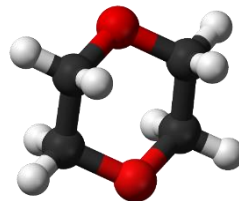


Emerging Trends in Regulatory Issues



Dan Schneider, P. E., CHMM
National Director, Site Investigation and
Remediation
Terracon Consultants, Inc



Organization of the Presentation

- History of Environmental Regulations (playing “Catch up” and Responding to Environmental Disasters)
- Current Administration Impacts on Current and Future Environmental Regulations
- Regulatory Transitions
- Takeaways - Business Opportunities Looking Forward



History of Environmental Regulations

“It is difficult to make predictions, especially about the future...”

Danish proverb, Yogi Berra, Mark Twain

From early industrialization...

*approach to waste management has been
-“out of site, out of mind”.*



Manhattan docks, c. 1890. Waste was often dumped into the Hudson or East Rivers. (Photo: Library of Congress/LC-DIG-det-4a18012)

Evolution of Environmental Regulations

1899 – Rivers and Harbors Act – Direct disposal of sewer without permit;

Administered by the Corps of Engineers

1903 – Wright Brothers fly at Kitty Hawk, North Carolina

1908 – Henry Ford introduces the Model T

1917 -1918 – World War I

1941 - 1945 – World War II

1948 – Federal Water Pollution Control Act; amended 1972; precursor to the Clean Water Act (1977) and
Water Quality Act of 1987 (pollution control NPDES)

1950 - 1953 – Korean War

1955 – Air Pollution Control Act; precursor to Clean Air Act (1963); amended 1965 – 1967, 1969,
1970, 1977, 1990

1965 – Solid Waste Disposal Act; (predecessor to RCRA)

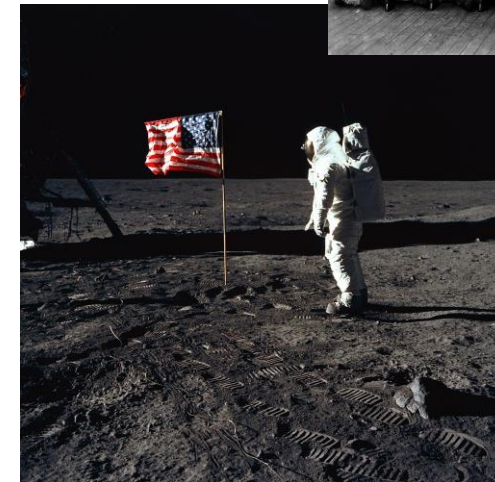
1965 – 1973 Vietnam War

1969 – Neil Armstrong walks of the moon

1970 – National Environmental Policy Act (EA, EIS for federal undertaking)

1970 – Formation of the US Environmental Protection Agency
(no authority to clean up sites until 1980)

1974 – Safe Drinking Water Act (drinking water quality standards); amended 1986



Evolution of Environmental Regulations (cont.)

1976 – Resource Conservation and Recovery Act (RCRA)
(managing solid and hazardous waste);
amended 1984

Bentsen and Bevill Amendments

- Basis – large volumes of waste presumed to exhibit low human health and environmental risk
- Bentsen Exemption - Crude oil, natural gas, geothermal exploration development and production wastes exempt under RCRA Subtitle C (hazardous waste management)
- Bevill Exemption
 - Fossil fuel combustion waste (coal combustion residue)
 - Cement kiln dust
 - Mining extraction, beneficiation and processing of ores and materials

1976 – Toxic Substances Control Act (TSCA)
(new and existing chemical management)



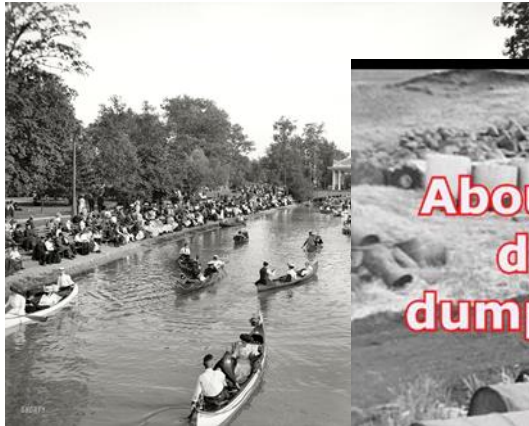
EPA Gets Funding and Enforcement Power

1980 –

Comprehensive Environmental Response Compensation and Liability Act (Superfund); amended 1986 (legacy waste management impacts to environment) (National Priorities List established)



Love Canal, Niagara Falls, NY



Infrared aerial photo of Love Canal area (taken in spring 1978) showing 39th Street elementary school in center, two rings of homes bordering the landfill and LaSalle Housing Development in upper right. White patchy areas indicate barren sections where vegetation will not grow, presumably due to leaching chemical contamination.



