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### FULL SCALE HAZMAT RESPONSE EXERCISE

BY DANNY PETERSON, PhD Page 12

## MILITARY AND ENVIRONMENTAL MANAGEMENT

A COMPARATIVE LOOK

BY RICHARD "DREW" MARCANTONIO Page 6

**APR**  
**16**  
2015 Arizona Health & Safety Summit  
see ad pg 4

**MAY**  
**14**  
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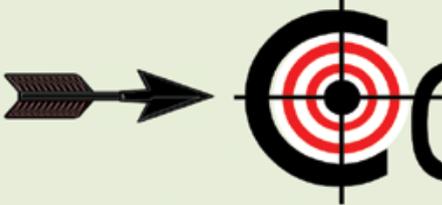
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## FROM THE EDITOR



The first six members of the new Arizona Voluntary Environmental Stewardship Program (VESP) were announced by the Arizona Department of Environmental Quality recently. Members include: PING, Inc., Arizona Public Service's Ocotillo Power Plant in Tempe, eGreen IT Solutions of Phoenix, Integrity Diesel, Integrity Auto Corporation of Tucson, and the Town of Eagar.

The VESP has five levels of recognition – platinum, gold, silver, bronze and copper. VESP will provide recognition and incentives for organizations that “go above and beyond environmental law requirements.” If you are interested in joining, contact ADEQ Ombudsman Ian Bingham at 602-771-4322. Look for more information on VESP in upcoming months in the Journal. Congratulations to these organizations, and hopefully we will see many more added to the list in the coming months and years!

This issue of the Journal begins our 13th year of publication -- and as always, thank you to our advertisers, authors, and readers for continuing to make the Journal possible. If you are interested in advertising, or contributing an article, please contact me at jimthrush@cox.net or at my number below.

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

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## CONTENTS

### ARIZONA

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Volume 13 Number 1

## ARTICLES, DEPARTMENTS, & COLUMNS

- 5 FROM THE EDITOR**
- 6 MILITARY AND ENVIRONMENTAL MANAGEMENT**  
A COMPARATIVE LOOK RICHARD “DREW” MARCANTONIO
- 8 ASSOCIATIONS PAGES**  
ASSOCIATIONS NEWS AND UPCOMING EVENTS
- 9 SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT**  
OPENING THE DISCUSSION AGAIN: RAISING GAS TAXES  
NICHOLAS R. HILD, PHD.
- 11 IT'S ALL ABOUT CHEMISTRY**  
GREEN PLASTICS LARRY OLSON, PHD.
- 12 ARE WE PREPARED?**  
FULL SCALE HAZMAT RESPONSE EXERCISE  
DANNY PETERSON, PHD, ASU
- 14 2015 GATEKEEPER REGULATORY ROUNDUP**  
PHOTO REVIEW.

#### JOURNAL OF ENVIRONMENTAL MANAGEMENT ARIZONA

EDITORIAL *Publisher & Editor:* James Thrush, M.S. Env. Mgr., jimthrush@cox.net or 480-422-4430. SUBSCRIBE: ehshomepage.com or 480-422-4430. RATES FREE to qualified EHS Professionals, others call. MAILING ADDRESS (NEW): JEMA, PO Box 51852, Phoenix, AZ 85076. ADVERTISING 480-422-4430 x42. Published 6 times/year. Copyright ©2013 by JEMA. All rights reserved. LEGAL DISCLAIMER Information presented in JEMA originates from sources presumed to be accurate and complete. Due to the rapidly changing nature of regulations and the law and our reliance on information provided by various sources, we make no warranty or guarantee concerning the accuracy or reliability of the content of JEMA. Readers are encouraged to contact authors, agencies, and advertisers directly for verification/clarification. Content for informational purposes only, and should not be considered legal or professional advice. Consult your legal counsel or environmental consultants for advice. WARNING Serious legal, environmental, and/or safety consequences can result from non-compliance with environmental and safety regulations and standard safety, environmental, and professional practices.

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# MILITARY AND ENVIRONMENTAL MANAGEMENT: A COMPARATIVE LOOK

By Richard “Drew” Marcantonio

**U**SAF Colonel John Boyd, a fighter pilot ‘Ace’ and military strategist, developed a decision-making paradigm called the “OODA Loop”, which stands for **Observe, Orient, Decide, and Act**. This cycle to observe and collect information in an actor’s environment, orient on the decisive or greatest influencing factors, deciding on which and how to counter them, act or implement a strategy, and then observe the results and re-implement a refined strategy accordingly, has been employed from military leadership to business strategists, and has been a preeminent concept in training leaders to execute a rapid decision-making cycle. The idea is to understand and employ this process in a circular manner that outpaces your adversary. For the military this is the opposing enemy force; for an Environmental Manager this can be represented by attempting to actively counter any negative influencing environmental stimuli from non-point source water pollution draining into the Mississippi River to greenhouse gases catalyzing global climate change.

