-scale testing
 - **Cap column studies** and isotherm studies for evaluating biodegradation, NAPL migration, and cap amendments
 - Biodecay slurry studies
 - Wind tunnel testing for emissions and odors
 - Sediment incubation studies for evaluating oxygen and nitrate augmentation
 - Water treatability studies
 - Dewatering methods (including **geotextile tube testing**)



Community Involvement and Protection – Onondaga Lake Bottom Site

- NYSDEC and USEPA have continued CP activities in RD phase
- Incorporation of public's concerns and protection
 - Hydraulic dredging with double-walled pipeline
 - Setbacks for SCA from existing wastebed perimeter
 - Use of geotextile tubes instead of open basins
 - SCA HHRA completed by EPA and used to support development of air quality standards, monitoring, and contingency plans



Remedial Design – Sag Harbor Former MGP Site

- NYSDEC issued ROD in 2006
- AECOM completed RD and construction management and monitoring
- Use of innovative management approach and technologies in an historic downtown business district and tourist destination
- Design optimized selected remedy which reduced construction schedule and community impact
- Facilitated an increase in parking areas to boost seasonal economy



Remedial Action – Sag Harbor Former MGP Site

- Removal of over 30,000 tons of contaminated soil in top 10 to 15 ft
- Movable temporary fabric structure with vapor capture and treatment
- In-situ soil mix wall with Portland cement minimized dewatering flow rate and discharge to harbor
- In-situ stabilization of 6,500 tons of subsurface soil
- Over 15MG of groundwater treated and discharged via subaqueous pipeline over ½ mile into harbor



Remedial Action Monitoring and Controls – Sag Harbor Former MGP Site

- Continuous community air monitoring with real-time GC
- Containment of vapors and emissions using a temporary fabric structure with activated carbon air filtration and use of odor-suppressant foam
- Traffic management plan
- Noise and odor monitoring
- Continuous vibration (remote telemetry) and structural monitoring of nearby homes, historic structures, and roadways
- Community outreach programs including a dedicated website, hotline, and regular meetings and updates
- All data were monitored daily and posted to a public website for access by the community
- No safety incidents throughout 46,000+ man hours.



New York
Construction
Magazine
Best of 2009
Award of Merit
Environmental

Thank You

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SECTION 6 – Site Management, Periodic Review and Closeout

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Site Management Plan Principles

- SMP is required to implement ICs and ECs
- One SMP per site
 - Except BCP sites with significant off-site contamination handled by SSF
- Interim Site Management
 - IRMs
 - Operable Units until all OUs are completed
- SMP not required where the remedy is only:
 - Tank pull
 - Subslab depressurization system (SSDS)
 - Point of entry treatment system (POET)
 - Short-term system (< 18 months)
- ***SMPs do not require PE certification***



SMP Principles (cont.)

- If owner is not remedial party
 - BCA/Order and COC apply to remedial party(ies)
 - Easement/Deed Restriction apply to owner
 - Agreement between parties recommended specifying SM responsibilities
- Inspection and monitoring frequency may be different than reporting frequency
 - Unless inspection reveals
 - Change of use
 - Damage to an EC affecting protectiveness
 - Severe conditions potentially affecting ECs



SMP Components

- Background and Remedial Program
 - Summary of previous work
 - Description of remaining contamination
- Engineering / Institutional Control Plan
 - Excavation Work Plan
 - Periodic Reporting & Certifications
- Monitoring Plan (Media & Cover)
- Operation & Maintenance Plan



SMP Notifications

- Changes in site use – 60 days advance notice
 - Includes certification of disclosure to prospective owner (Order/Agreement/Contract, work plans, reports)
- Confirmation of new owner – 15 days after
 - Include statement that new owner has received
 - SMP
 - Previously approved Periodic Review Reports
 - Certification forms for the next Periodic Review
- Ground-intrusive activities – 7 days advance
- Emergency conditions: Noon the next day (verbal), 7 days (written)
- Non-emergency damage – 5 days after



Site Management Plan

TEMPLATE

Also templates for FER, Environmental Easement,
Community Factsheets..



