EBC New Hampshire Program:

Update on Management of Limited Reuse Soils (LRS) in New Hampshire

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Welcome to Sheehan Phinney

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Program Purpose – What You Will Learn

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Overview of LRS & Why it is an Issue

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What are Mildly-Contaminated Soils or Limited Reuse Soils and Why are they an Issue?

EBC New Hampshire Program:

Update on Management of Limited Reuse Soils (LRS) in New Hampshire Policies and Practices

January 18, 2019

Lisa Damiano, P.E.

Sanborn Head & Associates, Inc.

What happens when soil is not "above the standards" but is also not "clean"?

What are "**Limited Reuse Soils (LRS)**"?

Soils with contaminant concentrations above naturally occurring background concentrations that *are not*:

- Impacted above soil remediation standards by a specific industrial discharge or
- Classified as a hazardous waste

Contaminant concentrations may be less than applicable regulatory standards.

What is LRS?

Unregulated Soils

Virgin soils/rock from gravel pits and quarries and virgin excess soils, free of anthropogenic impacts

Limited Reuse Soils

Contaminated soil not impacted by a discharge subject to Env-Or 600 and which do not constitute a hazardous waste (C might exceed SRS)

Soil impacted by a discharge subject to Env-Or 600 but C < SRS but > Natural Background

Contaminated Soils (i.e., Remediation Waste)

Soils that constitute a hazardous waste, or soils impacted by a discharge and subject to remediation in Env-Or 600 with C > Soil remediation Standards (SRS)

SANBORN HEAD


If it can't be used in a playground, it's not clean.

What is LRS?

What is LRS?

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Where is LRS found?

Not from spills

Not from “point” source areas

Where is LRS found?

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LRS from Roadsides

What's in this Roadside LRS?

- May contain a broad range of transportation related contaminants
  - Heavy Metals (i.e. lead)
  - Polycyclic aromatic hydrocarbons (PAHs)
    - Benzo[a]pyrene (and other carcinogenic PAHs)
- Risk and liability associated with these due to potential heath risks

What are PAHs and why do we care?

- PAHs are formed during the incomplete burning of organic substances
- PAHs are everywhere in the environment
  - Human activities, some naturally occurring
- Benzo(a)pyrene
  - Carcinogenic
  - Low solubility in water
  - Binds to soils with high organic carbon content (i.e., topsoils)

Where are the PAHs coming from?

- Vehicle emissions and deposition of airborne particulates.

- Particulates through stormwater flow or mechanical means, like snow removal operations in the northeast
  - Asphalt
  - Coal-tar based sealants

PAHs in coal-tar based sealants

- Transported through stormwater runoff, adhesion to tires or feet, wind, and volatilization.
- Largest source of PAH contamination to 40 urban lakes researched by the USGS
  - Use of these since 1960s is the primary cause of the trend of increasing PAH concentrations in urban lake sediment
- Sealants wear into small particles with high concentrations that can be tracked into homes and incorporated into house dust.
  - PAH levels can be 25 times higher in house dust for an apartment adjacent to a parking lot sealed with coal –tar based sealant

What is the extent of PAHs in LRS?

- Vertical extent limited with the highest PAH concentrations within the first layer of soil followed by a rapid decrease with depth.

- Horizontal extent may be controlled by topographic features like embankments and vegetative features.
  - Forest/trees along the roadside may act like a "green barrier" and limit the extent of PAH contamination
  - Wax-covered coniferous needles act like a filter for PAHs transported within airborne soot particles from vehicle emissions.

LRS

- We know they exist and where they could be encountered.

