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# JOURNAL OF Environmental Management

**CONTENTS**

**ARIZONA**

February / March 2014

Volume 12 Number 1

## ARTICLES, DEPARTMENTS, & COLUMNS

**4 FROM THE EDITOR**

**6 SPECIAL EDITION: INDEX**

**12 ASSOCIATION PAGES**

LOCAL ORGANIZATIONS NEWS & EVENTS

**13 SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT**  
SOLAR BUSINESS MODEL, NICHOLAS R. HILD, PHD.

**15 IT'S ALL ABOUT CHEMISTRY**  
A PANDEMIC OF NEUROTOXICITY?  
LARRY OLSON, PHD.

## FROM THE EDITOR



Since 2003 the Journal has published approximately 400 feature articles & columns on an extensive variety of environmental management topics, written by environmental professionals, mainly from Arizona, from every type of background: educators; engineers; scientists; attorneys; safety professionals; facility environmental managers; executives; and regulators on every level--city, county, state. Over that same period, another 640+ "Association Pages" articles have been published, contributed by Arizona's

leading environmental and safety organizations.

I would like to personally thank each of you who have, over these past years, contributed your expertise to the Journal with your articles, columns, and other contributions. You have helped hundreds, thousands, of other professionals in Arizona! I especially appreciate the hard work and dedication of our most prolific column and article authors -- the Journal would not have been the same without your participation -- **Dr. Nick Hild, Dr. Larry Olson, Mike Ford, Joe Holmes, Chuck Paulausky**, and, collectively, **ADEQ Directors Steve Owens, Ben Grumbles, and Henry Darwin**. And the many others have contributed multiple feature articles, which are all listed in this issue.

Association Pages articles are written by various officers of each organization, and over the years many, many, different professionals have filled the role of contributor-- my thanks to each of you for taking the time to keep our readers updated on your organizations accomplishments and activities. Especially, thank you to **Jeff Homer**, who has contributed an article on the Arizona Chamber of Commerce and Industry in almost every issue of the Journal beginning with the very first. (Note that Association Pages articles are not listed in this issue -- however, these can be found on the website.)

**READERS:** You can find all feature articles and columns listed in this issue, by author, and each can be downloaded from the Journal website by referring to the 2-month issue and year ([ehshomepage.com](http://ehshomepage.com))

**AUTHORS:** Again, thank you for your contributions -- and if you have not contributed recently, please consider publishing an article in an upcoming issue -- contact me anytime to discuss your next article!

Sincerely,  
**Jim Thrush, M.S. Environmental Management**  
Editor & Publisher 480-422-4430 x42

### JOURNAL OF ENVIRONMENTAL MANAGEMENT ARIZONA

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### Questions?

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Journal authors have addressed hundreds of AZ environmental management issues and topics since our launch in 2003. While some regulations and practices do change, the majority of the information in these issues is still relevant--and a valuable resource to you! Articles are immediately available online for download -- just locate an issue by month & year, and find it at [ehshomepage.com](http://ehshomepage.com).

**ACKEN, ALBERT H.**

Recent Inspection Protocol Changes Provide New Tools For Prepared Permittees 2011 A/S  
Regulatory Deluge: 2013 2012/13 D/J



**ADEQ**

ADEQ Presents 2013 Annual Employee Awards 2013/14 D/J  
ADEQ--25 Years Protecting Arizona's Environment, 1987-2012 2012/13 D/J

**AISTON, JENNIFER L.**

Add Value to Your Building During Tough Economic Times, With LEED EF Certification 2009 A/S

**ALLARD, PETER F., P.E., CIH**

Clandestine Drug Labs, New Regulations & Environmental Issues 2003/4 D/J  
Organizing Your SPCC and Stormwater Plans 2005 A/M

**ALLARD, PETER F., P.E., CIH AND KAMINSKI, STEVEN C., R.G.**

Update on the Proposed Arizona Soil Remediation Standards Rule 2006 O/N

**AVILES, VICKY L., AEP, CIAQM**

Asbestos: The Biggest Environmental Misconception 2011 A/S  
Get Back to Basics With: Respirators 2012 F/M

**BARNETT, ROB, AND CONWAY, MATT**

PING, Strengthens Bottom Line While Enhancing Environmental Quality 2009 A/M

**BEEBE, ANTERRE**

The First Step Toward Achieving EHS Compliance 2005/6 D/J



**BEILKE, PAMELA**

Apache Powder Superfund Site Wetlands 2008/9 D/J

**BENSON, WILLIAM R. AND MELVIN, STEPHEN R., PE, CSP**

Chemical Facility Vulnerability Assessment 2007 J/J



**BERKOWITZ, HAL**

Emergency Response Training for Maquiladora Workers 2006/7 D/J  
New Hazard Communication Standard 2013 J/J  
The Impact of Terrorism on Workplace Training Programs 2004 J/J

**BERRY, BOB, CEM**

Is it Prudent to Eliminate Emergency Management? 2007 F/M

**BLACKWELL, EZRA**

Can You Repeat That? Importance of hearing conservation and OSHA compliance 2008 F/M

**BLISS, GAIL**

Metal Finishing Successes in P2 2004 F/M

**BOHANNAN, ROBERT R., CET**

Defining Accepted Practices 2003 J/J

**BROWN, AL**

Supplemental Environmental Project (SEP) Opportunities 2006 F/M

**CARPENTER, MANNIE L., P.E.**

Dust: PM-10 Emissions, New Regulations to Impact Maricopa County 2008 J/J



**CARTER, RICHARD H.**

P2 Fundamentals 2003 O/N

**CARTER, RICHARD H. AND COULTER, GLYNIS**

The Condensed History of the: Southern Arizona Environmental Management Society 2007 O/N

**CLARK, ALYSSA C.**

Superfund Site Delisted, ADEQ Completes Rehabilitation of Once-Blighted Property 2013 J/J

**CMX**

CMX Adding Environmentally Friendly Touch to New AZ Cardinals Stadium 2005 J/J



**CONWAY, MATT, CHMM AND BARNETT, ROB, REM**

PING's Environmental Management System 2005 A/S

**COTTY, SUSANNE AND COMRIE, LEE**

Tracking Greater Tucson's Carbon Footprint 2010/11 D/J

**COWIE, FREDERICK J., PHD**

10 Steps to Great Exercises 2007 A/S



**CULBERT, LISA**

Perspective on Gatekeeper Regulatory Roundup 2006 O/N



**CURRY, TOM**

ADEQ Director Benjamin Grumbles, Exclusive Interview 2009 O/N  
Focus On: Liquid Environmental Solutions, Inc. 2013 A/M  
Sustainable Retirement / Dr. Nicholas R. Hild 2012 F/M