Reaction to Disaster...

1990 –
Oil Pollution Act



In response to complacency developed by oil carriers
1965 – 43 ship personnel manage 6.3M gallons crude
1989 – 19 ship personnel manage 53 M gallons crude



11M gallons of crude oil into Alaska's Prince William Sound
(March 24, 1989)



Regulatory Perspective Today

Protection of Human Health and the Environment...

Conservation and or Management of Natural or Historic Resources

- Antiquities Act
- Atomic Energy Act of 1946
- Atomic Energy Act of 1954
- Clean Air Act
- Clean Water Act
- Coastal Zone Management Act
- CERCLA (Superfund)
- Emergency Planning and Community Right-to-Know Act
- Endangered Species Act
- Energy Policy Act of 1992
- Energy Policy Act of 2005
- Federal Food, Drug, and Cosmetic Act
- Federal Land Policy and Management Act
- Federal Insecticide, Fungicide, and Rodenticide Act
- Federal Power Act
- Fish and Wildlife Coordination Act
- Food Quality Protection Act

- Fisheries Conservation and Management Act (Magnuson-Stevens)
- Lacey Act
- Marine Mammal Protection Act
- Migratory Bird Treaty Act
- Mineral Leasing Act
- National Environmental Policy Act
- National Forest Management Act
- National Historic Preservation Act
- National Park Service Organic Act
- Noise Control Act
- Nuclear Waste Policy Act
- Ocean Dumping Act
- Oil Pollution Act
- Resource Conservation and Recovery Act
- Rivers and Harbors Act
- Safe Drinking Water Act
- Surface Mining Control and Reclamation Act
- Toxic Substances Control Act
- Wild and Scenic Rivers Act

36 Federal Acts

Regulatory Overlap and Contradiction

Is all risk the same?

Scientific Risk – Exposure – Dose/Response – Pathway – Sensitive Receptor

Reputational Risk – Act/Policy – Severity – Communicated Message - Demographic

Alaska Department of Environmental Conservation 2011 Study

TPH cleanup levels ranged from 50 mg/kg (OK) to 4,100 mg/kg (AZ)

GRO cleanup levels ranged from 3.1 mg/kg (OH) to 1,500 mg/kg (UT)

DRO cleanup levels ranged from 2.7 mg/kg (OH) to 5,000 mg/kg (UT)

RRO (ORO) cleanup levels ranged from 99 mg/kg (TX) to 10,000 mg/kg (UT)

Regulatory Overlap and Contradiction (Cont.)

- ✓ Cancer prevention (positive effects on endocrine and immune systems)
 - ✓ Prevention of cardiovascular disease
 - ✓ Reduction of cognitive decline
 - ✓ Positive effects on thyroid disease
-
- ✓ Naturally occurring
 - ✓ Anthropogenic sources
 - Coal burning
 - Mining and smelting of sulfide ores
 - ✓ Can bio-accumulate/concentrate in plants and fish



* Numbering system recommended by the International Union of Pure and Applied Chemistry (IUPAC)
 ** Previous IUPAC numbering system
 *** Numbering system recommended by the Chemical Abstracts Service

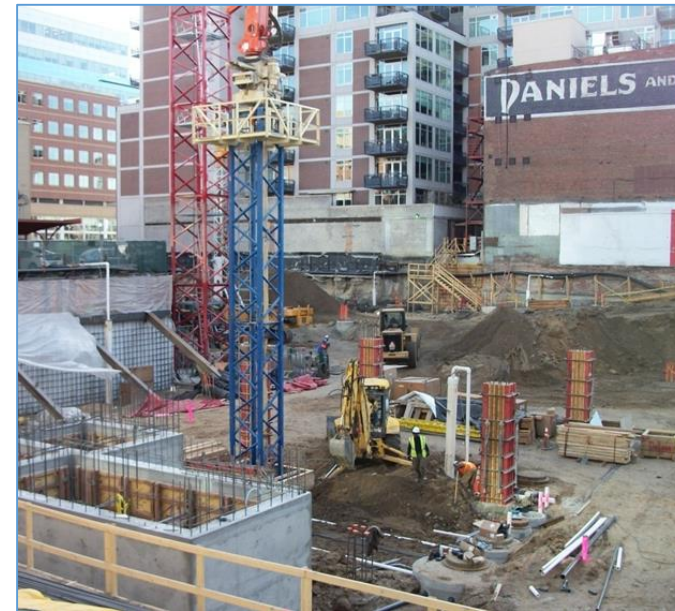
Regulatory Overlap and Contradiction (Cont.)