SMP Template - Intended to:

- Standardize SMP contents between NYS program sites
- Reduce document preparation complexity for consultants
- Reflect the Department's experience with SM
- Streamline Department reviews



Using the Template

- Check for the current version
- Not all sections are applicable to all sites
- Not all sections are applicable to all sites
- Not all sections are applicable to all sites
- You may use your own format
 - Use the checklist
 - Use standard language from the template



SMP Template:

Recommended Tables

(Items in orange typically exist by time SMP is started)

1. Remedial Investigation Soil Contamination Summary
2. Remedial Investigation Groundwater Contamination Summary
3. Remedial Investigation Soil Vapor Data
4. Soil Cleanup Objectives for the Site- Part 375 Tables XtoXX
5. Summary of Remaining Soil Contamination Above Unrestricted Levels- IRM Report?
6. Summary of Remaining Soil Contamination Above Site-Specific Action Levels- IRM Report?
7. Criteria for On-site Re-use of Excavated Material
8. Criteria for Imported Soils
9. Monitoring/Inspection Schedule
10. Schedule of Monitoring/Inspection Reports
11. Emergency Contact Numbers- HASP
12. Other Contact Numbers- HASP



SMP- Recommended Figures

1. Figure of Site and Site Boundaries
2. Geologic Cross Section(s)
3. Groundwater Flow Figure
4. Remedial Investigation Soil Contamination Summary
5. Remedial Investigation Groundwater Contamination Summary
6. Remedial Investigation Soil Vapor Data
7. Extent of Remedial Excavation Performed
8. Location of Remedial Treatment Systems
9. Location of Remaining Soil Contamination Above Unrestricted Levels
10. Location of Remaining Soil Contamination Above Site-Specific Action Levels
11. Location of Cover System Types
12. Truck Transport Routes
13. Area of Soil Vapor Intrusion Concern
14. Groundwater Monitoring Well Network- Long-term network- routine monitoring
15. Baseline Post-Remediation Groundwater Quality
16. Map of Route from Site to Hospital- HASP



SMP Template

Recommended Appendices

1. Excavation Work Plan- Template provided in the March 2010 Version
2. Metes and Bounds
3. Environmental Easement
4. Health and Safety Plan and Community Air Monitoring Plan
5. Stormwater Pollution Control Plan
6. Monitoring Well Boring and Construction Logs
7. Groundwater Monitoring Well Sampling Log Form
8. Field Sampling Plan
9. Quality Assurance Project Plan
10. Site-wide Inspection Form
11. EC As-Built Drawings
12. EC System Component Manual(s)
13. EC System Inspection Checklist(s)
14. EC Trouble Shooting Guide
15. EC Maintenance Schedules



SMP TEMPLATE

- Experience using templates on Chazen sites has resulted in rapid DEC review and approval
- Case Study- 9 Mall Plaza site
 - Received 5 DEC technical comments on SMP
 - Our second draft (proposed final draft) was re-issued to DEC with less than one day of editing.



Nine Mall Plaza Site
DUTCHESS COUNTY, NEW YORK

Site Management Plan

NYSDEC Site Number: C314114

Prepared for:

Nine Mall Investors, LLC
1680 Route 23 N, Suite 330
Wayne, NJ 07470

Prepared by:

Chazen Engineering & Land Survey, PC
21 Fox Street
Poughkeepsie, NY 12601
845-454-3980

I certify that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DEC Technical Guidance for Site Investigation and Remediation (DER10) and any DEC approved modifications.

NYS P.E.: Mr. Dan Stone, P.E.

Revisions to Final Approved Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date



Nine Mall Plaza BCP Site

- Site contaminants: PCE and breakdowns
- Involved in clean-up activities since early 1990's
- Well delineated groundwater plume at 20 feet below grade, but unsaturated zone source soils were historically absent???
- Former VCP site became a BCP in late 2006 (COC scheduled December 2010)
- No clear onsite source was identified as BCP program steps were implemented
 - Historic backyard dumping area was accepted as onsite source that was presumed washed into underlying deeper aquifer with time.
- Source identified during sewer repair in 2009 (pre-SMP/COC). Sewer pipe from former dry cleaners was found connected to a perforated drywell (surrounded by PCE-impacted soils)



Nine Mall Plaza BCP Site No. C314114

Presumed Source Location
(Dumpster Storage on Grass)