**CURRY, TOM AND THRUSH, JIM**

An Interview with ADEQ Director Stephen A. Owens 2003 A/M



**DARWIN, HENRY R., ADEQ DIRECTOR**

ADEQ Director Henry R. Darwin: ADEQ Coordinates Border Trash Cleanup 2011 A/M  
ADEQ Director Henry R. Darwin: Incentive-Based Approach to Clean Energy Tech & Green Jobs 2011 J/J



**DICKERSON, DENNIS**

Interacting With Maricopa County Air Quality Dept Has Just Become a Little Easier 2009 J/J

**EWBANK, SCOTT**

Minimize your Hazardous Waste Disposal Costs 2003 F/M

**FISHER, GREG**

Is Your Company TSCA Compliance? 2006 J/J

**FLOWER, CAMERON**

Vacant Site Stabilization, What Owners Need to Know 2009 A/M

**FORD, MICHAEL C. AND RAKOWSKI, STEPHEN M.**

SPCC Plan Final Rule 2003 F/M

**FORD, MICHAEL C., ATTORNEY REGULATORY DEVELOPMENTS**

"Waters" Guidance Issued; AZPDES Validity Confirmed 2007 A/S

8th Annual Gatekeeper Regulatory Roundup 2012 A/M

ADEQ Releases New Policy for Environmental Permits Near Schools 2005 A/S

ADEQ Unveils Draft Revisions to APP Rules 2004 J/J

ADEQ Unveils Draft Revisions to APP Rules (Part II) 2004 A/S

ADEQ's Report Card 2005 F/M

Brownfields Developers Beware! 2011 F/M

Claiming the Recycling Exemption 2003 A/S  
Common Misconceptions About Spill Reporting Requirements 2005 A/M  
Compliance Deadline Reprieve for TSCA IUR and SPCC 2007 F/M

EPA Extends Audit Policy to New Owners 2008 O/N

EPA Proposes Changes to RCRA Recycling Rules 2003/4 D/J

EPA Proposes New Due Diligence Standards 2004 O/N

EPA's Proposal to Encourage Recycling of Electronic Waste 2003 O/N

Global Warming: A Reality Check with Dr. Robert Balling 2006 J/J

Interview With Biodiesel Expert: Dan Rees 2009 O/N

Legal News You Can Use 2003 A/M

Legal News You Can Use 2003 J/J

Maricopa County Revamps Air Permit

Program in Response to EPA Audit 2005 J/J

Ninth Circuit Impairs NPDES Permitting 2008 F/M

Ninth Circuit Vacates AZPDES Program 2005 O/N

RCRA Proposal Regarding Industrial Rags/Wipes 2004 F/M

RIP, Matt Jacobs; BP, EPA, and the NCP 2010 J/J

Solar Energy Climate Heats Up For Arizona Businesses 2008 A/M

Stormwater Guessing Game Continues 2006 A/M

Supreme Court Narrows Cleanup Liability 2009 J/J

The 2011 Gatekeeper Regulatory Roundup Conference 2010/11 D/J

The Long, Hot Summer for Clean Water Law 2006 A/S

The Owl in the Ointment 2004/5 D/J

TRI, TRI Again ... 2010 A/M

Tulloch and Tree Huggers Tread Waters 2007 A/M

Waters Remain Unsettled After Rapanos 2006/7 D/J

What's New in Waste Regulation? 2009 F/M

**FRYDRYCH, DIANNE**

Arsenic: Forced Demand for Treatment Products, Interview with Doug C. Nelson, PhD. 2004 O/N

Barton Day's Personal Experience in Kuwait 2004/5 D/J

Environmental Compliance Assurance Programs, Observations by Roger Ferland 2004 A/S

Don't Let Contamination Invalidate Your Sampling Results: 6 Common Sources of Contamination 2007 O/N

Today's Tip: Chain of Custody 2007 A/S

**GARDENER, JOHN**

What's That Smell? 2005 A/M

*Continued on next page*

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### **GODEC, JOHN D.**

Principles of Risk Communication, Who are these people, and why do they hate me? 2008 J/J

### **GONZALEZ, RAUL E.**

P2 Resources: Western Regional Pollution Prevention Network 2003 O/N



### **GRUMBLES, BENJAMIN, ADEQ DIRECTOR**

ADEQ Director Ben Grumbles: Top 10 Wish List, "R and D" 2010 O/N

ADEQ Director Ben Grumbles: "Egads, E-Waste" 2010 A/S

ADEQ Director Ben Grumbles: "Green Chips" 2010 J/J

ADEQ Director Ben Grumbles:

"Hammer and Forks in the Road" 2010 A/M

ADEQ Director Ben Grumbles: Blue Ribbons and Green Emissions 2010/11 D/J

ADEQ Director Ben Grumbles: On the Road 2009/10 D/J

ADEQ Director Ben Grumbles: Wasted Energy 2010 F/M

### **HARRIS, GREGORY Y., AND HAKE, ALANA C.**

SB 1598 Helps Businesses Navigate Regulatory Maze 2011/12 D/J



### **HILD, NICHOLAS R. PH.D. SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT**

"...Everyone is Entitled to His Own Opinion, But Not His Own Facts!" 2007/8 D/J

"...It Takes a Village ... 'Eco-Village,' That Is ..." 2008 O/N

"...It Takes a Village ... 'Eco-Village,' That Is ..." Part II of II 2008/9 D/J

"...Methanol is the Best Alternative Fuel..." 2012/13 D/J

"...The News is What I Say It Is ..." 2008 A/S

"...What's Good for GM is Good for the Country!" 2005 A/S

"Branding" Sustainability, A New Approach for Creating Demand 2004/5 D/J

"Mr. President, Tear Down Those Malls!" 2004 O/N

"Old McDonald's Had A Brand...E I E I O" 2005 A/M

"Shades of Green ..." 2005 J/J

"The Death of Environmentalism" is Also Killing Progress Toward Sustainability 2006 J/J

