Human Health Risk Versus Water Resource Protection: Are Indiana’s Environmental Cleanup Policies Right for Long-Term Sustainability?

39th Annual Indiana Water Resources Association Symposium

“Ensuring a Sustainable Water Future for Indiana”

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What did I hear yesterday?

• We need a plan to assess Indiana’s water capacity!

• Indiana will be like NC in the Winter and Texas in the summer ($\Delta T = 5.54^\circ F$ moderate, $10.51^\circ F$ high) in 60 years.

• Energy demand will increase >>> water demand increases.

• Stream flows will decrease (5 % all seasons, 15 % in summer)

• Crops will need added water or will need to change.

• Higher discharge into streams due to flash floods.

• Water demands will increase…. A lot!

We are leaving a water crisis to our next generation!!!
The focus of this talk

- Water resource availability and capacity.
- What is the water quality of that resource?
- How do we protect that quality for future generations?
What is the Issue Here?

- **Historical Background:** personal/regulatory
- **Regulatory Programs:** U.S. EPA, IDEM LUST, VRP, Brownfields
- **Water resource designation versus wellhead protection zones:** geology versus withdrawal
- **Regulatory Modifications:** Policies, laws, oversight.
### Important Historical Events

<table>
<thead>
<tr>
<th>DATE</th>
<th>EVENT</th>
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<tbody>
<tr>
<td>0.012 mya</td>
<td>end of Pleistocene</td>
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<tr>
<td>1492</td>
<td>Columbus</td>
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<tr>
<td>1694-1733</td>
<td>industrial revolution</td>
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<tr>
<td>1962</td>
<td>Silent Spring</td>
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<tr>
<td>1970</td>
<td>U.S. EPA established</td>
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<tr>
<td>1979/80</td>
<td>John gets out of school</td>
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<td>1981-1984</td>
<td>first indiana environmental projects</td>
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<tr>
<td>1988</td>
<td>IDEM Leaking Underground Tanks (LUST)</td>
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<td>1989</td>
<td>IDEM State Cleanup Program (SCP)</td>
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<tr>
<td>1996</td>
<td>IDEM Voluntary Remediation Program (VRP)</td>
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<tr>
<td>1997</td>
<td>Indiana wellhead protection rule</td>
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<tr>
<td>1999</td>
<td>IDEM Excell Liability Trust Fund (ELTF)</td>
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<tr>
<td>2001</td>
<td>IDEM Risk Integrated System of Closure</td>
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<tr>
<td>2012</td>
<td>IDEM Remediation Closure Guide</td>
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<tr>
<td>20??</td>
<td>Sustainable Aquifer Protection Act (SAPA)</td>
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EPA DECLARES SPENCER A SUPERFUND SITE

Mr. Robert Kaplan
Acting Regional Administrator
U.S. Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Mail Code: K-191
Chicago, Illinois 60604-3507

Dear Mr. Kaplan:

Re: Proposed Riverside National Priority Site EPA-HQ-GLEM-2016-07

EPA Continues Cleanup on Keystone Corridor Superfund Site

February 1, 2016

Andersen well field could become Superfund site; city,
IDEM say drinking water is safe

Federal agencies might help with cleanup of well field

Ken de la Bastide | The Herald Bulletin | Jan 9, 2016
Who Pays for Cleanups?

- **Companies** – self-insured
- **Insurance Companies** – policy coverage for historical releases
- **State of Indiana** – Taxes; ELTF resources
Aquifer System Characterization and Designation

Unconsolidated Aquifer Systems in Indiana - IDNR (2011)

Unconsolidated Aquifer Systems in Indiana, 2011 - Shows unconsolidated aquifer systems in Indiana (IDNR)
A Question Yesterday

Available maps and data: Why do we need more?

• Quantity of Data and Scale of Coverage
• Map illustration provide too much confidence in accuracy of data.
• Prediction of capacity approximate by a significant percent (+/- 50 %).
Flows, Soils, Urban Wells

Geology and Hydrogeology of Marion County

- Glaciers formed landscape
- Melting glaciers filled areas with sand and gravel = aquifers

AQUIFER VULNERABILITY VARIES

Drinking water is stored in aquifers
AQUIFER VULNERABILITY VARIES

Hydrogeologic Settings

A1

Thick sections of unconfined sand and gravel interstratified with a few small widely scattered till units. This setting characterizes the axis of the White River Valley, which is the regional discharge area for all aquifers in the county.

A2

Variable thickness of outwash overlying complexly interbedded sand and gravel and till. Thick unbroken sections of sand and gravel are present locally. Sand and gravel units at depth are typically confined or semi confined by bodies of till, whereas the upper portions of the system are commonly unconfined.
Marion County Hydrogeologic Settings

Class I Aquifer

Class II Aquifer

Class III Aquifer
Wellhead Protection Area
Determining Wellhead Protection Zones
Wellhead Protection Area
Wellfield Protection Zones
Wellfield Protection Zones

Remediation Cleanup Standards
Wellfield Protection Zones

Remediation Cleanup Standards

Drinking Water

Environmental Restrictive Covenants (ERCs)

Long-term Monitoring
The Aquifer Guardian System
Conclusion

• We need changes in policies/laws and approaches to make a sustainable program for drinking water protection.

• Definition of Aquifer Protection Areas (APA) versus wellhead protection areas (WHPAs).

• Remediation Cleanup goals protective of the APAs. Environmental Restrictive Covenants (ERCs) that include payment into an Aquifer Guardian Fund (AGF).

• Long-term monitoring of APAs for quality and protection.