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SPRING CONFERENCE

"Landfills and Groundwater" A Case Study of Impact in North Carolina

May 10, 2017

Presenter:

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Outline:

- Introduction/Purpose
- NC Landfill Groundwater Monitoring
- Focus of Study
- Groundwater Quality Results
- Leachate Vs. Groundwater Results

Introduction/Purpose

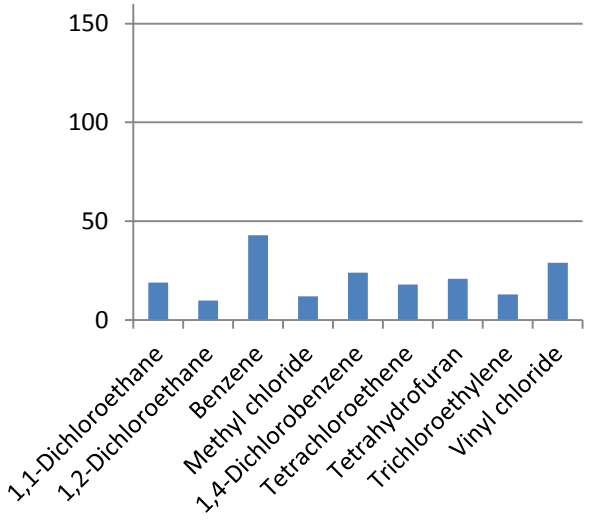
- NC Landfill Monitoring Database
- NC GW Standards vs. MCLs
  - 15A NCAC 2L.0100 (et.seq)
  - GWP's
  - No Standard
- Purpose: Evaluate Statewide Landfill Monitoring Data for Trends/Exceedances

- NC Water Quality Monitoring for Landfills
  - Semi-Annual Monitoring since 1993
  - NCDEQ Mandated Format in 2007
  - Required Data includes:
    - Permit #, Well ID, CAS #, Parameter, Results, Units, Qualifier, Method, MDL, MRL, SWS Limit, etc.
  - Only State in Region Using Database
  - Trend Evaluation – Great in Theory!
  - Data Management/Required Reporting = KEY

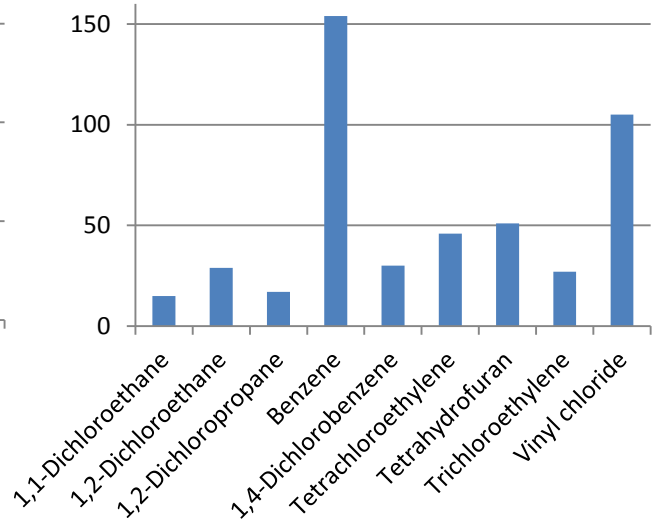
- Focus of Study
  - Database includes data from various landfill types: Unlined MSW, Lined MSW, C&D, and LCID
  - NC – A Mineral Rich State
  - Focus=Organic Constituents at Unlined MSW and C&D
  - Evaluated Data by Physiographic Province/Statewide

C&D Landfill Results (>10 Exceedances)