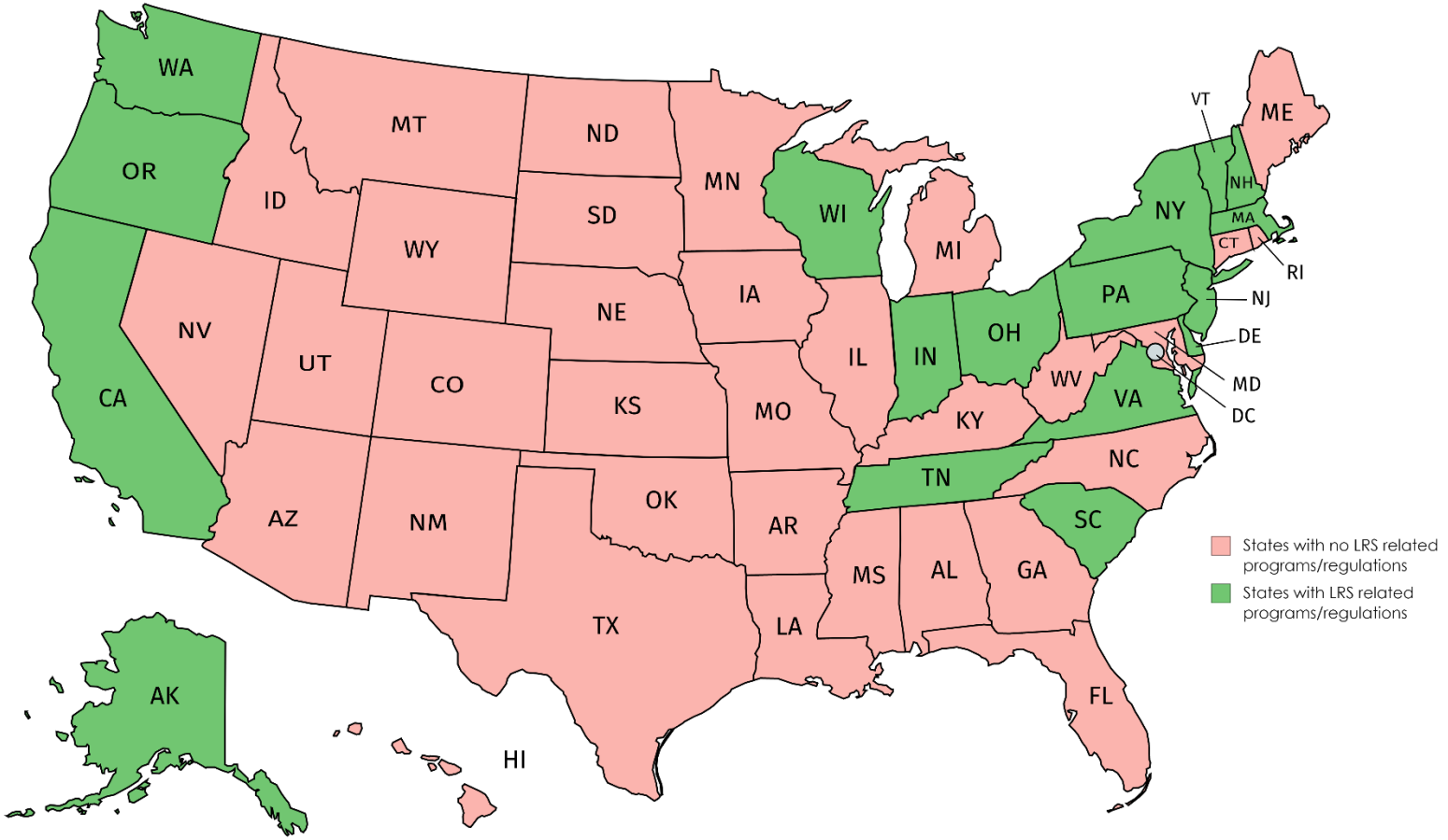
- Once they are disturbed, they need to be properly managed
  - Disposal or use as daily cover material at a permitted landfill
  - Recycling at an asphalt batch plant
  - Recycling at a thermal treatment plant
  - Other beneficial use
  - Re-used/managed in place?

In the Northeast,

Landfill Capacity is diminishing

Disposal costs are rising

Who's doing what with LRS?



Oregon

- Statewide Highway Shoulder Soil Evaluation
  - Elevated lead & benzo(a)pyrene concentrations
- Mildly-contaminated roadside soil defined as
  - Soil 25’ from edge of pavement and 18” below ground surface

Oregon

- Implemented a directive for managing these soils
  - >1.5 feet below grade → assume clean fill
  - <1.5 feet below grade →
    - Reuse within DOT right-of-way
    - Sample and compare to standards for re-use elsewhere
    - Obtain permit to reuse soil off-site
    - Dispose in landfill

OREGON DEPARTMENT OF TRANSPORTATION TECHNICAL SERVICES

GEO-ENVIRONMENTAL SECTION DIRECTIVE

SUBJECT	FINAL NUMBER	EFFECTIVE DATE	VALIDATION DATE	SUPERSEDES or RESCINDS
Management of Surface Soils Removed Within Operational Right of Way	GE 14-01(D)	09/17/2014	03/26/2018	
DISCIPLINE/PROGRAM: Surface Soils	WEB LINK(S): http://www.oregon.gov/ODOT/Engineering/Pages/Technical-Guidance.aspx			
	APPROVED SIGNATURE: Original Signed By: Susan Haupt, Chief Environmental Officer			

PURPOSE

Assessment of excavated surface soils adjacent to ODOT's highways has indicated that such soils might contain contaminants. The purpose of this Directive is to provide direction for managing surface soil excavated from within ODOT's operational right of way.

GUIDANCE

This technical directive provides options for managing surface soil, when removal is required for construction purposes. This directive does not require soil removal; it only addresses how to manage soil that must be removed for construction purposes. Maintenance policy for materials management is covered by the ODOT Maintenance EMS program and the Blue Book. Therefore, maintenance projects are not included in this directive.

DEFINITIONS

DEQ - Oregon Department of Environmental Quality
ENV 16-01 – ODOT Hazardous Materials and Wastes Policy
ENV 16-02 – ODOT Contaminated Site Management Policy
ODOT Maintenance EMS – Most recent version of the "ODOT Maintenance Yards Environmental Management System (EMS) Policy and Procedures Manual"
Blue Book – Most recent version of the "ODOT Routine Road Maintenance: Water Quality and Habitat Guide Best Management Practices."

BACKGROUND/REFERENCE

Limited sampling of surface soils adjacent to state highways has identified the presence of contaminants that exceed DEQ's clean fill guidance values in the top 1.5 feet. Contaminant levels are generally low enough to not require cleanup or management if the soils remain undisturbed. However, excavated soils that exceed clean fill levels must be managed per OAR 340-093 (Solid Waste General Provisions).