Construction dewatering discharge under Clean Water Act
(National Pollution Discharge Elimination System (NPDES))

Selenium – 4.6 ug/l chronic; 18 ug/l acute (fish toxicity)



Selenium – SDWA 50 ug/l



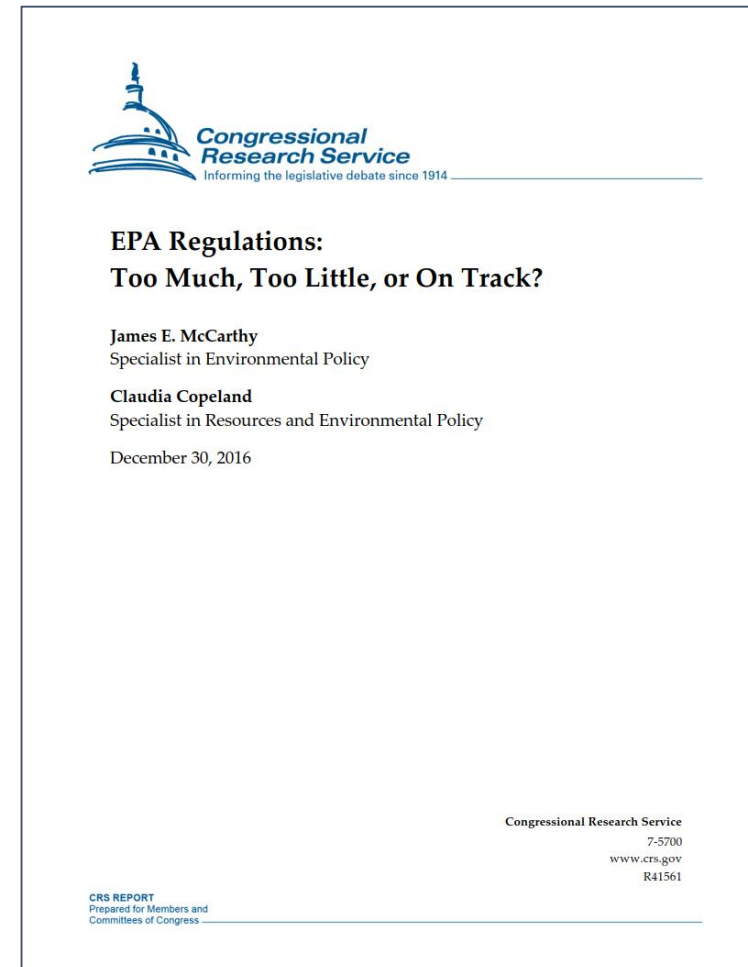
Do We have Too Much Regulation?



McCathy and Copeland, December 30, 2016

“most significant and most controversial”
regulations EPA proposed or promulgated
in past 8 years

Environmental Program	Impact Regulations
Clean Air Act	31
Clean Water Act	11
RCRA	3
TSCA	1



Current Administration Impacts

From Day 1, January 20, 2017...

“Regulatory Freeze Pending Review” Memo

Reince Priebus, Assistant to the President and Chief of Staff



1. No regulation sent to the Office of Federal Register (OFR) unless an emergency condition exists;
2. Regulations sent to OFR but not published need to be immediately withdrawn;
3. If regulations published but not taken effect, temporarily postpone regulation; and
4. Caveat critical health, safety, financial or national security matters.

Current Administration - The 1st 100 days...

- [Executive Order 13771](#) (82 FR 9339, February 3, 2017) ...directs all agencies to repeal two existing regulations for each new regulation issued in FY 2017 and thereafter. It further directs agencies that the “total incremental costs of all regulations should be no greater than zero” in FY 2017.

1 new regulation requires 2 deleted regulations

- [Executive Order 13777](#) (82 FR 12285, March 1, 2017) ...evaluate existing regulations and make recommendations to the agency head regarding their repeal, replacement, or modification

Review all regulations – now!

- [Executive Order 13783](#) (82 FR 16093, March 31, 2017) ...directs the EPA to review the Clean Power Plan, related rules and the NSPS for Oil and Gas, and all agencies to review existing regulations, orders, guidance documents and policies that potentially burden the development or use of domestically produced energy resources