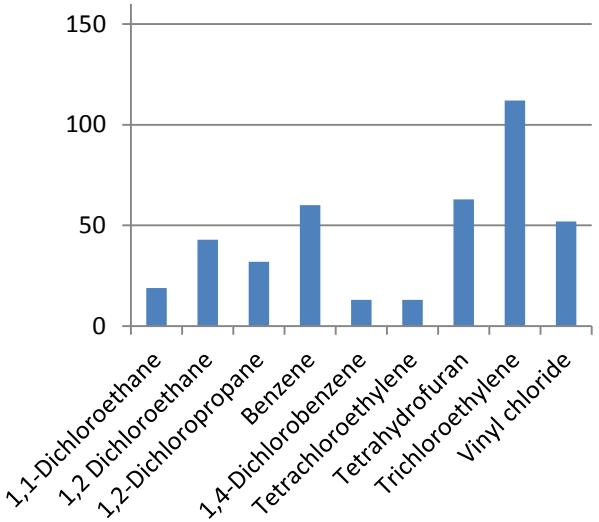
Blue Ridge C&D Exceedances (9 Facilities)



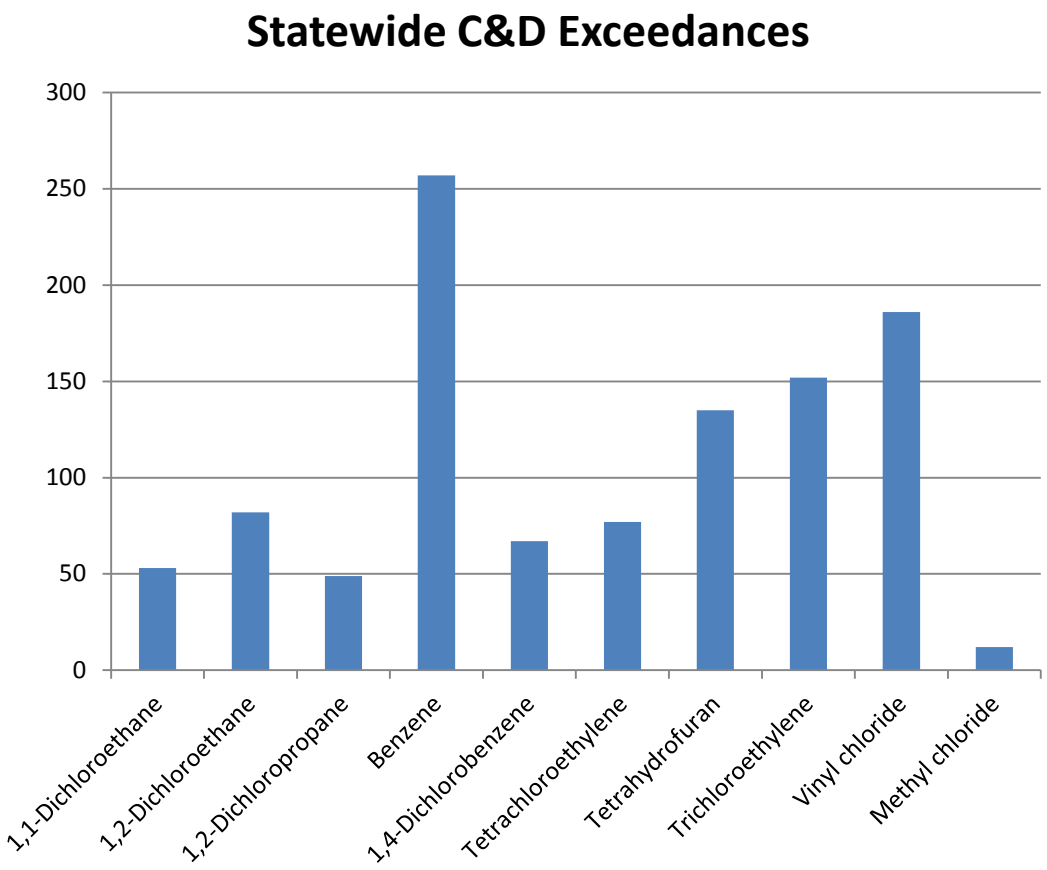
Piedmont C&D Exceedances (23 Facilities)



Coastal Plain C&D Exceedances (11 Facilities)