Wisconsin

- Waste Soil Determination and Identifying Clean Soil
- Recognized soil in transportation corridors as a probable impacted material, requiring pre-disposal testing
- 4 Categories of Waste Soil:
  - Clean
  - Restricted Use
  - Landfill Disposal Required
  - Hazardous Waste

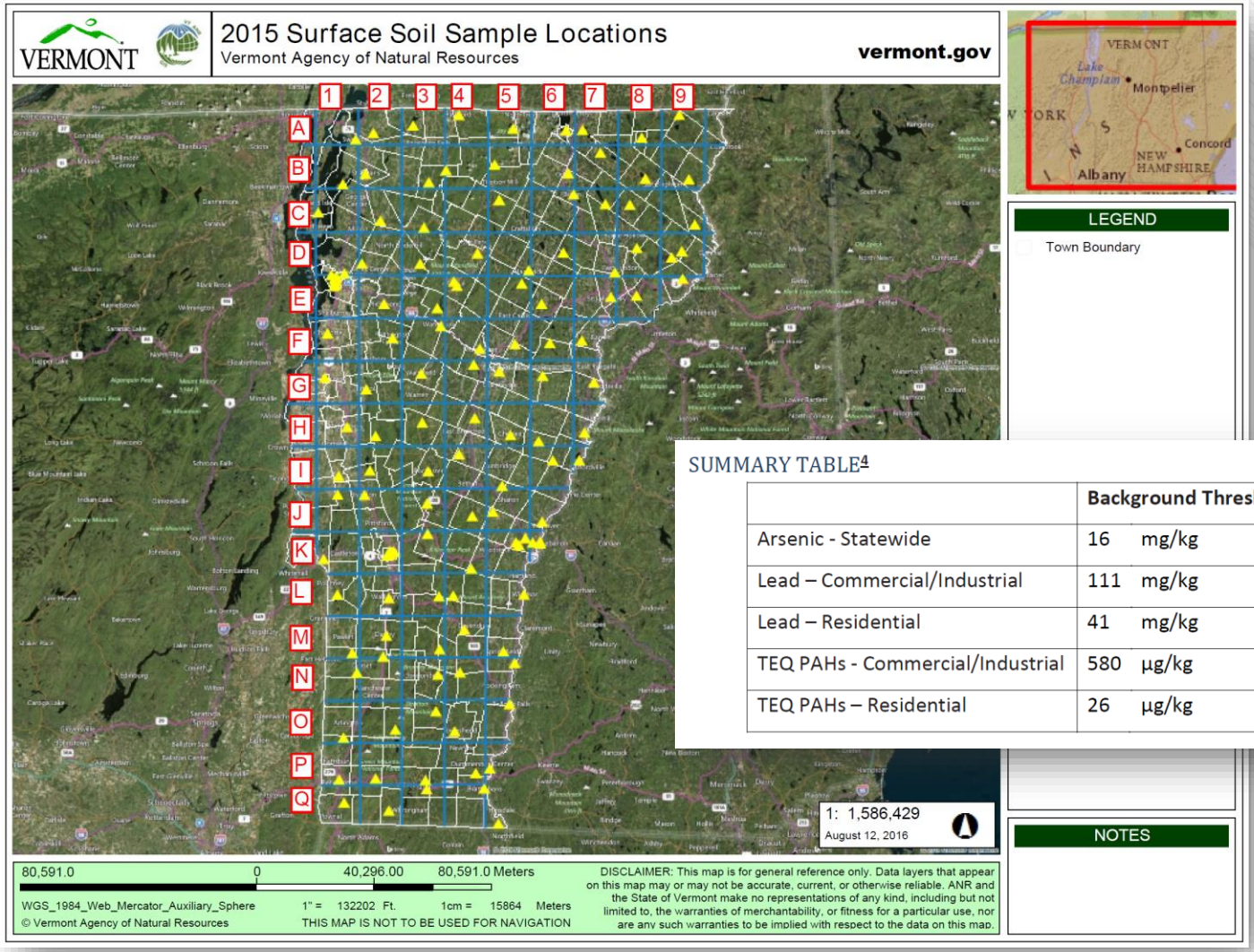
New York

- Guidance/policies for non-hazardous soil reuse
- Case-specific beneficial use determinations (BUDs)
- Generic BUDs
  - Non-petroleum sites
    - Backfill in same/similar excavations at same site
  - Petroleum-contaminated sites
    - Use in asphalt batching
    - If sufficiently decontaminated, and with approval
      - On-site or off-site fill
      - Embankment or subbase material

Vermont

- Policy for Development Soils (Act 52) in May 2016
- Focused on Burlington area and cost of disposing **development soils** containing arsenic, lead, and PAHs
- Development Soils:
  - *Contain PAHs, arsenic, or lead in concentrations that exceed the relevant soil screening level for residential soil and when managed according to VT rules, pose no greater risk than the established soil screening value for the intended reuse of the property and no unreasonable risk to human health through dermal, inhalation, or ingestion exposure pathways, and does not leach compounds at concentrations that exceed groundwater enforcement standards or result in an exceedance of VT groundwater enforcement standards.*
- VT commissioned a statewide background study

Vermont



SUMMARY TABLE[4]

	Background Threshold Value	
Arsenic - Statewide	16	mg/kg
Lead – Commercial/Industrial	111	mg/kg
Lead – Residential	41	mg/kg
TEQ PAHs - Commercial/Industrial	580	µg/kg
TEQ PAHs – Residential	26	µg/kg

Vermont

- Soil relocation allowed if:
  - Receiving site does not become more contaminated
  - Groundwater will not be impacted (SPLP test)

- Disposal options
  - Landfill
  - Daily Cover at a Landfill
  - Categorical Disposal Facilities

New Hampshire

- We know there are elevated levels of metals and PAHs (i.e., above background levels) in roadside/fill soils and railroad right-of-ways.