"Uncertainty Paralysis" As A New Business Strategy 2010/11 D/J

"What's Good for GM is Good for the Nation ..." 2008 J/J

"Yes, Virginia ... There is a Santa Claus ..." 2005 F/M

... Water, Water, Everywhere, But ... 2008 A/M

...Talking the Talk, Waling the Walk ... NOT! 2012 A/S

A GHG Action Plan That Works For All! 2010 J/J

A Sonic Boom in Sustainability 2011 O/N

Advancing Sustainability Using TOMS

Methodology 2013 J/J

An EV in Your Future? 2011 J/J

An Opportunity in the Budget Crisis 2009 J/J

April 22, 1970: A History Lesson 2013 A/M

Back to the Future for EV's? 2010 A/M

Born in the USA: Sam's Impact on a Sustainable America 2003 O/N

CAP and Trade: Writing Permits to Pollute 2009 A/S

Cellulosics Biorefineries 2010 O/N

Dichlorodiphenyl Trichloroethane: Vs A

Million Deaths Per Year 2009 A/M

Educating Our Youth: Targeting Their Future 2009 O/N

Embarking on Retirement 2012 A/M

Emergency Management Sustainability 2013/14 D/J



Energy Skeleton Keys 2003 F/M

Exporting Gas 2013 F/M

Good Science and Bad: Knowing the Difference 2013 A/S

Green Labeling or Green-Washing: How Do You Know? 2012 J/J

Lessons From Will Rogers 2003 A/M

Measuring the Immeasurable: Sustainability Indicators and Global Warming 2003/4 D/J

Mr. President: It Is Time To "Change" to

Cellulosics-Based Ethanol 2009 F/M

New Rules! The "S" Word is Off-Limits! 2006 A/S

NOT-Axioms of Environmental Sustainability 2003 J/J

Part I: Mensa and Black Swans 2011 F/M

Part II: Mensa and Black Swans 2011 A/M

Petrolism and Our Addiction to Oil 2006 O/N

Planes, Trains, and Automobiles -- Does

anyone else see this? 2007 A/S

Proposed Recycling Legislation Unnecessary,

Unenforceable 2011/12 D/J

Revisiting the Fuel Tax Issue 2011 A/S

Seeing Spots in the Big Picture 2007 O/N

Shock and Awe All Over Again (Part Two of

Three) 2004 J/J

Shock and Awe in the Desert: "De ja" Vu All

Over Again! 2004 A/M

Sustainability Examples 2003 A/S

Sustainable "Growth" with Popcorn & Soda? 2009/10 D/J

Sustainable Personal Transportation for the

Future (Part Three of Three) 2004 A/S

Sustaining Growth in Alt-Fuel Options 2007 A/M

Sustaining Our Efforts: Many People in Many Places 2005 O/N

Sustaining Our Focus on the Important Things 2004 F/M

Sustaining the Money Tree: ... Playing the Budgeting Game 2006 F/M

Sustaining the Superfund: Re-Fund It! 2010 A/S

Targeting Solar Incentives for Existing Arizona

Businesses .... 2010 F/M

The Conundrum 2012 O/N

The Dilbert School of Management: Lessons in Sustainability 2007 J/J

This Isn't Lake Wobegon, Toto ... 2007 F/M

Throwing Common Sense Away: A Sustainable Tactic For Clean-Up? 2005/6 D/J

Ticky-Tacky Fees Drive Me Crazy!! 2006/7 D/J

Today's Lesson: Insulation "R" Value ... What does it Really mean? 2006 A/M

Topsy - Part II (Not by Cozy Cole) 2008 F/M

US Economy Still Fossil Based After 40 Years

of Energy Politics & Policies 2013 O/N



### **HOLMES, JOSEPH C. PROSPECTING FOR ENVIRONMENTAL BUSINESS!**

"No-Bid" Has Never Been More Tough! 2009 A/S

6 Easy Steps to Break Through "Sales Call

Reluctance" 2006 A/M

A Message From Your Prospect 2008 O/N

A Networking Success Story 2010 O/N

A New Year: How About a New Value

Proposition? 2005/6 D/J

A Salesperson's Job is Never Done ... Maybe it Should Be! 2005 A/M

A Sales & Marketing Plan: Who Needs It?

2008 F/M

Are We in the Right Place at the Right Time?

2007 F/M

Building Better Conferences 2007 A/M

Client Relation Management Systems 2008/9 D/J

E-Bids and Reverse Auctions: Industry

Opinions Here! 2005 A/S

Economic Survey Results 2009 O/N

Get Connected! 2007 O/N

Greenbuild 2009/10 D/J

I Want YOUR Success Story 2011 O/N

Ideas for Your Next Hole Sponsorship 2011 F/M

It's Not the Economy, Blame the Sales Guy!

2009 J/J

More on Our Changing Market 2007 J/J

More on the Sales/Operations Relationship

2005 J/J

Prospecting for Environmental Business 2004 O/N

Sales in Today's Modern Business World 2006 A/S

Sales Person to Sales Manager 2010 J/J

Selling During Mergers/Acquisitions 2008 A/M

Selling in the Down-Turn 2008 J/J

Selling Sustainability 2008 A/S



Social Media in Our Market 2007 A/S  
 Survey Says! The Outlook for '05 is Good!  
 2005 F/M  
 Sustainability in the Downturn 2009 A/M  
 The "Seller-Doer" 2007/8 D/J  
 The Environmental Industry's "Long Tail" Part  
 I 2006 O/N  
 The Environmental Industry's "Long Tail" Part  
 II 2006/7 D/J  
 The Internal Marketplace 2010 F/M  
 The Strategic Hire 2011 A/S  
 The Value of Association Memberships 2005 O/N  
 To Bid or Not to Bid? 2004/5 D/J  
 Training Resources for Business Development  
 Personnel 2006 J/J  
 When Does Vision Become Opportunity?  
 2010 A/S  
**HOSKIN, JULIE SLOCUM**  
 Testing for Total Petroleum Hydrocarbons  
 2004 A/S



**HRISTOVSKI, KIRIL, PHD**  
 Much Ado About Small Materials,  
 Nanotechnology and its Environmental  
 Applications and Implications 2008/9 D/J  
 Regulatory Implications for Commercial  
 Fabrics Containing Nanosilver: Haz Waste or  
 Not? 2012 O/N  
**HUTZEL, ROBERT L., CIH, CSP**  
 Dispelling a Myth: Managing Asbestos in  
 Buildings 2009/10 D/J  
**JACOBS, MATT, CHMM**  
 "CHMMunity" Volunteers Remove Tons of  
 Debris From Rio Salado 2007 O/N



**KIRCHNER, DAVID L.**  
 How About an Acre-Foot of Water - Enough  
 for a Family of Four For a Year? 2003 O/N  
 How Environmental Consultants Could Avoid  
 Making Silly Mistakes 2003 F/M  
 It's All About Survival, Hey, Can I Bum a  
 Camel Off of You? 2008 F/M  
 Lessons Learned After 30 Years of  
 Environmental Consulting .... 2006/7 D/J  
 Water From Our Oceans 2004 A/S