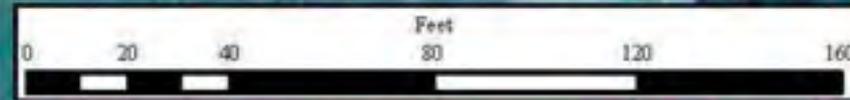
Source Location -
Perforated Sewer Drywell
Identified and Removed: 2009



Historical Highest
Groundwater PCE
Concentrations



Former
Dry
Cleaners



Nine Mall Plaza BCP Site: Site Remedy

- Install SSDS over Strip Mall Building (SMB)
- Bioremediation- Inject electron donor compounds into groundwater plume
- Drywell removal (added after perforated drywell structure was identified in 2009)
- Monitor groundwater progress via well network



SSDS on roof of SMB



SSDS Operation:

SMP provision to keep system running, perform repairs, maintenance and promptly report issues to DEC.

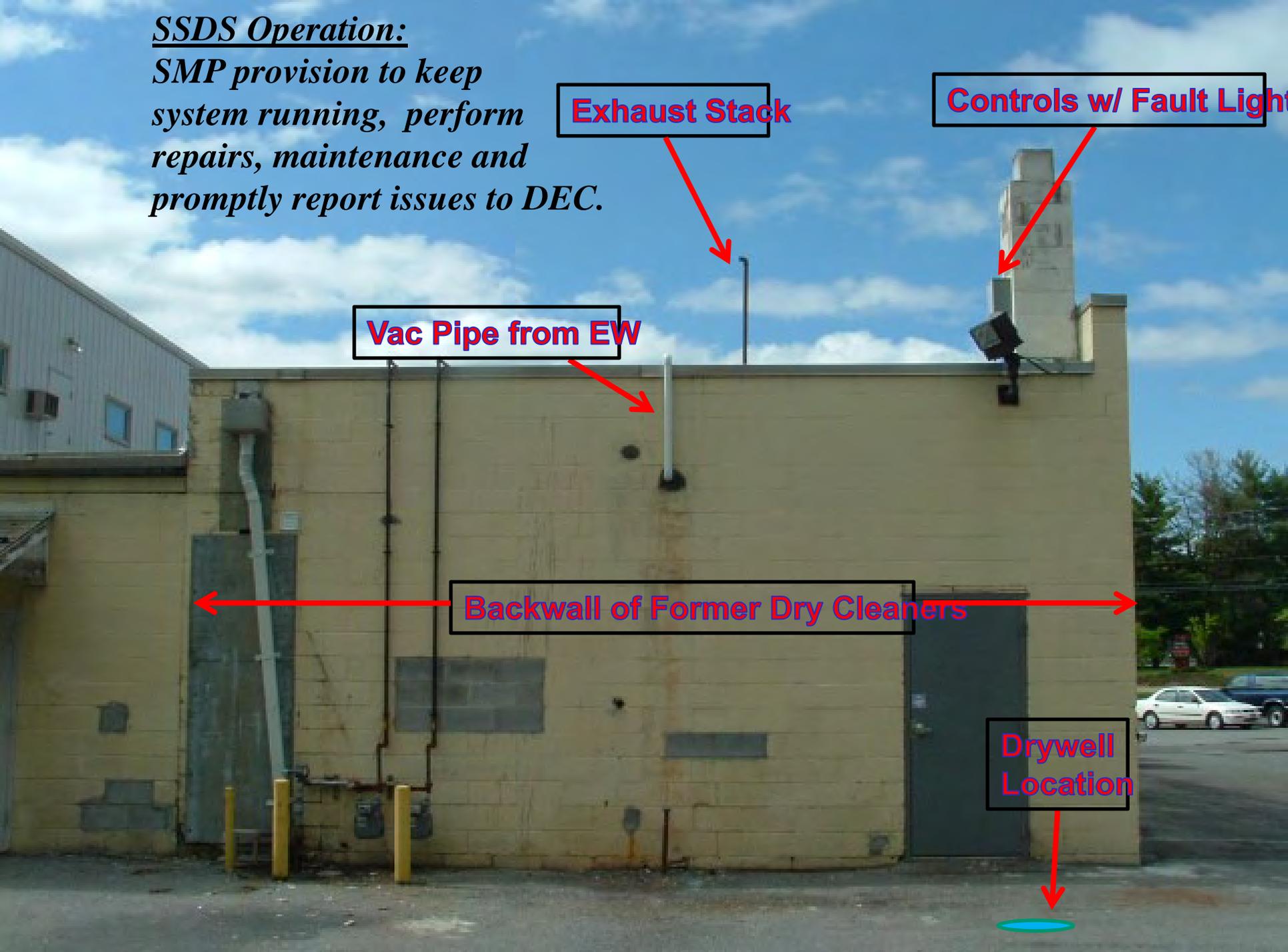
Exhaust Stack

Controls w/ Fault Light

Vac Pipe from EW

Backwall of Former Dry Cleaners

Drywell Location



Electron donor injection into delivery well behind former dry



Chemical Injections:
SMP provision
includes possible add'l
injections if needed.



AUG 6 2006

Drywell (SOURCE!!) Removal

Future Soil Excavation:
**SMP provision to
monitor future
excavation activities,
import/export soils.**