Having recently completed my military service as a Marine Corps Infantry Officer, I am now in the inchoate stages of retraining as an Environmental Manager. Little did I know that while pursuing this

new endeavor I would find so much transitivity between military leadership and environmental management. With new perspective, this really should not have come as a surprise. Both military leaders and environmental managers work in an environment characterized by resource finitude, extremely dynamic systems, against adversaries that threaten the livelihood and health of the impacted party, a complex web of differing values and interests from all parties involved, and with a mission-oriented focus that compels the manager to deliver a maximally effective – if imperfect – outcome.

## PRP

Environmental Managers and military managers alike have standard analytical processes and frameworks with which to frame, investigate, and assess issues. These tools allow managers from differing backgrounds to find common ground from which to begin orienting on an issue. In the remainder of this article I will seek to illuminate correlations and connections between military and environmental management through the environmental planning framework of Program, Resource, and Political Management (PRP).

## PROGRAM MANAGEMENT

Program generation and development, both for military and environmental managers, requires traversing functional and jurisdictional boundaries. For example, a Marine infantry platoon commander must integrate into his planning any adjacent units, supporting units, and higher headquarters units ensuring synchronization and mutual understanding. A failure to appreciate and account for all of these variables can result in mission failure and lives lost. An Environmental Manager must bridge jurisdictional lines when an issue impacts several regulatory bodies’ areas of responsibility (which is the case more often than not), engage and include political and public leadership as well as the populace affected by the issue.

Program management for Environmental Managers includes four key responsibilities: permitting, monitoring, enforcement, and technical assistance, all of which have direct parallels to military management. In permitting, an environmental manager must screen and certify polluting parties to conduct their actions in accordance with established environmental standards, ensuring proper documentation of actions and fulfillment of associated

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mandates. Military managers must permit and empower their subordinates to conduct training, equipment maintenance, administrative upkeep, and various other tasks that require meeting established unit standards and the published Commander's Mission Essential Task List. Once a permit has been issued or person empowered, the manager must monitor the execution of the co-produced plan and supervise those enacting it. Managers on both sides must supervise to ensure critical standards are maintained and that the personnel enacting the intent are making progress toward the desired endstate. The major difference between the two is merely in the event itself (i.e. environmental control vs infantry maneuvers) but the methods of monitoring and quality assurance are very similar.

Another illustration of parallels is in the enforcement of standards. Military managers conduct back-briefs prior to execution and after-action reviews after the fact, as well as occasional direct intervention during execution to maintain standards amid changing circumstances while maintaining effectiveness. Environmental Managers conduct inspections of permitted field work and can audit the paperwork of polluting entities, along with a host of other active and passive enforcement efforts. Finally, both environmental and military managers provide technical assistance to their regulated entities or supervised personnel, respectively, in order to enable them to overcome potential or identified shortfalls and maximize efficiency. Efficiency, then, is a virtue, whether in the optimal distribution and employment of military personnel and firepower, or in the human, financial, and technical resources employed by an environmental manager. Managers bring to bear their own abilities, as well as their discretion to employ outside subject matter experts to train and educate for proficiency, updated standards and technology, and stay ahead of their adversaries' capabilities.

## RESOURCE MANAGEMENT

The next step in our PRP framework is Resource Management. In both worlds resources are often scarce with many competitors vying for them, each believing their own need to be preeminent in importance and immediacy. Effective military managers are required to identify the assets on-hand and those that are potentially available elsewhere in order to begin developing a plan to gain and effectively employ these assets. Whether radio batteries, ammunition, or time in a training area, it is the crafty manager who can best justify his need and plan for efficient, effective usage that is usually granted those resources. The Environmental Manager follows the same process of asset identification and allocation. He/she faces some of the exact same general considerations, such as time and money, and others of a different sort, driven by a difference of mission, such as preventing cyanide leaching in a mining retention pond vs. conducting a 10 kilometer movement-to-contact operation. Environmental and military managers face the same challenges in analyzing their problem, resource matching and utilization for optimal performance, and acquiring resources in a competitive environment and thus must conduct a structured but flexible process to develop a resource management plan.