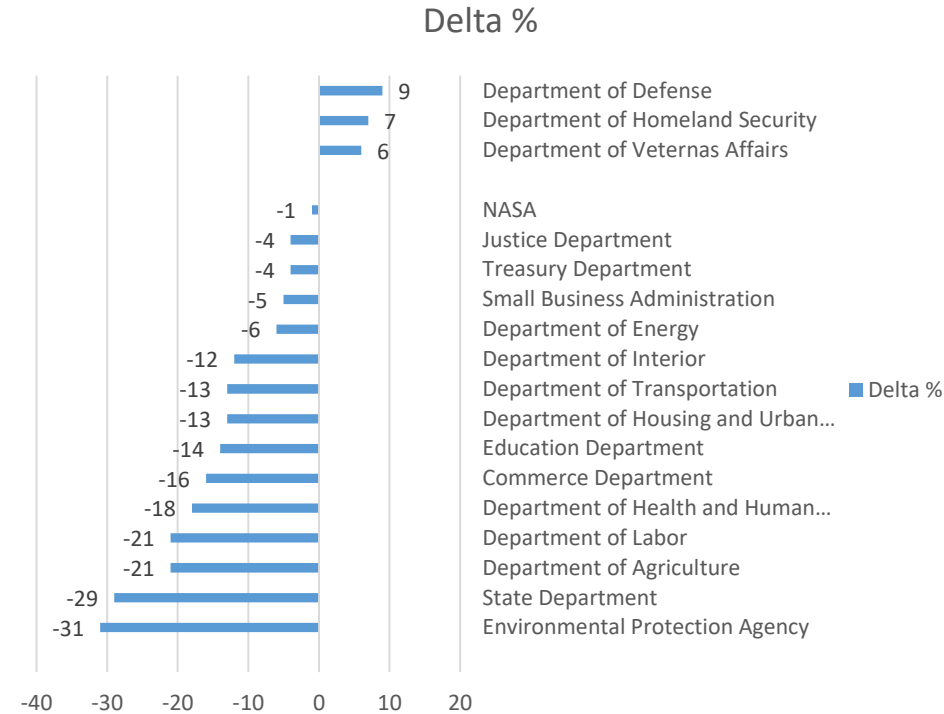
Clean Power/Domestic Energy Policy review plan – mid-May 2017



Proposed 2018 Funding – “Skinny Budget”

March 2017

Government Agency	Delta %
Environmental Protection Agency	-31
State Department	-29
Department of Agriculture	-21
Department of Labor	-21
Department of Health and Human Services	-18
Commerce Department	-16
Education Department	-14
Department of Housing and Urban Development	-13
Department of Transportation	-13
Department of Interior	-12
Department of Energy	-6
Small Business Administration	-5
Treasury Department	-4
Justice Department	-4
NASA	-1
Department of Veterans Affairs	6
Department of Homeland Security	7
Department of Defense	9



Note: DOD budget increased from \$5.28B to 5.54B with Hanford Site reduction of funding

EPA “Back-to-Basics” Agenda

The 3 E’s:

- **Environment:** Protecting the environment
- **Economy:** Sensible regulations that allow economic growth
- **Engagement:** Engaging with state and local partners

“We can and we will achieve clean air and clean water and we will also have strong economic growth and job creation at the same time.”

EPA Administrator Scott Pruitt



Scott Pruitt and local coal miners at the Harvey mine, Sycamore, Pennsylvania April 13, 2017 discussing the EPA “back-to-basics” agenda

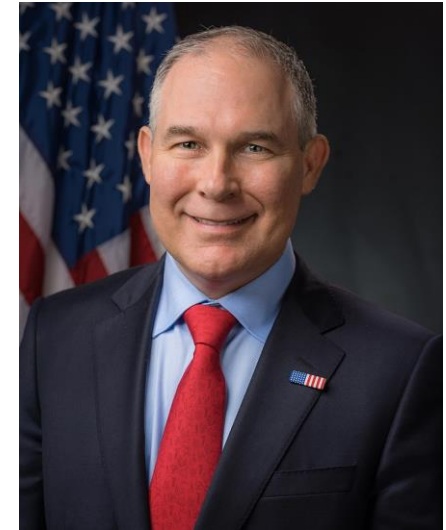
Streamline Superfund...

May 22, 2017 Memo “Prioritizing the Superfund Program

“streamline”, “overhaul”, “reduce the amount of time”, “reduce overhead (EPA)”

July 25, 2017 EPA CERCLA Task Force Report

- 42 separate recommendations
- 11 specific immediate action items
 - Identify potential complex groundwater and sediment projects for Adaptive Site Management;
 - Prioritize returning all (or portions) of sites to reuse and get more private investments; and
 - Resource management (focus RI/FS on projects that immediate action is required to using enforcement as a means to discourage lengthy and costly litigation).