- NH completed a background metals concentration study in 1998
  - No data on PAH background concentrations
  - Therefore, background is **zero.**


SHA
Sanborn, Head & Associates
Consulting Engineers & Scientists

BACKGROUND METALS CONCENTRATION STUDY
NEW HAMPSHIRE SOILS
New Hampshire Department of Environmental Services
Concord, New Hampshire

Prepared for
New Hampshire Department of Environmental Services

Prepared by
Sanborn, Head & Associates, Inc.

File 1571
November 1998

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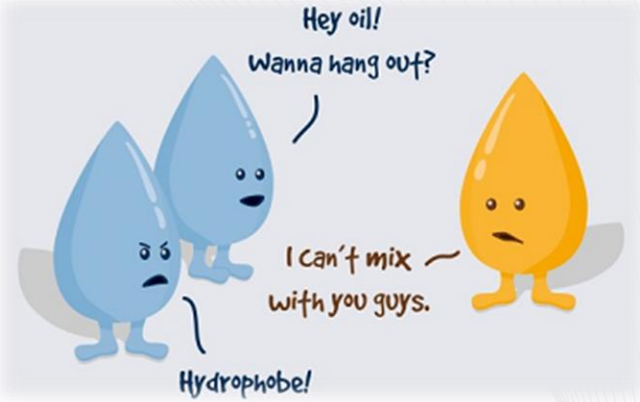
Should we be concerned?

- Mobility and transport
  - Mobility most influenced by organic carbon content of soil and hydrophobic nature of many PAHs
  - Leaching tests have shown transport of PAHs is minimal



- PAH bioavailability and bioaccessibility
  - LOW due to the contaminants inclination to be absorbed strongly to particulates and organic carbon in soils

Questions?

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How LRS Is Managed in Other States, with a Focus on Massachusetts

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EBC NH CHAPTER – MASSACHUSETTS UPDATE ON LIMITED REUSE SOILS (LRS)

Michael Martin, Project Manager

Tighe&Bond

SOILS FORECASTS

- **Estimated Soil Volumes Between 2018-2021 – Eastern MA**
  - Anticipated Generation 2-3M tons per year
    - 60-65% < RCS-1/2 Soils (LRS)
    - 10-15% Unlined Landfill Soils
    - 5% Lined Landfills Soils
    - 5-10% Asphalt Batch/Thermal
    - 5-10% Out-of-State Landfill

MASSACHUSETTS SOIL REUSE FACILITIES

- **Historically Unlined and Lined Landfills utilized for most soil with Acceptance Criteria established by MassDEP Policy Comm 97-001**

- **Similar Soil Policy (Policy WSC#-13-500) enacted in September 2014**

- **Interim Policy on the Re-Use of Soil for Large Reclamation Projects Policy # COMM-15-01 on August 28, 2015**

SIMILAR SOIL POLICY

- **Provide Guidance for Compliance with the "Anti-Degradation" Requirements of the MCP:**

  310 CMR 40.0032(3)(b) – *(soils) are not disposed or reused at locations where existing concentrations of oil and/or hazardous material at the receiving site are significantly lower than the levels of those oil and/or hazardous materials present in the soil being disposed or reused*

- **Reduce Volume of Soil in MA Landfills**

- **Ensure**

  The managed soil does not increase risk of harm to health, safety, public welfare or the environment at the receiving location

SIMILAR SOIL REQUIREMENTS

- **Four Requirements of 310 CMR 40.0032(3)**
  - Managed Soil Must No Be a Hazardous Waste
  - Managed Soil Must be Less than RCs applicable at the Generation Site
  - Managed Soil Must Not Create a Reportable Condition at Receiving Facility
  - Managed Soil Must Not Be Significantly More Contaminated Than Soil at Receiving Location

- **For Sites not subject to the Comm 15-001 Policy MassDEP and Local Approval* are not required though recommended**

WHAT DOES SIGNIFICANTLY MORE MEAN

- **Developing Acceptance Criteria**
  - Conduct Background Soil Sampling at the Receiving Site; or
  - Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil
  - Use the Similar Soil Multiplying Factors to Calculate Acceptance Criteria
  - Acceptance Criteria Cannot Exceed the Applicable RCS-1 or RCS-2 Value

Table 1. Receiving Soil Concentration Multiplying Factors

If the concentration in soil at the receiving location for a given OHM is:	Then use a multiplying factor of:
< 10 mg/kg	10
10 mg/kg ≤ *x* <100 mg/kg	7.5
100 mg/kg ≤ *x* <1,000 mg/kg	5
≥ 1,000 mg/kg	2.5

MASSDEP COMM 15-001 POLICY

- **Applied to any quarry, gravel pit, or sand pit reclamation project that receives, or plans to receive greater than 100,000 cy of soil for reclamation after August 28, 2015**