**KLEIN, MITCH**  
 How to Respond to an Environmental  
 Enforcement Action 2009 F/M

**KRAMKOWSKI, PAUL, CHMM**  
 Internet 101 for the Environmental, Health &  
 Safety Professional 2004 F/M

**KRILOFF, SEAN**  
 ADOSH Inspections: Respiratory Protection  
 in Emergency Response 2003 A/S

Arizona's Top 15 Safety Citations 2004 O/N  
 Hazard Analysis 2004 F/M  
 Ladder Safety Regulations: Precautions Protect  
 Employees 2003/4 D/J  
 What to Expect from an ADOSH Inspection  
 2004 A/M  
 What to Expect from an ADOSH Inspection,  
 Part II 2004 J/J



**LAME, MARC AND GOUGE, DAWN**  
 Integrated Pest Management: A Healthy  
 Alternative for Arizona's Schoolchildren  
 2005/6 D/J

**LANEY, DAVID, CHMM**  
 Arizona Law to Assure Sufficient Funding for  
 UST Cleanup 2013 A/S

**LATIMER, ED, PHD, PE, CPSWQ**  
 EPA Pesticide Exemption Rule Overturned  
 2009 A/S  
 Permitting of Stormwater Discharges 2005 A/S  
 AZPDES MSGP 2009, Highlights of ADEQ's  
 Proposed AZPDES Stormwater Permit 2009 J/J

**LIMA, DAVID, MS, CHMM**  
 Chemical Facility Anti-Terrorism Standard  
 2007/8 D/J  
 How Will the Proposed New HAP Rules Affect  
 You? 2006 F/M

**LITE, JEREMY A.**  
 Anatomy of a Toxic Tort Case 2003/4 D/J

**LOCKWOOD, BARBARA D., P.E.**  
 Management Options: Reuse, Recycle, Disposal  
 Cathode Ray Tubes 2003 J/J

**MARTIN, TODD AND SUMNER,  
 RICHARD, P.E.**  
 "How Can I Get My Air Permit Faster?" 2013 O/N

**MAYE, JACQUELINE**  
 Five Components of a Hazardous Waste  
 Contingency Plan 2003 A/S



**MCCURRY, CRAIG, P.E.**  
 How to Re-Energize Your P2 Program, The  
 Boeing Company 2006 A/M  
 VOC Reduction at The Boeing Company 2004 A/M

**MEMORIUM**  
 Cynthia Ann "Syndee" Wundrock 2010 A/M  
 Matt Jacobs 2010 J/J  
 Norwood B. Melcher, Jr. (Nick) 2009 J/J  
 Janet Tjan. A Memorium and Article Authored  
 by Vicky L. Aviles. Mesothelioma...A Big Word  
 for a Menacing Disease! 2011/12 D/J  
**MOHAMED, ABDELLATIF A., PHD**  
 Beyond Soil, Water, and Air: A New Definition  
 of the Environment 2013 F/M



## OLSON, LARRY PHD. IT'S ALL ABOUT CHEMISTRY

"Water, Water, Everywhere Nor Any Drop To  
 Drink" 2010 A/M  
 A Sustainable Source of Chemicals? 2009 J/J  
 Air Pollution From Biodiesel 2006 O/N  
 Algae - Is it the Answer? 2008/9 D/J  
 Biodiesel From Waste Oil 2008 O/N  
 Biofuels 2006 F/M  
 Black Carbon 2011 J/J  
 BP May Be Only the Beginning 2010 A/S  
 Carbon Capture and Storage 2009 A/S  
 Carbon Sequestration 2009/10 D/J  
 Chemistry and Sustainability 2007 A/S  
 Clean Coal? 2005/6 D/J  
 Climate Change - the Verdict 2007 A/M  
 Climate Change Choices 2007/8 D/J  
 Desertification 2006/7 D/J  
 Do You Know What's In Your Swimming  
 Pool? 2011 A/S  
 Environment and Health 2012/13 D/J  
 Ethanol Revisited 2006 J/J  
 EU Leads The Way 2004/5 D/J  
 Final Impressions of Africa 2013 A/M  
 Fracking Scorecard 2012 O/N  
 Fracking--The Solution to Our Energy  
 Problems? 2011 A/M  
 Good vs Bad Ozone 2003 A/S  
 Green Chemistry 2003 O/N  
 How Much of a Threat is Bisphenol A? 2008 J/J  
 Human Guinea Pigs 2008 A/S  
 Is That Arsenic in My Drinking Water? 2003 A/M  
 Is That Teflon Frying Pan Killing You? 2005 A/S  
 Managing Chemicals In the 21st Century  
 2003/4 D/J  
 Mercury: Death by Quicksilver 2004 F/M  
 MTBE A Classic Case Study of the Law of  
 Unintended Consequences 2004 J/J  
 Nitric Oxide: A Most Remarkable Molecule  
 2006 A/S  
 Nitrogen for Your Tires? Is it Just Hot Air?  
 2009 A/M  
 No MSDS is Better than a Wrong MSDS 2005 A/M  
 Particulate Matter 2004 A/S  
 Particulates and Your Health 2004 O/N  
 Perchlorate - An Emerging Contaminant 2009 F/M  
 Pharmaceuticals in Your Drinking Water 2008 A/M  
 Rare Earths - The Next National Security  
 Threat? 2013/14 D/J  
 Removing Arsenic From Drinking Water 2003 J/J  
 Response to Desertification 2007 F/M  
 Second Generation Biofuels 2008 F/M  
 Spotty Dishes? 2011 F/M  
 Storage of Incompatible Chemicals 2003 F/M

*Continued on next page*



The Black Stink (Yang Su Pu River) 2006 A/M  
The Dirty Dozen 2010 F/M  
The End of Cheap Coal 2005 O/N  
The Keystone XL Pipeline 2013 A/S  
The Pebble Mine in Bristol Bay, Alaska 2012 A/S  
The Precautionary Principle 2005 J/J  
The Scientific Method 2012 F/M  
The Vasa's Greatest Battle 2010/11 D/J  
Tilting at Windmills 2012 J/J  
Toxicology of Mercury Part II 2004 A/M  
Unintended Consequences 2013 O/N  
Waste Not, Want Not 2007 J/J  
Waste to Energy 2012 A/M  
What's New at Your Dry Cleaners? 2007 O/N  
Zimbabwe: First Impressions 2013 F/M

#### OSTERMAN, DANIEL J.

How Can We Validate Green Product Attributes? 2012 A/M



#### OWENS, STEPHEN A., ADEQ DIRECTOR

Arizona Performance Track, Broadening the Base and Improving Incentives 2007 F/M  
Performance Track: Promoting Sound Environmental Management 2003 O/N  
Putting Environmental Quality on the Performance Track 2005 J/J