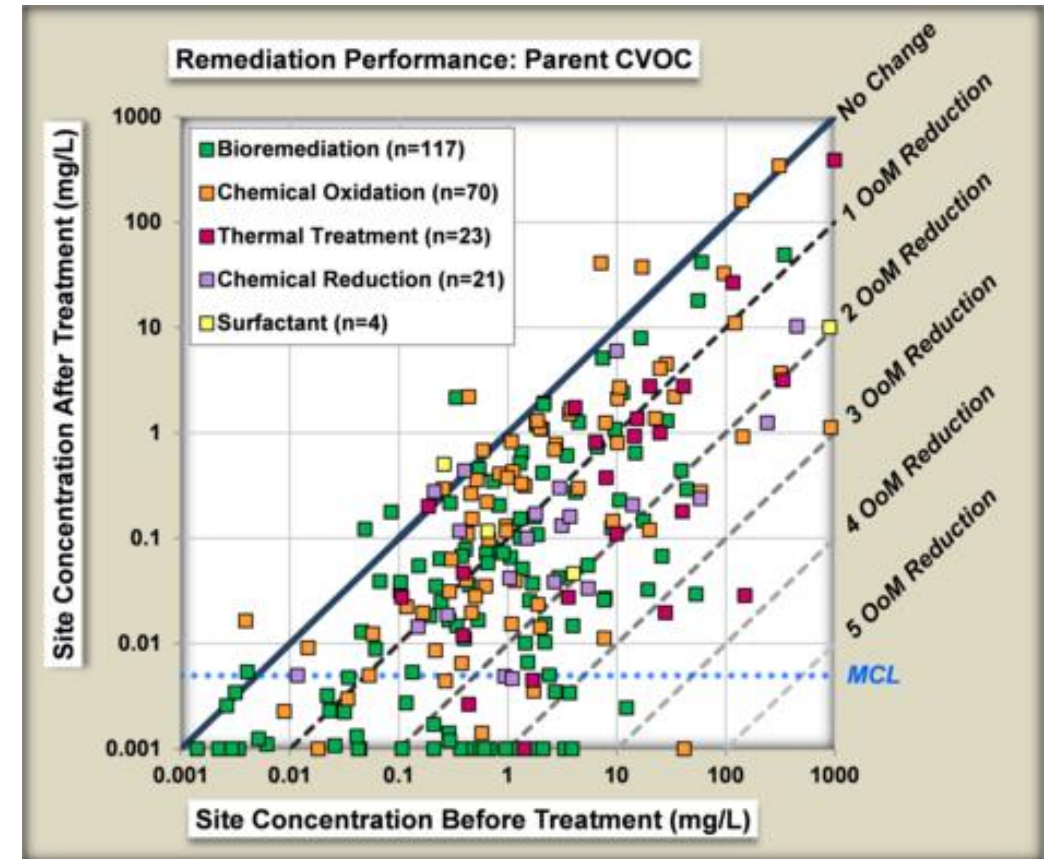


E. Scott Pruitt, EPA Administrator

What we know now...

After 35 years of Superfund, how effective are the current remedial technologies?

235 Superfund sites were evaluated for in-situ remediation technologies performance

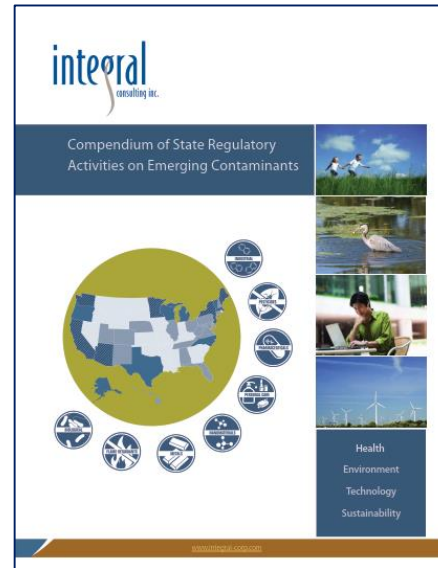


McGuire et al, 2017

Impact of Emerging Contaminants

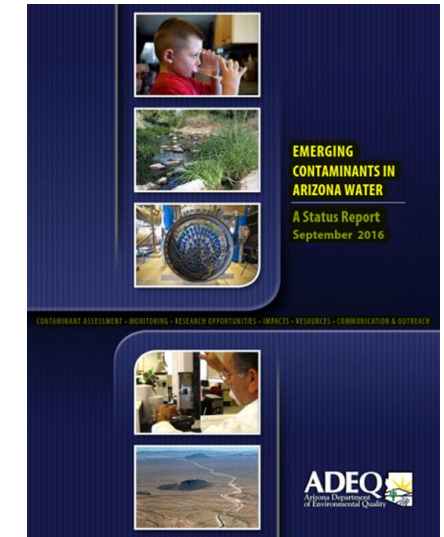
Currently 8 categories of emerging contaminants (ICI)

- Industrial
- Pesticides
- Pharmaceuticals
- Personal Care Products
- Nanomaterials
- Metals
- Flame Retardants
- Biological