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**Richard "Drew" Marcantonio** is a dual-Masters degree candidate studying environmental management at the School of Public and Environmental Affairs at Indiana University, and holds a Bachelor of Arts in Geography and the Environment from the University of Texas at Austin. He is a combat veteran who served in the United States Marine Corps as an infantry officer and foreign military advisor. Richard can be reached by email at [rmarcant@indiana.edu](mailto:rmarcant@indiana.edu).

## POLITICAL MANAGEMENT

Political Management is the final step in the PRP framework. "Political" can be big P or little p as it applies to persons of differing titles and positions. For virtually any manager working in or with a human organization, managing people, with their varying personalities, strengths, weaknesses, biases, and potential, is an inherent and essential function that must be primary in priority. Military managers must manage relationships with personnel of various ranks, personalities, and priorities, inside and out of their unit, coupled with issues caused by relatively frequent turnover of those personnel. Significantly, they must build manage relations at their peer level, across supporting and adjacent units, and with their superiors in order to garner support for their plans. Without effective relationship management inefficiency and idle time will reign. Similarly, environmental managers must maintain relationships with varied regulatory agencies in their assigned region ranging from their representatives to the national legislature (big P) to representatives from the state Council on Environmental Quality (little p). Environmental managers deal with internal personnel rotational issues (revolving door: personnel rotating between public and private sector) and leadership rotation (elected officials changing), facing the same issues military managers do. Both types of managers must shape conditions and leverage relationships to ensure their programs gain the support and resources necessary to attain their desired end state.

Whether the issue at hand is a combatant enemy force or a pollution source negatively impacting human health and the environment, the processes to orient on these issues are very similar in kind and require managers with the same attributes: a critical mind to analyze the situation; an understanding of logistics and asset-to-issue pairing; cross-boundary communication and co-production; ability to create buy-in from all stakeholders; and the ability to generate a clearly defined end state with an adaptable plan to achieve it.



# 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.



Education is an important mission for the Arizona Hydrological Society (AHS). Every year, we award three intern scholarships and four academic scholarships to Arizona college students.

The intern scholarships, each with a stipend of \$3,000, are awarded and administered by the three local Chapters of AHS (Phoenix, Tucson, and Flagstaff). Each Intern is required to complete 200 hours of service, typically with three organizations in the local Chapter area, choosing from government, private industry, environmental consulting, and water-resources consulting. The employers provide training that helps prepare the interns for working in their chosen career areas.

The four academic scholarships, awarded at the AHS statewide level, include \$2,000 to one student from each of the three Arizona state universities, and \$1,000 to a student pursuing water-related studies in the Gateway Community College Environmental Science program.

Education is also the focus of our Annual Symposium, held in rotation in Tucson, Flagstaff, and Phoenix. The Symposium includes keynote speakers, technical breakout sessions, short courses, field trips, and many opportunities to network with fellow professionals. Planning is underway for this year's Symposium, September 16-18 in Phoenix. More information is always available at [azhydrosoc.org](http://azhydrosoc.org).



Tom Walker  
Executive  
Director



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Over 50 attendees representing 34 organizations from the Pinal County area participated in the January 21st Air Quality Permit Compliance Assistance Seminar in Casa Grande. Co-hosted by the Alliance and the Pinal County AQ Department, presentations from both county regulators and industry experts addressed permitting, compliance inspections, enforcement procedures, strategic permitting, and several other topics. Speakers included Michael Sundblom (Director, Pinal County AQ Department) Kale Walch (Pinal County AQ), Bob Farrell (Pinal County AQ), Josh Dezeuw (Pinal County AQ), Mitch Klein (Snell & Wilmer), Tim Sturdavanc (Hexcel), Amanda Reeve (Snell & Wilmer), and seminar moderator, Dr. Nick Hild (ASU).

The Alliance is working with Maricopa County Air Quality Department to plan an AQ Permit Compliance Assistance Seminar for facilities in Maricopa County, on July 14th. For more information visit our website at [www.azalliance.org](http://www.azalliance.org) or call our office at 480-422-7392.



Greg Bopp  
Chair



AZ.ASSE.ORG

A few of the diverse agenda topics among the two keynote speeches and a dozen subjects in three different breakout sessions spotlight: emerging issues, risk management, professional development, and CSP/ASP preparation. Specific topics and speakers can be found at the event homepage <http://asseaz.com/>.