#### PALASZ, CATHY

Misconceptions of an EMS Audit 2010 F/M

#### PAUL, PATRICK J.

What's New In Waste Management 2003 F/M



#### PAULAUSKY, CHUCK, CHMM

Accident Investigation: Solving the Mystery 2007 J/J  
Cows or Crows? Employee Awareness? 2008 O/N  
Emergency Response and Evacuation Planning 2010 A/M  
Ergonomics: It's Personal! 2012 J/J  
Job Safety Analysis, A Safety Management Tool 2005 F/M  
Laser Safety: The Eyes Have It! 2013/14 D/J  
Managing Your Workers' Compensation Costs 2009 A/S  
OSHA Documentation: CYAWP 2007 F/M  
Powered Industrial Trucks, Critical Safety Training Requirements 2008 A/M  
Protecting Your Workers, OSHA PPE Requirements 2007 A/S  
Slip, Trip, Fall: Preventing "STF" Injuries and Deaths 2011 A/M  
Emergency Egress 2006 A/S  
Fire Extinguisher Basics 2006 J/J  
OSHA Requirements for Safety Training 2006 O/N  
SOP's: Safety Operating Procedures 2007 O/N

#### PETERS, JOAN

Does Your Business Need a City of Phoenix Wastewater Discharge Permit? 2004 A/M



#### PETERSON, DANNY, PHD

Ribbon Cutting Ceremony: Alternate State Emergency Operations Center 2012 A/M  
A New Challenge for Emergency Management: Terrorism Defense 2003 A/S  
The Changing Landscape 2006 A/S

#### PETERSON, DANNY, PHD., AND BROWN, RYAN, BS

Alternate State EOC Goes On-Line at ASU Polytechnic 2008 A/S

#### POLITO, RICHARD

South Phoenix Toxics Reduction Project 2005 F/M

#### RATYNSKI, ANGELA

Alternative Fuels 2005 O/N

#### RAVEGA, KATEA

Marketing Claims: "Green" or "Greenwash"? 2009 A/M



#### REILLY, HON. KENNETH F., J.D.

EHS: 2006, An Enforcement Prediction 2006 F/M  
Environmental Compliance, Awareness, & Responsibility 2007 F/M  
RCRA Generator Training Requirements 2008 F/M  
US DOT Compliance Requirements 2005 F/M

#### RODRIGUEZ, MIGUEL A.

Bloodborne Pathogens 2007 A/M

#### ROE, DANIEL

Emergency Planning and Community Right to Know - Plus! 2003 A/S



#### ROGERS, JULIE C.

MCAQD Seminar for Metal Finishers 2011 A/M  
NESHAP Plating and Polishing Rule 2010 A/S

#### ROMIC

Romic Enhances their "Excellence Through Commitment" in the Env. Industry 2005 O/N

#### ROSENTHAL, BILL

A Review of Mandatory DOT Training 2003 J/J

#### SANCHEZ, ROSANNE

Phoenix Brownfields University 2003 J/J



#### SEXTON, MICHAEL S.

Palo Verde Nuclear Generating Station 2005 O/N

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## SOESILO, J. ANDY, PHD, REM

Building a P2 Based EMS 2007 O/N  
Competitive Advantage: A good reason to adopt EMS? 2007 F/M  
EMS: The "D" Word of the PDCA-Cycle 2008 F/M  
Not in Compliance? Consider an Environmental Management System 2006 A/M  
Sustainability, Environmental Management, and Paradigm Shift 2013 F/M  
Developing an EMS Through P2 Planning 2003 A/M

## SOESILO, J. ANDY, PHD., AND BILL QUINN, RES

P2 Achievements: The 2003 NPPR Report, a Decade of P2 Results 1990-2000 2003 O/N

## STAFF

"Partnering for Cleaner Air" Annual Air Quality Conference 2009/10 D/J  
2008 Gatekeeper / Regulatory Roundup 2008 A/M  
2011 Gatekeeper Regulatory Roundup 2011 A/M  
2011 SAEMS 1st Annual Regulatory Roundup 2011 A/M  
2012 Gatekeeper Regulatory Roundup 2012 A/M  
2012 SAEMS RCRA 2012 J/J  
9th Annual: Gatekeeper RR 2013 A/M  
ADEQ Orders Hazardous Waste Facility Closure 2003 A/M  
Alliance Hosts Business Leadership and Sustainability Leg. Forum Luncheon 2011/12 D/J  
Alliance Hosts: Air Quality Luncheon 2011 F/M  
Arizona Resource Exchange, From Trash to Treasure 2005 J/J  
ASU College of Tech. Cohort Dinner 2011 F/M  
Cardno Completes Acquisition of ATC Associates 2012 A/M  
Committee Volunteers "Give Back to the Community", "Value Sense of Accomplishment" 2009 A/M  
Company Focus: LFR, Inc. 2006 O/N



Company Focus: Liquid Environmental Solutions 2006/7 D/J  
Company Focus: ARCADIS 2010 A/M  
Environmental Technicians: Ready for Hire 2006 A/M  
ESS Expo 05: Users Conference 2005 J/J  
Exciting Developments at Turner Laboratories, Inc. 2011 O/N  
Focus On: CARE; Carter, Affiliates, Inc., Resources for the Environment 2008 A/S  
Fuel Spill Clean-up in the Apache-Sitgreaves National Forest 2004 O/N  
Gatekeeper Regulatory Roundup, 2009 2009 A/M  
Gatekeeper RR, A Rounding Success! 2007 A/M  
Green Arizona, Arizona Environmental Strategic Alliance Sponsors Youtube Contest 2010 J/J



Hal Berkowitz, Director, Office of Env. Technology, ASU, Program and Retirement

Plans 2009/10 D/J  
How to Determine Your Employee's EH&S Training Requirements 2003 J/J  
Maricopa County Hires New Air Quality Director 2008 O/N  
Performance Track / EMS Seminar 2007 J/J  
Phoenix Receives Recycling Leadership Award 2006 A/M  
Pillars of Sustainability, Sustainable P2 Seminar 2008 O/N  
Recent Videos on Environmental Management.TV 2011 J/J  
SAEMS 2010 RCRA 2010 J/J  
SAEMS 2011 Annual RCRA Seminar 2011 J/J  
SAEMS 2012 P2 Seminar 2012 O/N  
SAEMS 20th Anniversary Kick-Off, Governor Proclaims "SAEMSDAY" 2007 A/S

SAEMS and RCRA: Next Generation 2013 J/J  
SAEMS P2 Sustainable Growth to Reduce Our Carbon Footprint 2010 O/N  
SAEMS RCRA 2008, RCRA: The Keys to Compliance 2008 J/J  
SAEMS RCRA 2009 2009 J/J  
SEED Event 2005, Symposium for Environmental and Economic Dynamics 2005 A/M  
SESHA 31st Annual International High Technology EHS Symposium & Expo 2009 J/J  
Shanghai V. Director of Policy Research Speaks at Polytechnic Campus 2006 F/M  
Treasurer 4 Teachers, Non-Profit Finds Innovative Uses for Manufacturers' Discards 2009 A/S



US EPA and ADEQ Sign MOA on Performance Track 2009 F/M  
www.ReUseAZ.org, Assistance with your reuse and recycling needs 2007 O/N  
ADEQ Letters of Regulatory Interpretation: Evaporation of Hazardous Waste Rinse Waters 2003 A/S



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## TURNER, NANCY D.