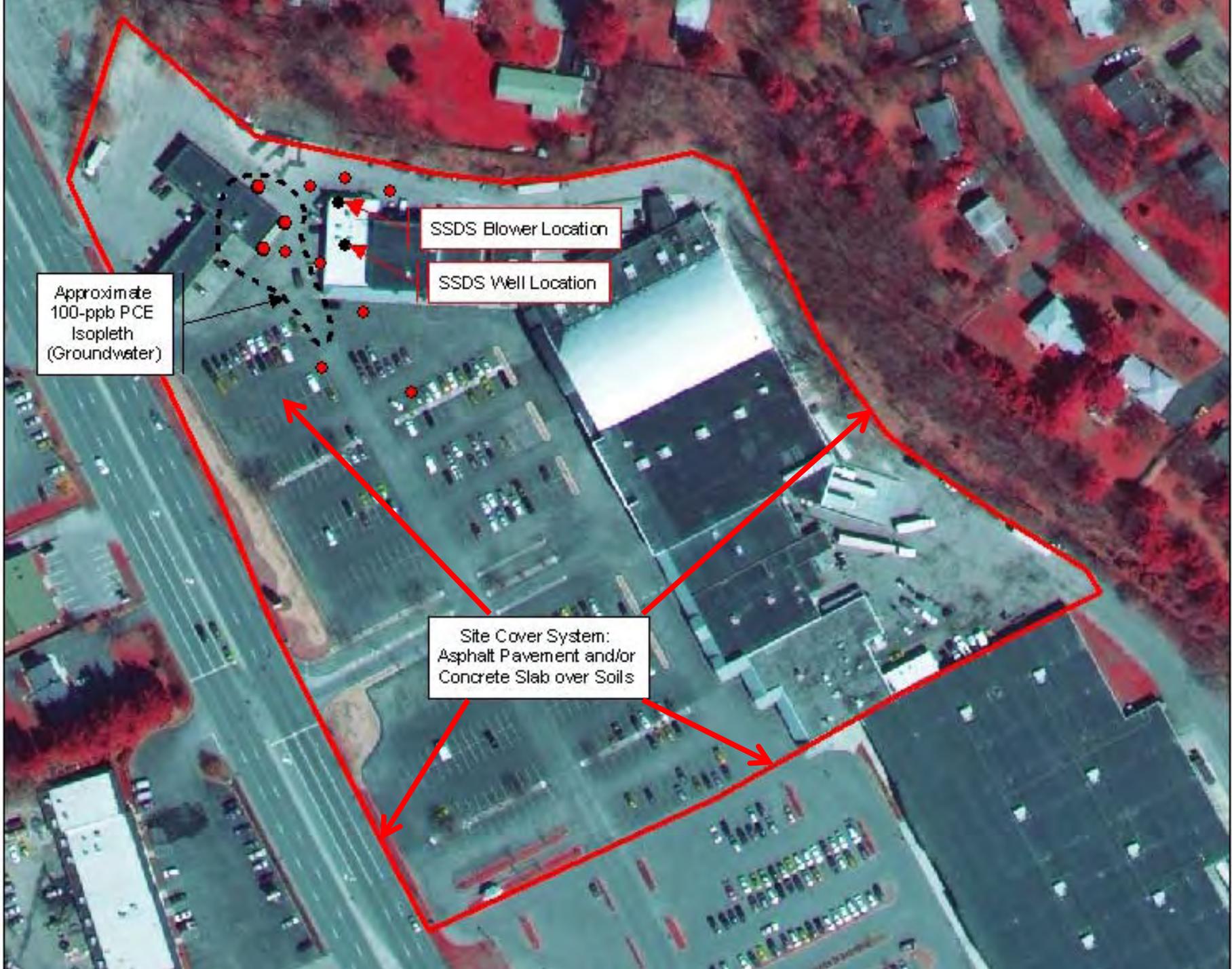
10/15/2009



Site Management- Commercial Use

- Post-remedy GW- CVOC levels < 300 ppb
- Site recently entered MNA
- Sub-slab vapor: SMB has SSDS which will continue to operate
- Pavement/Concrete Cap- limits potential exposure to subsurface soils, although all soils left in place were documented at concentrations below Part 375 “Unrestricted” Values
- MNA includes provision for additional bio-remediation measures if groundwater concentrations re-spike or don’t continue to decline
- GW use restriction/Environmental Easement
- Annual SSDS certification and GW Monitoring (MNA)
 - PRR annual for first 5 years, and then re-evaluate frequency
- SMP/EE restrictions apply to ALL areas of the “Site”





Approximate
100-ppb PCE
Isopleth
(Groundwater)

SSDS Blower Location

SSDS Well Location

Site Cover System:
Asphalt Pavement and/or
Concrete Slab over Soils

Periodic Reviews and PR Reports

- First PR is 18 months after COC
 - DEC sends 45-day notice letter and forms
 - Subsequent PR frequency varies (1, 3, 5 yrs)
- One PR per site, regardless of subdivisions
 - Arrange for and identify “Certifying Party”
- Summarize and evaluate
 - Media monitoring data (effectiveness & trends)
 - Operational data
 - Include data in EDD format



PRR Certifications

- 45-day letter includes necessary certifications
 - Based on DEC's database
- ICs & ECs are in place and effective
- Monitoring, O&M is being performed
- Land use may be certified by the owner
- Engineering evaluations and re-designs require a PE
- Don't change the certification language!
- Don't certify unless everything is in place!
 - Site redevelopment
 - Changes in use



Corrective Measures

- When certification cannot be made, include a Corrective Measures Plan (CMP)
 - Can range from simple fix to extended redevelopment