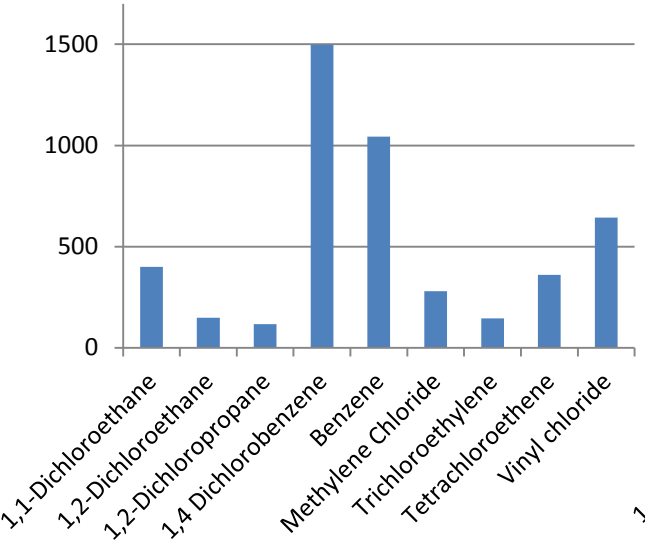


Statewide C&D Landfill Results (>10 Exceedances)

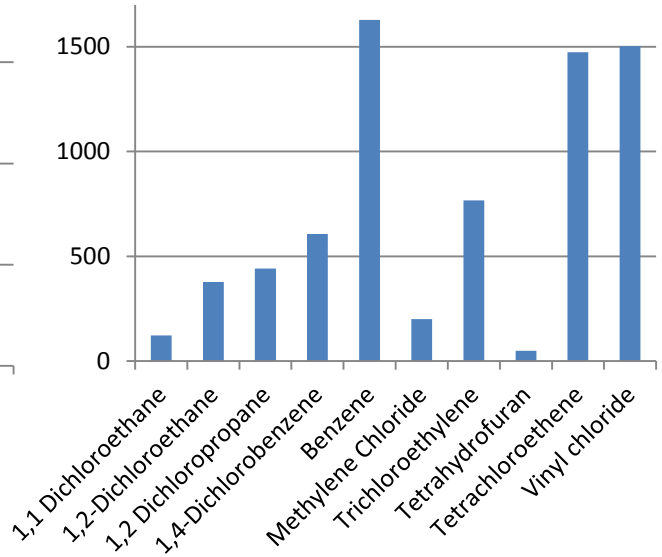


Unlined MSW Results (>49 Exceedances)

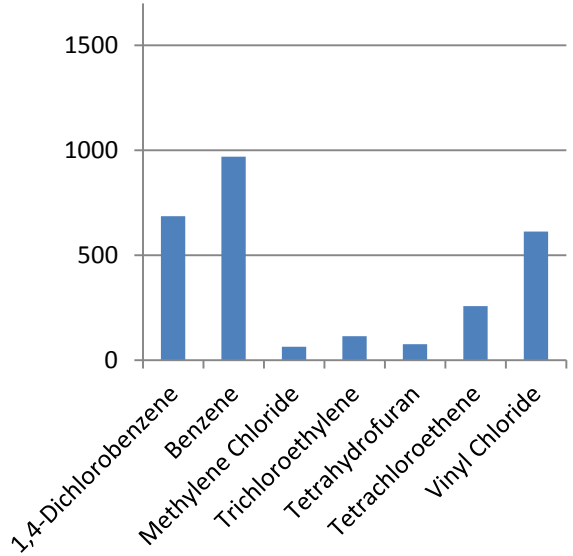
Blue Ridge MSW Exceedances (26 Facilities)