- **Required MassDEP ACO and Local Approval**

- **Monthly 3rd Party QA/QC Sampling and MassDEP Reporting**

COMM 15-001 PERMITTING OVERVIEW

- **Public Outreach to Municipality**
- **Develop Site Acceptance Criteria**
  - Following Similar Soil Approach
  - Propose to Use Full RCS-1/RCS-2 Values

- **Submit Draft SMP and Acceptance Criteria for State and Local Approval**
- **Obtain Other Applicable Permits (Wetlands, EPA CGP, NHESP, etc.)**

ACCEPTANCE CRITERIA

Constituent		MassDEP RCs		Similar Soil Acceptance Criteria	
		RCS-1	RCS-2	RCS-1 Acceptance Criteria	RCS-2 Acceptance Criteria
TPH - mg/Kg	TPH	1,000	3,000	500	1,000
EPH[2] - mg/Kg	C9-C18 Aliphatics	1,000	3,000	Summation of EPH Fractions <500	Summation of EPH Fractions <1,000
	C19-C36 Aliphatics	1,000	3,000		
	C11-C22 Aromatics	1,000	3,000		
VPH - mg/kg	C5-C8 Aliphatics	100	500	<10	<10
	C9-C12 Aliphatics	1,000	3,000	<100	<100
	C9-C10 Aromatics	100	500	<10	<10
Target PAHs - mg/Kg	2-Methylnaphthalene	0.7	80	0.7	5
	Acenaphthene	4	3,000	4	5
	Acenaphthylene	1	10	1	5
	Anthracene	1,000	3,000	10	10
	Benzo(a)anthracene	7	40	7	20
	Benzo(a)pyrene	2	7	2	7
	Benzo(b)fluoranthene	7	40	7	20
	Benzo(g,h,i)perylene	1,000	3,000	10	10
	Benzo(k)fluoranthene	70	400	10	10
	Chrysene	70	400	20	20
	Dibenzo(a,h)Anthracene	0.7	4	0.7	4
	Fluoranthene	1,000	3,000	40	40
	Fluorene	1,000	3,000	10	10
	Indeno(1,2,3-cd)Pyrene	7	40	7	10
	Naphthalene	4	20	4	5
	Phenanthrene	10	1,000	10	30
	Pyrene	1,000	3,000	40	40
Other Common SVOCs - mg/kg	Bis(2-Ethylhexyl)phthalate	90	600	9	60
	Dibenzofuran	100	1000	10	100
	All Other SVOCs	NE	NE	To be considered on case by case basis	
Total Metals[2] - mg/Kg	Antimony	20	30	10	10
	Arsenic	20	20	20	20
	Barium	1,000	3,000	375	375
	Beryllium	90	200	4	4
	Cadmium	70	100	20	20
	Chromium	100	200	100	200
	Lead	200	600	200	500
	Mercury	20	30	3	3
	Nickel	600	1,000	150	150
	Selenium	400	700	5	5
	Silver	100	200	6	6
	Thallium	8	60	6	5
	Vanadium	400	700	225	225
	Zinc	1,000	3,000	500	500
	Other Metals	o/s	o/s	To be considered on case by case basis	
PCBs - mg/Kg	TOTAL PCBs	1	4	<0.1	<0.1
VOCs - mg/kg	All VOCs	o/s	o/s	< 10% of RCS-1 value or 0.1 mg/kg considered on a case by case basis	
Pesticides - mg/kg	All Pesticides	o/s	o/s	RL <10% RCS-1 or 0.05 mg/kg	
Herbicides - mg/kg	All Herbicides	o/s	o/s	RL <10% RCS-1 or 0.05 mg/kg	
Inorganic Parameters	Conductivity	NE	NE	2,000	2,000
	Corrosivity (pH)	NE	NE	5.0 - 9.0	5.0 - 9.0
	Ignitability	NE	NE	140	140
	Reactive Cyanide	NE	NE	250	250
	Reactive Sulfide	NE	NE	500	500
Field Parameters	Total Volatile Organic Vapor Screening[4]	NE	NE	<5 ppmv	<5 ppmv
	Debris/Solid Waste Materials	NE	NE	de minimis (<5% by volume ABC > 6 inches and <1% Wood/Plastic/Paper/Wire/Pipe & other Solid Waste)	
	Odor[5]	NE	NE	No petroleum, solvent, organic, sulfide or other nuisance odors	
	Moisture Content/%Solids	NE	NE	No Free Liquids	