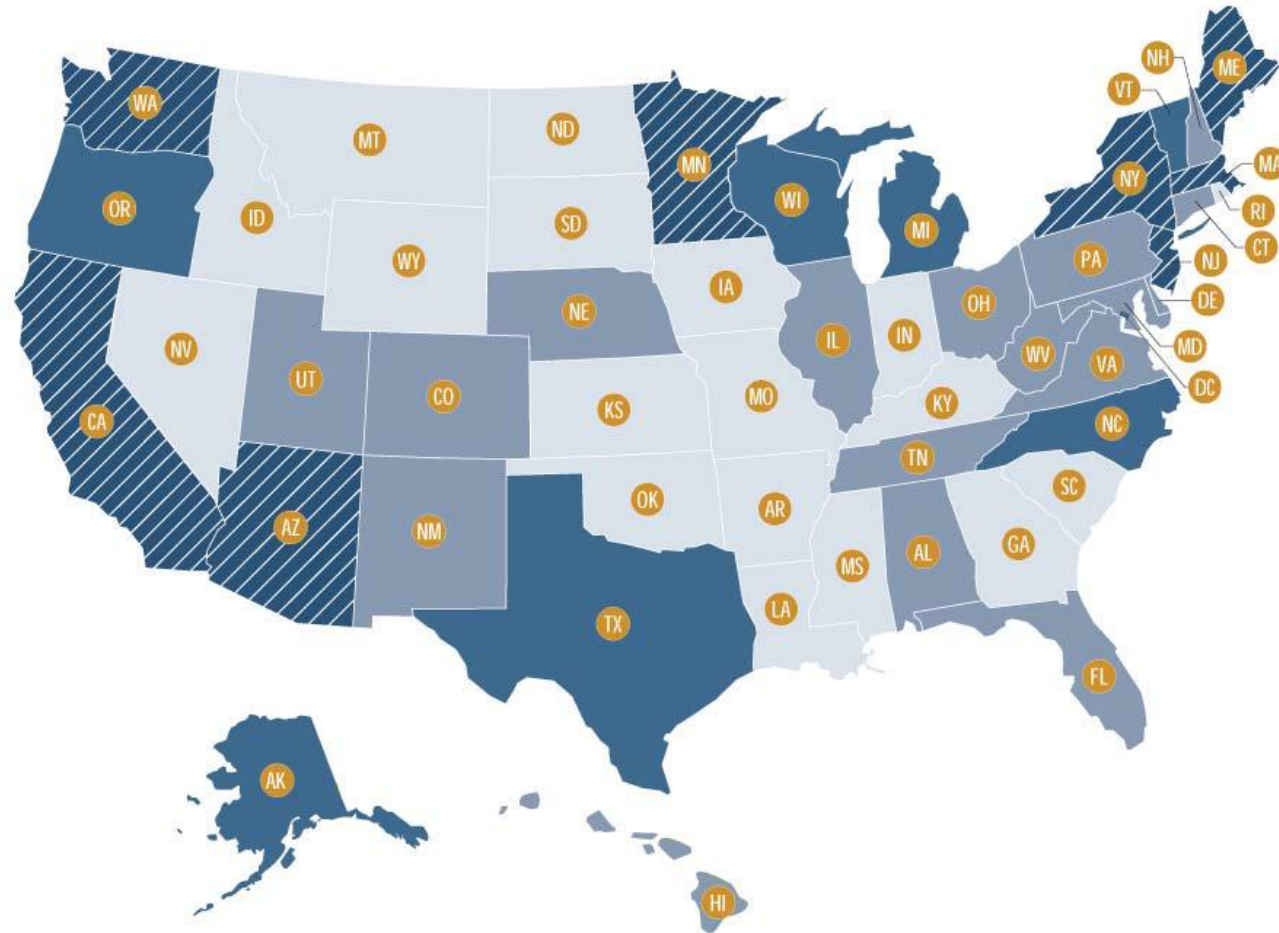
Currently 7 categories of emerging contaminants (ADEQ)

- Pharmaceuticals
- Personal Care Products
- Industrial and commercial Products
- Steroids and Hormones
- Illicit Drugs
- Naturally Occurring Elements
- Microorganisms



Current State Regulatory Programs

-  **Inactive**
State relies exclusively on federal actions, guidance, and regulations.
-  **Limited**
State regulators are assessing scientific and regulatory information on ECs and may have conducted response actions in a limited or site-specific manner, but have not implemented a statewide initiative.
-  **Active**
State has one or two initiatives or is beginning to gather state-specific information; however, it does not have an explicit program for ECs and does not devote significant resources to EC initiatives.
-  **Very Active**
State has specific risk management programs addressing ECs.



FOR MORE INFORMATION
For additional information, contact Janet Anderson, Ph.D., DABT, at (830) 751-2434 or janderson@integral-corp.com; or Phil Goodrum, Ph.D., DABT, at (315) 446-5090 or pgoodrum@integral-corp.com. Information is up to date as of May 2016. Periodic revisions will be made.