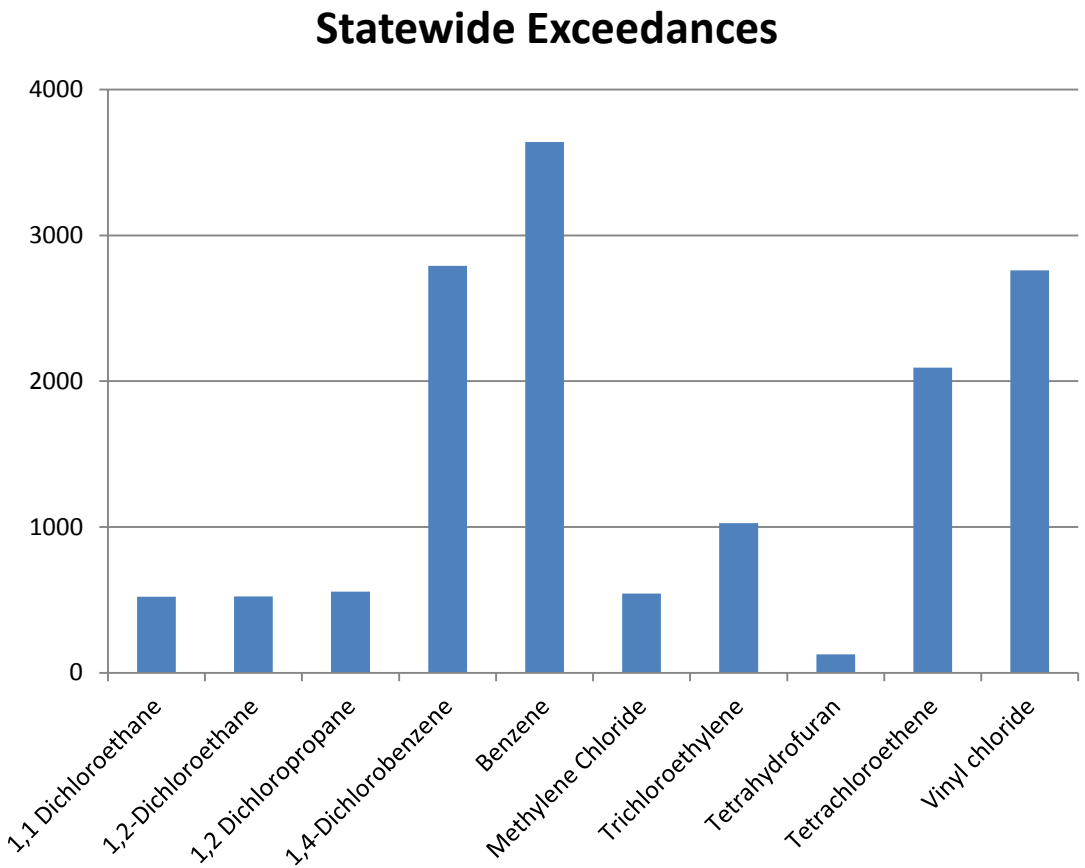
Piedmont MSW Exceedances (60 Facilities)



Coastal Plain MSW Exceedances (6 Facilities)



Statewide Unlined MSW Results (>49 Exceedances)



- Landfill Leachate
  - Changes Strength Over Time
  - Varies Based on Industry, Compaction, Climate, Etc.
- Leachate Constituents Vs. Detected
  - EREF MSW Landfill Leachate Characterization Study, 2007
  - U.S. EPA Summary of Data on Municipal Solid Waste Landfill Leachate Characteristics, 1988

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Red = Common Constituent in GW

Detected GW Constituent	Leachate Detections (2007)	Leachate Detections (Pre-1980 landfills, sampled 1988)
1,1 Dichloroethane	39.12%	48%
1,2 Dichloroethane	13.91%	9%
1,2 Dichloropropane	6.54%	13%
1,4 Dichlorobenzene	30.74%	24%
Benzene	43.29%	56%
Methylene Chloride	42.90%	71%
Trichloroethylene	14.68%	38%
Tetrachloroethylene	10.51%	24%
Vinyl Chloride	21.07%	19%

1988 High Leachate Detections Not prevalent in GW exceedances: Trans 1,2 Dichloroethylene (55%), Isophorone (43%), Naphthalene (52%), Toluene (83%)

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Conclusions

- Limited Subset of Appendix I Parameters Seen in GW near C&D/MSW Landfills
- Data Management Varies by Provinces Making Trend Analysis Difficult
- Leachate Parameters Line Up With Detections
- Some High Detection Leachate Parameters Not Seen at Corresponding Rate in Groundwater
- Incredible Opportunity to Refine Future Monitoring But Data Must Be Managed/Collected Properly
- Long Term Decisions Could Be Influenced by Data

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