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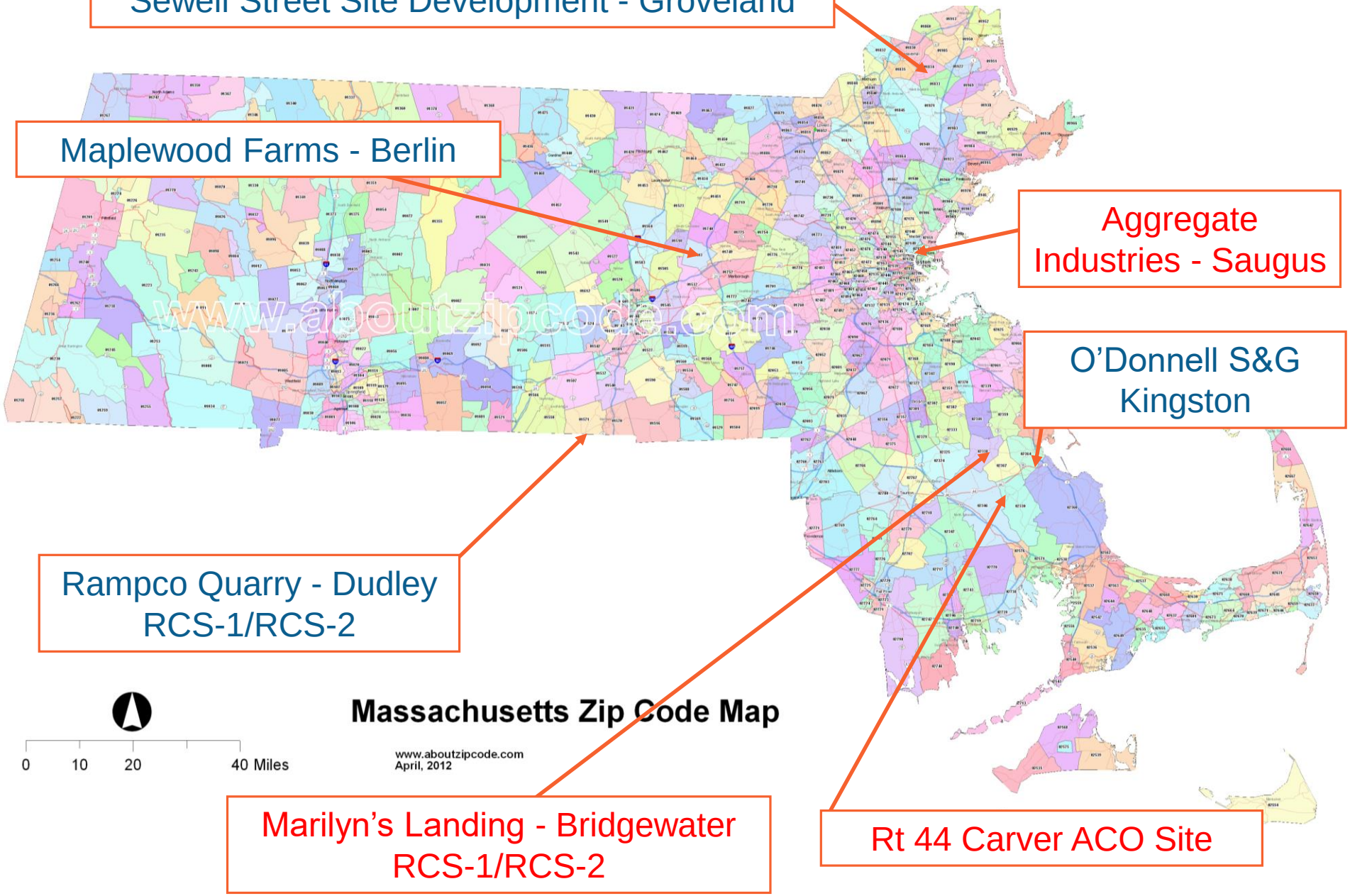

Sewell Street Site Development - Groveland
Maplewood Farms - Berlin
Aggregate Industries - Saugus
O'Donnell S&G Kingston
Rampco Quarry - Dudley RCS-1/RCS-2
Marilyn's Landing - Bridgewater RCS-1/RCS-2
Rt 44 Carver ACO Site
Massachusetts Zip Code Map
0 10 20 40 Miles
www.aboutzipcode.com
April, 2012

EBC New Hampshire
Management of Limited Reuse Soils

CLEANEARTH™

RECYCLING & DISPOSAL SOLUTIONS

LRS in Other States

New Jersey and Pennsylvania

LRS in New Jersey

Three Categories

1. Residential Reuse

2. Nonresidential Reuse

3. Alternative Fill on SRP sites with written approval from NJDEP

LRS in New Jersey

Residential Reuse

Residential Reuse material may be used on residential properties, including schools and parks, conforming to an approved Fill Plan;

1. To bring construction site to grade for a future development
2. Raise grades due to change in flood zone (Superstorm Sandy)
3. Must conform to established soil (by Mass) and Impact to Ground water (IGW) Standards (by SPLP)

* ie. TPH < 1,000 mg/kg, BAP < 0.5 mg/kg, As < 19 mg/kg, Pb < 400 mg/kg

LRS in New Jersey

Nonresidential Reuse

Nonresidential Reuse material may be used on industrial or commercial properties conforming to an approved Fill Plan;

1. To bring construction on a previously impacted site to grade for a future Industrial/Commercial development
2. Raise grades due to change in flood zone (Superstorm Sandy)

Like-on-Like Requirement for Impact to Groundwater

- Limited to the contaminants present in GW on site
- Develop acceptance criteria by using 75th Percentile Evaluation

* ie. TPH < 5,000 mg/kg, BAP < 2 mg/kg, As < 19 mg/kg, Pb < 800 mg/kg

LRS in New Jersey

Alternative Fill

Alternative Fill may be used on Site Remediation Program (SRP) sites as;