Current State Regulatory Programs

Comparison “at a glance” of 3 states

Emerging Contaminants

CALIFORNIA

State at a Glance

- Has formal Emerging Environmental Challenges (EEC) Program
- Actively monitoring and evaluating multiple ECs: Proposition 65, state environmental monitoring, establishing provisional guidance values

State agencies and programs that manage environmental issues	How California addresses ECs
<ul style="list-style-type: none"> ✓ Overarching state agency: California Environmental Protection Agency ✓ Office of Environmental Health Hazard Assessment (OEHHA) <ul style="list-style-type: none"> Conducts risk evaluations for hazardous substances Includes numerous programs to assess hazards Proposition 65: Program intended to inform and protect people from potential carcinogens and developmental toxicants ✓ State Water Resources Control Board (SWRCB) <ul style="list-style-type: none"> Sets state policy on water rights and quality control ✓ Nine regional water quality control boards <ul style="list-style-type: none"> Responsible for adoption and implementation of water quality “basin plans” Issues water discharge requirements Performs water quality monitoring and control ✓ Department of Toxic Substances Control (DTSC) <ul style="list-style-type: none"> Environmental restoration and enforcement of hazardous waste laws Environmental Chemistry Lab performs extensive sampling and monitoring of chemicals in environmental samples, consumer products, and biological or human tissue samples 	<ul style="list-style-type: none"> ✓ OEHHA established EEC Program <ul style="list-style-type: none"> Identifies issues that may pose state challenges in the next 5 to 10 years Develops EC guidance via public health goals (PHGs)—a PHG is the first step toward drinking water regulation in California ✓ Proposition 65 program ✓ Multiple monitoring strategies <ul style="list-style-type: none"> Assess environmental occurrence of chemicals that pose potential human and ecological health risks ✓ SWRCB EC Advisory Panel <ul style="list-style-type: none"> Meetings in 2009–2010 addressed EC issues and research needs Issued table of ECs to monitor in state waters in 2013 ✓ Groundwater Ambient Monitoring and Assessment Program <ul style="list-style-type: none"> Provides additional EC monitoring data ✓ Safer Consumer Products: Green chemistry regulations prompted by DTSC to protect consumers from unsafe levels of chemicals in products

EC Spotlight for California

1,4-Dioxane: The drinking water notification level (1 µg/L) triggers additional monitoring and response actions. If drinking water concentrations are higher than the response level (35 µg/L), the drinking water source must be removed from service. No state drinking water MCL or PHG.

Hexavalent Chromium: The drinking water MCL is 10 µg/L (2014).

1,2,3-TCP: The drinking water notification level (0.005 µg/L) triggers additional monitoring and response actions. PHG (0.0007 µg/L) established (2009). No state drinking water MCL.

For more information: [view table of state ECs](#) or [explore Integral's EC capabilities](#) May 2016

Emerging Contaminants

ARIZONA

State at a Glance

- Actively evaluating ECs through Advisory Panel on Emerging Contaminants (APEC)
- Has developed drinking water standards for a number of ECs
- Currently monitoring for ECs as practicable

State agencies and programs that manage environmental issues	How Arizona addresses ECs
<ul style="list-style-type: none"> ✓ Arizona Department of Environmental Quality (ADEQ) <ul style="list-style-type: none"> Water Quality Division Hazardous Waste Division Solid Waste Management Division 	<ul style="list-style-type: none"> ✓ ADEQ convened APEC <ul style="list-style-type: none"> Created to advise ADEQ and water utilities on ECs and pathogens in drinking water sources Provides a forum for discussion, planning, and prioritization of EC issues ✓ Has formally defined ECs ✓ Currently preparing a draft report on ECs found in Arizona waters, which will include: <ul style="list-style-type: none"> A list of ECs that will be evaluated Information and recommendations for state utilities Recommendations for the public Pharmaceutical drug take-back program information ✓ Manages ECs in specific research and case-by-case situations

EC Spotlight for Arizona

17-beta Estradiol: This EC will be included in the APEC draft report on ECs and is slated to be a priority chemical for evaluation.

Phthalates: ADEQ has derived state drinking water standards for several phthalates not regulated by EPA.

Triclosan: This chemical has been detected in reclaimed water and is slated for inclusion in the APEC draft report on ECs as a priority chemical for evaluation.

For more information: [view table of state ECs](#) or [explore Integral's EC capabilities](#) May 2016

Emerging Contaminants

WYOMING

State at a Glance

- Follows federal guidance and regulations
- EPA Region 8 responsible for Safe Drinking Water Act oversight
- Through the University of Wyoming, participates in Consortium for Research and Education on Emerging Contaminants (CREEC)

State agencies and programs that manage environmental issues	How Wyoming addresses ECs
<ul style="list-style-type: none"> ✓ Overarching state agency: Wyoming Department of Environmental Quality ✓ EPA Region 8 implements the federal Safe Drinking Water Act and oversees monitoring, reporting, and water testing throughout the state 	<ul style="list-style-type: none"> ✓ Follows federal guidance and regulations for environmental regulations ✓ University of Wyoming is a stakeholder in CREEC

EC Spotlight for Wyoming

Wyoming does not currently address any specific EC under state regulatory initiatives.