- Include a realistic schedule that includes recertification
- Approved CMP schedule determines next PR certification
 - If > 45 days, a 45-day letter will be sent



Closeout

- RAOs and SCGs have been achieved, or
- Bulk reduction in gw contamination achieved
 - Operation no longer feasible
 - Has been properly implemented & optimized
 - Cannot be modified to achieve SCGs
 - Not a significant threat
 - Asymptotic contaminant levels achieved
 - System has been pulsed
 - Compare pre and post pulsing levels
 - Decreasing soil vapor and adjacent gw levels



Closeout (cont.)

- Soil treatment systems
 - Levels at or near SCO for gw protection
 - GW standards met at the property line
 - No off-site significant threat
 - Verify with soil borings or test pits
- If RAOs not met, evaluate alternatives
- Formal shutdown request must be made



MNA Closeout

- Plume is stable or decreasing
- Sentinel well meets SCGs
- Concentrations in center line of plume are decreasing
- Statistical evaluations required
- PRR may also recommend reduced monitoring



Other Closeout Cases

- Plume Management Monitoring (PMM)
 - Transition to MNA
 - Active remediation required
- Drinking water treatment systems
 - Below Part 5 stds 4 consecutive quarters
 - Then < 50% of stds 4 consecutive quarters



Closeout Process

- Document in final Periodic Review Report
- Upon approval
 - Discontinue remedial processes
 - Extinguish easement/deed restriction



A Few Concluding Thoughts....

- Be sure to be early or on-time with your BCP task milestone submissions.
- Calendar call meetings are held as an open forum with DEC staff to discuss missed deadlines, unsatisfactory or missing reports, and/or project issues that need resolution to keep project on track.
- Use DEC templates and get input from DEC PMs while you write/edit template sections => quicker approvals and less edits.