Turner Labs Celebrates 22 Years 2005 O/N

## VON OPPENFELD, ROLF R.; HISER, ERIC L.; FREEZE, MARK E.

Air Quality Permitting Strategies 2003/4 D/J

## WALTERS, KAREN

Aerotech Environmental Laboratories State-of-the-Art Facility 2004/5 D/J



## WEBB, DARIN

A Contrasting View: Global Warming 2006 A/S  
Company Focus: ARCADIS 2006 A/S  
McPhee Stays Above the Competition 2006 J/J  
Where Are They Now? Yesterday's Environmental Managers, Today 2006 A/S

## WILEY, WILLIAM (BILL), P.E.

Air Quality in Maricopa County: What's Really Going On 2012 A/S  
Caution: A few Mistakes Can Undermine Your: Sustainability Program 2010 A/S  
Lessons from the Sustainability Trenches, 14 Tips to Achieve Sustainability 2010 J/J

## YOUNG, BARBARA

Univar USA: Improve Emergency Preparedness and Increase Security 2003 A/S

# ASSOCIATIONS PAGES

The Journal of Environmental Management Arizona invites environmental, health and/or safety organizations in Arizona to contribute news articles about their associations. Contact the editor at 480-422-4430 x42.



WWW.SAEMS.ORG

In January SAEMS teamed up with the Pima County Local Emergency Planning Committee for their 2014 Hazardous Material Safety Seminar at the Desert Diamond Casino. Topics included: AzSERC Database Tier II reporting, Hazardous Materials and the Fire Code, Incident Reports by US DOT, and Pima County's LEPC roles and activities.

SAEMS's luncheon on February 26th highlighted Daniel J. Brennan from Raytheon. He presented on moving away from chemical cleaners for janitorial work and replacing them with ozonated water.

SAEMS March luncheon will be held at Hotel Tucson on March 26th from 11:30 am to 1:30 pm and will feature Marie Light from PDEQ. Marie is part of the storm water management program.

SAEMS conducted a highway clean up on February 15th. The highway clean up team picked up 16 bags of trash, several tires and a chair.

If you are interested in joining SAEMS or attending an upcoming event please visit our website at [www.saems.org](http://www.saems.org).



Dawn Weyer  
President



WWW.AZAEP.ORG

The National Association of Environmental Professionals (NAEP), our parent organization, held its first Board Meeting of 2014 in Phoenix. AZAEP board members participated in the meetings and provided a tour of the Desert Botanical Gardens on Friday, January 24 (photo). NAEP hosted a Meet and Greet Happy Hour for AZAEP members at a Phoenix pub that was well attended and provided an excellent opportunity for our members and the NAEP Board to learn more about each other.

Please plan on attending our Tuesday, April 22, dinner meeting at Grimaldi's, 4000 N. Scottsdale Rd. This meeting is jointly sponsored by the Air & Waste Management Association-Grand Canyon Chapter. The speaker will be Colleen McKaughan, Assistant Air Division Director, US EPA Region 9, who will provide updates on PM10 designations, the Navajo Generating Station permits, and other important EPA air quality decision-making.

AZAEP is pleased to announce our annual Scholarship and Project Grant awardees (details on our website):

Lynn Massey – University of Arizona  
Plant Sciences Club – University of Arizona

Special thanks to the Scholarship Committee for their outstanding work: Beth Defend, Jennie Curé, Marcie Martin and Stacy Campbell.

Our GoDaddy email system inexplicably and randomly dropped over 75 names from our distribution list last October and because of privacy regulations,



PHOTO: NAEP and AZAEP Board at Desert Botanical Gardens in Jan.

we are not able to add names back to the list. If you are not receiving our monthly email announcements of meetings and webinars, please go to our website ([azaep.org](http://azaep.org)) and sign up again! You can also become a member or learn more about AZAEP by visiting our website. AZAEP has a new post office address: P.O. Box 69, Tucson, AZ 85702.



AZ.ASSE.ORG

March is upon us and I'm really looking forward to April, for the summer heat? No, for our Annual Professional Development Conference and Charity Golf Tournament! This one-of-a-kind event geared towards the safety professional has only gotten better year after year with quality, relevant educational sessions and some inspiring keynote speeches. CEU's are available and as always, we will have great giveaways and raffle items from our terrific sponsors (April 24th). The golf tournament is on Friday the 25th and is a great way to get out and have some fun golfing while meeting new faces and winning some great prizes, I hope to see you there, you can register for both events and even sign up to be a sponsor or vendor at <http://www.assez.com/>

Also, I would like to invite you to our April 4th chapter meeting, the topic will be "Interpersonal Communication Skills for Safety Professionals – What the Research Says, What the Benefits Are, and How to Apply It" presented by Jonathan Klane and Fredi Doerstling of ASU. This meeting will be held at the Phoenix Art Museum again and through your participation in the meeting get a free pass to the museum afterwards, nice. Cheers!



The Arizona Hydrological Society (AHS) Flagstaff Chapter is busy planning another great symposium! This year AHS has teamed up again with AIPG to host 2014 AIPG/AHS National Conference: Water & Rocks - the Foundation of Life, September 13-16, 2014, in Prescott, AZ. Be sure to join us for some great field trips and technical



Patricia  
Mariella, Ph.D.  
President



Ryan  
Oughterson  
President

sessions. Visit the AHS web site for additional information and details at [www.azhydrosoc.org](http://www.azhydrosoc.org).

Attention Students! The AHS is now accepting applications for three AHS scholarships plus our Halpenney, Bouwer, and Avery intern-scholarships which are sponsored in part by each chapter and the AHS Foundation. Please check the AHS web site, <http://www.azhydrosoc.org/StudentResources.html> for details including application deadlines.



Christie  
O'Day  
Executive  
Director



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## ARIZONA'S BUDDING RELATIONSHIP WITH MEXICO

Arizona's land of opportunity lies in an unexpected place – south of the border. Our Mexican counterpart boasts a blossoming economy, emerging middle class and expanding manufacturing capabilities that have already surpassed South Korea's economic plateau.