For more information: [view table of state ECs](#) or [explore Integral's EC capabilities](#) May 2016

Protection of Human Health and the Environment - A Moving Target

Former EPA Administrator Gina McCarthy signed the rulemaking to add a subsurface intrusion component to the Hazard Ranking System (HRS) on December 7, 2016. This rule was published in the Federal Register (FR) on January 9, 2017. This action took effect on [May 22, 2017](https://www.gpo.gov/fdsys/pkg/FR-2017-01-09/pdf/2016-30640.pdf). The final rule can be accessed through the link below.

<https://www.gpo.gov/fdsys/pkg/FR-2017-01-09/pdf/2016-30640.pdf>

Figure 4. HRS Structure with Subsurface Intrusion Addition

HRS Pathways	Ground Water	Surface Water			Soil Exposure and Subsurface Intrusion		Air
					Soil Exposure	Subsurface Intrusion	
Factor		 DW	 HFC	 ENV	 RESIDENT	 NEARBY	
LR / LE Likelihood of Release / Exposure							
WC Waste Characteristics							
T Targets							
	S_{GW}	$S_{SW} = DW + HFC + ENV$			$S_{SESSI} = \text{Soil Exposure} + \text{Subsurface Intrusion}$ (where: Soil Exposure = Resident + Nearby)		S_A

S_{GW} = Ground Water Migration Pathway Score

S_{SW} = Surface Water Migration Pathway Score

S_{SESSI} = Soil Exposure and Subsurface Intrusion Pathway Score

S_A = Air Migration Pathway Score

A Cultural Paradigm Continues Evolves...

Meanwhile back at the ranch...

A new paradigm has been emerging –
responsible environmental stewardship



Corporate environmental responsibility has been in transition the last 5-10 years; triple bottom line ... people, planet, profits (3P's)

- Mars Sustainable Cocoa Initiative – fair treatment of labor exchanged for premium prices
- 2015 Nielsen Report findings
 - 73% of millennials (largest consumer demographic in US history) would pay more for sustainable goods up from 46% in 2014
 - 56% of consumers are willing to pay more for products produced by companies committed to social values
- By product of social responsibility is brand protection and loyalty (fair trade, post-consumer reuse)



Blending Social Responsibility with Regulatory Transition...

On the Federal Level...

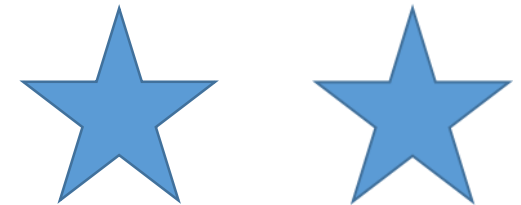
- ✓ Superfund and RCRA cleanups will continue to be migrate to be driven more by PRPs from social responsibility as much as EPA enforcement
- ✓ More technical impracticability (TI) waivers and transition assessment (adaptive site management)
- ✓ Fewer EPA-funded technology research projects which will be replaced/augmented with private sector funding including re-assessment of “real risk” vs “possible risk”



Blending Social Responsibility with Regulatory Transition...

On the state level...

- ✓ State Programs – less federal funding – fewer resources
 - ✓ Longer regulatory approval
 - ✓ Less likely to look at innovative approaches due to long proof-of-concept lead time
 - ✓ More opportunity to educate the regulators
- ✓ Corporate responsibility will continue to drive remediation and innovation
- ✓ Federal funding cuts will affect state-specific programs entirely differently depending on the strength of the state environmental program and funding (CA example)
- ✓ Pressure to develop state-specific guidance on emerging contaminants (variability by state experience and funding)



Takeaways – Business Opportunities Looking Forward



1. What we currently have is a complex set of regulations that need significant overhaul and consolidation; while considered protective they are sometimes contradictory, overlapping and outdated. Consultant knowledge provides risk management guidance to clients.
2. Risk assessment in 1980 is different than risk assessment 2017 and beyond; we need to come up with the solution and then develop the data to support it.
3. Vapor pathway is more significant now in CERCLA and will drive cleanup ups.
4. Effective remedial technologies will continue to be a challenge for complex sites and recalcitrant compounds including many emerging contaminants.
5. Timebound focus for site closure needs to shift for applicable sites. Some sites may take a very long, long time to remediate (centuries); Adaptive Site Management is critical.

Takeaways – Business Opportunities Looking Forward



6. Reduced EPA budget will challenge enforcement and project management while corporate social responsibility is continuing to increase and will most likely continue to affect remediation in the future.
7. State programs will continue to be inconsistent between states and states will need our expertise to develop and implement new risk-based management strategies.
8. Emerging contaminants are outpacing the ability to regulate them. Paradigm shift to quicker risk assessment is necessary. In some cases, ECs may become “re-openers” to closed sites.
9. The NEPA process for telecommunications may provide an insight into how other environmental programs will be streamlined and fast-tracked.
10. Sustainable remediation – sustainable development.

Thank you for your attendance!



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