1. Backfill to bring excavations or sites to grade
2. Raising elevation to preclude flooding
3. Fill for capping needs

Like-on-Like Requirement

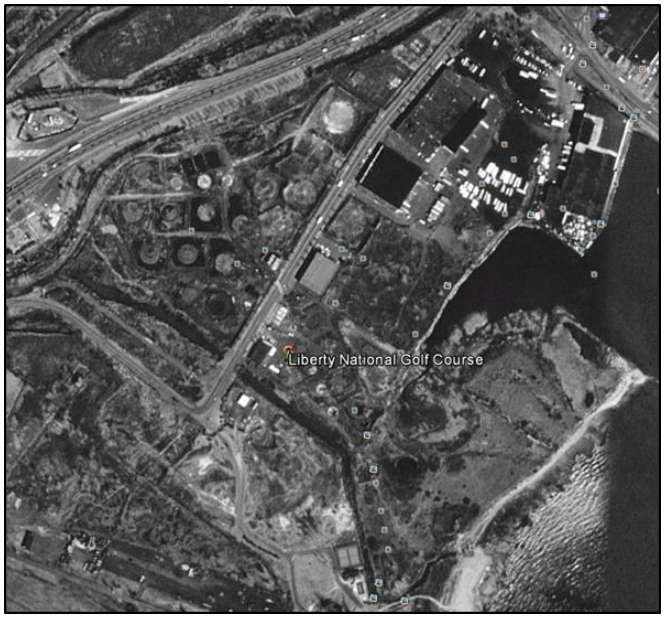
- Limited to the contaminants present
- 75th Percentile Evaluation
- Impact to Groundwater (IGW) Evaluation (by SPLP)
- Historic Fill, Dredge Sediment & Recycled Concrete

Fill Use Plan/Material Acceptance Plan (LSRP)

Tracking and Recordkeeping

NJ Project Profiles

Alternative Fill Site - Liberty National Golf Club



200-acre former Tankport site in Jersey City, NJ; 675,000 CYs of recycled soils and dredged materials to grade, cap and develop the site into New Jersey's most expensive golf course ever and host to the USPGA Barclays Tournament.

LRS in Pennsylvania

Three Categories

1. Clean Fill

2. Regulated Fill

3. Act 2 – Land Recycling Program

LRS in Pennsylvania

Clean Fill

Clean Fill (soil, stone, sediment, used asphalt, brick & concrete) not affected by a release of a regulated substance may be used in an unrestricted or unregulated manner subject to;

1. Certify origin of the fill
2. Analytical testing to qualify as Clean Fill* or Generator certification
3. Complete Form FP-001

Sites receiving Clean Fill must retain FP-001 forms from all fill sources

* ie. BAP < 2.5 mg/kg, As < 12 mg/kg, Pb < 450 mg/kg – No requirement to test for TPH (no objectionable odor)

LRS in Pennsylvania

Regulated Fill

Regulated Fill may not be reused on a greenfield project or for residential use subject to;

1. Soil and Sediment for Commercial or Industrial beneficial reuse on a construction site
2. Complete General Permit for Processing/Beneficial Use of Residual Waste
3. Concentrations below Table GP-1* (Like-on-Like for metals)

Once Regulated Fill is placed on a site, it ceases to be a waste because it has been beneficially reused

* ie. BAP < 11 mg/kg, As < 53 mg/kg, Pb < 450 mg/kg – No requirement to test for TPH (no objectionable odor)

LRS in Pennsylvania

Act 2 – Land Recycling Program

The Act 2 Program was designed to encourage the clean up and redevelopment of Brownfield sites preserving farmland, open spaces and natural areas.

- Voluntary Clean Up to Statewide Health and/or Site Specific Standards based on risk factors, proposed land use and cost effectiveness
- Special Industrial Area Processes by Entity that did not impact the site
- Liability relief for current and future owners after attainment of remediation standards and approval of Final Report