The truth is, Mexican residents go to Arizona for the shopping and Texas for business. In fact, 2012 numbers revealed that Texas' import/export trade with Mexico totaled \$194 billion versus \$13 billion for Arizona.

In order for Arizona to catch up to its aggressive Texas and California competitors, our borderlines need to be treated as connectors, not separators. Let's remember: partnerships make great neighbors, not walls.

With the Mariposa port of entry stationed in Nogales, Arizona, the City of Nogales is naturally positioned to serve as a hub to strengthen ties, amplify our relationship with Mexico and shatter any negative myths Mexico may have about Arizona.

Prime location is opportunity and Arizona is geographically blessed. As a border state, Arizona houses the infrastructure to become a trade titan with premium access to the \$1.8 trillion Mexican economy. This will require innovative thinking and productive ways to engage with our economically maturing next-door neighbor.



Diane Brossart  
President



[HTTP://SOUTHAZ.ASSE.ORG](http://southaz.asse.org)

The Southern Arizona Chapter of the American Society of Safety Engineers (ASSE) is busy preparing for a potential presentation on skin cancer for March, and our annual awards banquet in April. The Chapter's board serves for two years, and the nominating committee is in full swing preparing for the next two years leadership. March's meeting is scheduled for the 18th at our new venue - the Sabaar Shrine Temple, 450 S. Tucson Blvd. The luncheon runs from 11:30 to 1:00 PM. The Awards Banquet details have not yet been established so stay tuned to our web site. In May (20th), we join the Southern Arizona Safety Council for an all

Continued on page 14



## SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT



Nicholas R. Hild, PhD.

### SOLAR BUSINESS MODEL

*"To make substantial progress on thwarting climate change emissions, returning to full employment, reducing health care impacts, and protecting water resources, we need more business model innovation and less of an obsession with technology innovation..."*

Jagar Shaw, Stanford Research Journal  
Online, October 23, 2013

Essentially, that paraphrases the philosophy of the founder of the world's leading solar services company. Shaw says, we need to adapt more unique business models to move investment in solar power (and other alternative energy) particularly now when solar government incentives are diminishing. His strategy is based upon the fact that, in these tough economic times, businesses won't make investments unless they see a real potential for an economic payback even if those investments green their bottom line.

And, he is right: unless there's a potential positive bottom line result, scarce investment monies for *any* business, especially for small businesses, won't get a second look if there's not a potential payback.

So, that is why Shaw developed his unique solar power business model, a totally unique way of incentivizing businesses to invest in solar. And he put his money where his prophecies' were when he founded SunEdison in 2003. In just six years, his company became the largest solar services company worldwide by using the unique business concept of '*no money down solar*,' the business model that he adapted and implemented to make his company successful. He calls his model, Solar Power Purchase Agreement (SPPA) and, it has turned out to be a business (investment) model that has the potential to be adapted to all kinds of alternative energy technologies around the world including solar power.

Shaw says naysayers irrationally argued that utilizing already proven technologies—to meet climate change goals—are not good enough to deploy at scale. In dismissing Shaw's SPAA, they said that better technologies are needed to make businesses invest, not better investment models. *"I see the problem differently," says Shaw. "While technology innovation is important, with oil hovering at \$100 per barrel on average, (we need) to capture the value of existing technology through business model innovation..."* Clearly, as traditional incentives such as government tax subsidies for businesses to invest in solar, are rapidly being withdrawn, it is clear there needs to be innovative ways to provide incentives to businesses to invest that haven't been thought about previously.

The SPPA business model in solar power investment has already been replicated globally. In a paper for the Stanford Research

Journal Online (October 23, 2013), Shaw writes that SPPA has been utilized and validated by governments, as well as retailers like Wal-Mart, and in school systems where money is always in short supply. In fact, he notes that his SPPA model has played a key role in allowing the solar industry to grow from 1,000 megawatts per year to 40,000 megawatts (expected) in 2013, supporting millions of jobs around the world.

But, there is a conundrum: naysayers present the irrational argument that today's proven technologies—to meet climate change goals—are not good enough to deploy at scale. The argument goes---*if they were good enough, they would have scaled up globally, already---* however, Shaw argues that, in the end, our inability to promote business model innovation at scale holds back the largest economic opportunity of our lifetimes.

Shaw details his success at SunEdison in his book, *Creating Climate Wealth: Unlocking the Impact Economy* (Climatewealth.com) where he makes a compelling argument for his Solar Power Purchasing Agreement business model. SPPA was the foundation he used to create and build SunEdison to become the largest solar power services company in the world. You can't get better empirical evidence than worldwide success to prove his theory isn't just built on hypothetical projections.

Shaw sold the company in 2009 and has since served as the first CEO of the Carbon War Room, where he is a board member today. (Carbon War Room is the global organization founded by Sir Richard Branson and Virgin United to help entrepreneurs address innovative ways to address global climate change).

In the Stanford Online paper, Shaw notes that Citibank analysts measured the (SPPA) solar business model opportunity and reported that, using just this Solar Investment business model alone, global businesses could cost-effectively deploy \$5.7 trillion of renewable electricity without raising electricity rates. In a conclusion to their report, Citibank analysts said that they are confident in existing business model innovation led by companies like SunEdison as an excellent way to reduce worldwide greenhouse gas emissions.

In Arizona, *if* we didn't already have good reasons to find new ways of incentivizing businesses to invest in solar power, an Arizona Republic article on February 16, 2014 broke the news that the recent extra user fee that APS has rolled out for all new solar power purchasers has already had a dampening effect on new applications for solar installations. The number of businesses adding solar in January 2014 fell by over a third compared to January, 2013 and residential installations by over half. The effects of the extra user fee may or may not be the reason for the decline in APS territory. But, in SRP territory where no extra fees have yet been added for new solar installations, the numbers are just the opposite for the same months--- more solar power was installed in those months in SRP territory. So, with ever more diminishing government subsidies for new solar installations on the horizon, this bad news should serve as a red flag that something more needs to be done to encourage more Arizona businesses to invest in solar.

The SPAA investment model may not be the only model that is right for every Arizona businesses, but it is yet a unique and innovative way to incentivize businesses that has been proven worldwide. So, now it is in your hands---the environmental professionals who work for those Arizona businesses that need to take advantage of this opportunity---you need to show your companies the way! Otherwise, how will we ever convince our children in 2050 and beyond, that we did all we could to reduce our carbon footprint when they ask us... *"didn't you think about the future of your children's, children's, children?"*

## ASSOCIATION PAGES

CONTINUED FROM PAGE 12

morning quarterly safety meeting. The SASC holds their meetings from 0830 to noon at the Granite Construction Training Room - 4115 E. Illinois. The Chapter continues work on the University of Arizona Student section. If you are in need of OSHA classes, check out our web site's scheduled events - <http://southaz.asse.org/events/>.

John Roads  
Secretary



WWW.AZCHAMBER.COM

The Arizona Chamber of Commerce and Industry held its 2014 Heritage Awards Dinner on February 28th where Governor Janice Brewer was honored as the recipient this year. Past recipients include Frank Kush, Bob Fannin and John McCain among others. The Chamber will hold its 2014 Classic Golf Tournament on May 9, 2014 at the Lookout Mountain Golf Course. In addition, the Arizona Chamber and Manufacturer's Council annual Environmental and Sustainability summit is scheduled for August 14th and 15th in Prescott, Arizona. Anyone interested in participating in the planning should contact Jeff Homer at [jeff.homer@gmail.com](mailto:jeff.homer@gmail.com)/480-441-6672.

Environment Committee Breakfast Meetings continue to be held on the second Wednesday of each month at 7:00 AM at the Sheraton Phoenix Airport Hotel. More information about all of these events can be found on the Arizona Chamber's web page at [www.azchamber.com](http://www.azchamber.com).

Jeff Homer  
Chairman  
Environment  
Committee



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WWW.AZALLIANCE.ORG

Compliance Assistance Seminar on January 14th in Casa Grande. The 43 attendees included representatives from stationary source regulated facilities in Pinal County and nearby areas, and interested consultants. Morning presentations focused on Permit-



ting, Compliance Inspections, and Enforcement Procedures, with speakers from Pinal County including Kale Walch, Anu Jain, Bob Farrell, and Mike Sundblom. The afternoon sessions included presentations on PING's AQ permit compliance experience (Matt Conway), Honeywell Aerospace and its EMS (Greg Bopp), and an entertaining presentation on "How to get and keep the attention of regulators" by Mitch Klein, of Polsinelli.

Hosting educational and compliance assistance seminars is one way we fulfill our mission to protect Arizona's environment through leadership and mentoring. A similar seminar is planned for June in Maricopa County--see our website and the next issue of the Journal for more details.

Neal Brown  
Chair



The Alliance and the Pinal County Air Quality Department co-sponsored an Air Quality Permit

## 2014 GATEKEEPER REGULATORY ROUNDUP

The 2014 Gatekeeper Regulatory Roundup was held in Scottsdale on February 11-12 at the Chapparal Suites Resort.

The theme of the two-day seminar was "Helping Communities Through Climate and Environmental Challenges". Numerous speakers addressed a variety of topics, including Keynote Speaker Mark Holmes discussing "Superfund, Super Fun, Super Friends: Partnerships for a Greener Community" on day one, and Keynote Speaker Christie Slater discussing "Arizona State Parks: Stewardship & Sustainability for Arizona's Valuable Places" on day two.

A special feature this year was the "Industry Focus - Plating Panel", with panelists Ken Hooker, MCAQD (AIR); Mike Golden, City of Tempe Pretreatment (WATER); Barton Day, Polsinelli (WASTE); and Chuck Paulausky, CPSE (OSHA SAFETY).

The Gatekeeper Regulatory Roundup Planning Committee, as always, is a volunteer group of Arizona environmental management professionals, and the Journal congratulates the Committee on a successful and valuable event! For more information visit the EPAZ website at [www.epaz.org](http://www.epaz.org).



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Larry Olson, PhD.

## IT'S ALL ABOUT CHEMISTRY

# A PANDEMIC OF NEUROTOXICITY?

Does it seem like every week you read that a new chemical has been linked to some type of disease or disorder? Sometimes it's a chemical you've heard of such as lead, arsenic, ethanol or pesticides. But increasingly it can be a chemical that you didn't even know you were exposed to such as BPA (bisphenol A), perchlorates, or 4-methylcyclohexanemethanol (MCHM, the chemical spilled into the Elk river in West Virginia). Is there evidence that our exposure to industrial chemicals is greater than it has been in the past and that this is causing increased rates of cancer, neurodevelopmental disorders, or other diseases?

Some people think so. Very recently, Philippe Grandjean of Harvard and Philip Landrigan of Mount Sinai School of Medicine published an update to their Lancet review in 2006 in which they claim there is a "global, silent pandemic of neurodevelopmental toxicity" due to environmental exposure to industrial chemicals. (Lancet Neural 2014; 13:330-338) In particular, they focus on developmental toxicity in the fetus and young children because they lack some of the protective mechanisms of adults that can make them more susceptible to low doses of toxins. It is not only the dose, but the timing of the dose, especially during key gestational and development periods, that must be considered in evaluating toxicity. They cite studies of exposure to very low doses of lead, methylmercury or ethanol to support claims that such chemicals

can cause neurotoxic effects in children at much lower doses than those which affect adult brain functions.

The problem is that most of our understanding of the risks associated with industrial chemicals is first derived from case studies of occupational exposures that involve high doses and healthy adults. Epidemiological data from children might follow years later, but these are usually focused on obvious functional abnormalities. The type of study that would evaluate whether a chemical can be transferred through breast milk, cross the placental barrier, or affect neural stem cells is much rarer and almost never involves a dose-response relationship.

The possibility of subclinical toxicity, meaning a range of adverse effects that might require special testing and not be clinically obvious, has only recently been addressed and in just a handful of chemicals. Maybe the best studied example is lead, where problems with memory, cognition, behavior and lower IQ have been associated with even low levels of childhood exposures leading to the conclusion that there is no "safe" level of exposure to lead. It is these subclinical effects that led Grandjean and Landrigan to describe a silent epidemic where toxic effects are underreported.

Major risk assessments for a toxic chemical in the U.S. can take 10 years or more and cost millions of dollars. This is not only due to a lack of resources and trained personnel to develop the scientific data, but also to legal entanglements over proposed regulations and even ethical arguments over the use of animals for dose-response studies. There needs to be a better way and indeed EPA, the National Academy of Sciences, and others are focused on improving the risk assessment process. The increasing sophistication of in vitro models and computational methods may provide alternatives to traditional animal studies. The focus is also on defining risk specific doses that can provide quantitative information on risks associated with various exposures and control strategies.

Nevertheless, we are faced with the fact that well over 200 industrial chemicals in widespread use including metals, organic solvents, and pesticides are known to be neurotoxic to adults but we know very little about how they interfere with the neurological development of infants and children. The de facto approach right now is that a new chemical is safe until proven otherwise. It may be time to try something new.

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