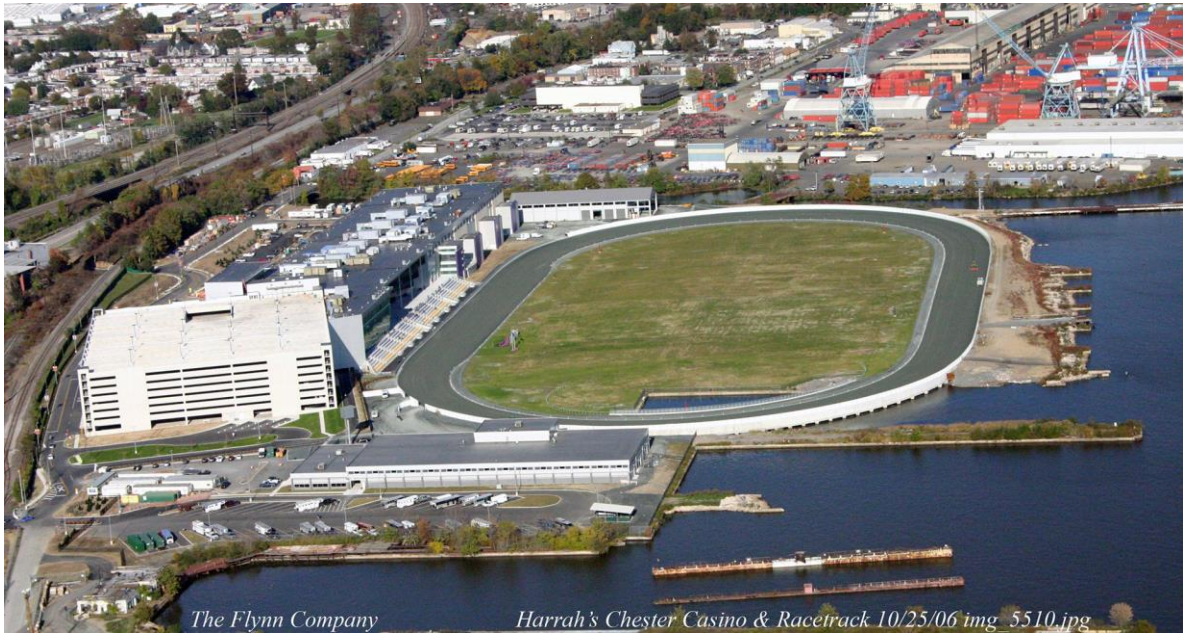
PA Project Profiles

Regulated Fill Site – Bethlehem Earth

Former Beth Steel slag dump site in Bethlehem, PA; 4.5mm yard BU fill site for future Industrial use expansion

PA Project Profiles

Act 2 Site – Harrah's Chester Downs Casino and Racetrack



Former industrial site in Chester, PA; 100,000 tons of Beneficial Reuse soil meeting Site Specific Standards to cap and raise grades to construct casino and racetrack

How LRS is Currently Regulated in New Hampshire – LRS Rules/Policy and the Waiver Process

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NHDOT Case Study – Ongoing Management of LRS Under NHDES Waiver

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Overview of Some Policy Issues and Options for the Future Management of LRS

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Some Policy Issues and Options to Consider for Management of Limited Reuse Soils (LRS) in New Hampshire

Tom Burack, Shareholder, Sheehan Phinney Bass & Green, PA
Chip Crocetti, Sr Vice President, Sanborn Head & Associates, Inc.

EBC New Hampshire Program: Update on Management of Limited Reuse Soils (LRS) in New Hampshire Policies and Practices - January 18, 2019

Key Risks

- Risk of creating widespread low level contamination of soil or groundwater where it does not already exist
- Risk of "moving/expanding" contamination if on-site soil management is not possible
- Risk of becoming a dumping ground for contaminated out-of-state Soils
- Risk that soil constituents other than oil or hazardous materials may cause negative groundwater impacts (e.g., nitrogen, chloride, sulfate, high level of organic material resulting in redox changes & Fe/Mn/As mobilization)
- Risk of unpredictable emerging contaminants (What's the next PFAS?)

Some Regulatory Framework Considerations

- All groundwater in New Hampshire is considered a drinking water resource, so must meet ambient groundwater quality standards
- New Hampshire does not have an "LSP" type program, hence requires considerable NHDES involvement/oversight
- New Hampshire does not have a regulatory mechanism for long-term tracking/accountability of LRS placement/liability (but NH does have inventories of asbestos disposal sites, biosolids applications, and auto salvage yards)

Initial Steps On-Going in New Hampshire:

- NHDOT has been conducting LRS management pursuant to their solid waste rules waiver for approximately 2 years
- The Larrabee Pit Restoration Project in Hooksett has been operational and accepting LRS ("background" levels with some leeway for heavy PAHs) for approximately 3 years
- These two operations provide examples of LRS management options which could be expanded or modified, and applied elsewhere in NH

Some Further Future Policy Options:

- Expand application of solid waste rules waiver for LRS management (DOT approach) to other entities. Private sector may have significant motivation to pursue waiver.
- Consider additional reclamation/construction projects that would allow reuse of LRS: key technical issues would be the geographic/hydrogeologic setting of receiving site/facility, and soil chemical composition/characteristics.
- Use Certified Waste Derived Product (CWDP) approach, identifying acceptable incoming parameters and analytical parameters for processed soils (e.g., based on Soil Remediation Standards (SRS) or some % of SRS).
- Develop and permit one or more LRS disposal landfills (based on customized rules for solid waste landfills).

Additional Considerations for Possible Next Steps and Policy Options:

- Favorable hydrogeology: areas of low groundwater use or contamination potential, no current receptors, existing public water supply
- Heavily developed areas: pre-existing soil & groundwater impacts (e.g., unlined landfills, heavy urban development, areas of extensive GW plume[s])
- Consider importance of water resources and unpredictable nature of future emerging contaminants, and avoid otherwise valuable groundwater and surface water resources

Additional Considerations for Possible Next Steps and Policy Options (Continued):

- Consider acceptance of higher concentrations of immobile contaminants (e.g., PAHs, heavy petroleum hydrocarbons, some metals)
- Assessment of constituents other than oil or hazardous materials that may cause groundwater or surface water impacts (e.g., nitrogen, chloride, sulfate, organic material causing redox changes & Fe/Mn/As mobilization)

Some Questions for Our Panel:

- *What in your experience is the greatest challenge we've seen so far in managing LRS in NH or other states? What are some of the future challenges?*
- *What concerns do users/receivers of LRS have? How could they be addressed?*
- *What are experiences with groundwater or surface water impacts from LRS management in other states and NH?*
- *What kind of approaches could work in New Hampshire?*
- *Are there other major policy options to consider?*

Moderated Discussion

Moderators: Tom Burack & Chip Crocetti

Panelists:

- **H. Keith DuBois,** *NHDES*
- **Jennifer Griffith,** *NEWMOA*
- **Mike Martin,** *Tighe & Bond*
- **Scott Miller,** *Clean Earth, Inc.*
- **Stephanie Monette,** *NHDOT*