Further down the road is the 2015 AZ-ASSE Annual Charity Golf Tournament at McCormick Ranch Golf Club on May 29. Proceeds benefit the AZ ASSE Foundation to fund academic scholarships.

These are in addition to the two monthly regular scheduled events. The first Friday is a luncheon and technical meeting at the GateWay College Copper Room in Phoenix. Then on the second Friday is the Construction Section early morning meeting from 7-8:30 a.m. at the AZ Safety Education Center in Tempe. Recent past topics have seen Darin Perkins explain his role in managing safety systems at the Central Arizona Project, and Ron Arthur with American Contractors Insurance Group (ACIG) talk about Accident Investigation.

Click on Upcoming Events at [az.asse.org](http://az.asse.org) for details on upcoming meetings and their focus.



Wayne  
Carroll  
President



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ARIZONA CHAMBER  
of Commerce and Industry

The Arizona Chamber and Industry and Manufacturer's Council's annual Environmental and Sustainability summit is scheduled for August 13th and 14th at the Prescott Resort 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



HTTP://SOUTH.AZ.ASSE.ORG

The Southern Arizona Chapter of the American Society of Safety Engineers (ASSE) is busy with a mid-term board change due to transfers. However, plans continue for the Spring meetings

and annual awards banquet. The March 17 meeting was on Animal Control and the May meeting is the quarterly joint safety council meeting. Plans are also in the works this year to include the Chapter's Student Section research projects as part of the regular meeting presentations. The regular breakfast and lunch meetings are being held at the Hungry Fox Restaurant in Tucson. The SASC meetings are held at Granite Construction on E. Illinois Street. For more information or If you are in need of OSHA classes, check out our web site's scheduled events - <http://southaz.asse.org/events/>.



John Roads  
Secretary



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ARIZONA CAN'T MEET TRANSPORTATION NEEDS; COULD IMPACT ECONOMIC GROWTH

Arizona needs a strong transportation system to remain economically competitive, but revenues to maintain and expand the system aren't there.

In a recently released Arizona Forward transportation white paper, the study discloses that as important as an efficient transportation system is to the economy, Arizona (and other states) has not been maintaining the dedicated revenue stream required to maintain the existing system or build for future needs.

The transportation system needed to accommodate growth and deliver goods and services in 2035 will cost an estimated \$88.9 billion over the next 25 years – approximately \$3.56 billion a year. Current revenues are projected to provide \$26.2 billion over that time period, or \$1.05 billion a year.

The gap is significant and it's a real concern because not only do transportation design and construction projects create short-term jobs, but a robust transportation infrastructure is key to a region's economic success.

The Arizona Forward study shows how recent polling indicates that Americans understand that delays in maintenance will only increase the eventual cost, much like the damage that can happen if you don't maintain the roof of your house. Additionally, Americans agree that it is our responsibility to build the transportation system that will meet future needs, just as the generation before us did when they created the Interstate highway system.

The complete document, loaded with good information, is available by logging onto [ArizonaForward.org](http://ArizonaForward.org)



Diane Brossart  
President

ASSOCIATION PAGES are continued on page 12

## SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT



Nicholas R. Hild, PhD.

### OPENING THE DISCUSSION AGAIN: RAISING GAS TAXES

We have discussed the topic of gas taxes before but now that gasoline is hovering around two and three bucks a gallon again, it is time to revisit the issue of raising the gas tax. The Federal tax is 18.5 cents a gallon and hasn't changed since 1993. Unfortunately for States, the amount of that federal tax provided to States for highway funds, has declined over the last five years; less and less comes to Arizona for funding highways and transportation infrastructure projects, so it is more than timely that Arizona should open this discussion once again.

Our new governor faces a real budget dilemma in finding ways to pay off the \$1.5 Billion deficit while continuing to provide all the other agencies with funds to operate state programs. And, notwithstanding the fact that one of those agencies is the Department of Transportation (ADOT)-- which continues to find itself on the short end of the funding stick year after year--its more than timely to suggest, once again, that the state raise the tax on a gallon of gas and direct those revenues directly to fund our transportation infrastructure.

According to the American Road and Transportation Builders Association, more than half of the funds used for highways and bridges across the country come from Federal Highway Trust funds--the same funds that have dwindled by 3.5% over the past five years-- and with the economy in free-fall over that same period and the congressional and state legislature's mantra of 'no more new taxes' most states have taken a wait and see approach to highway and bridges maintenance funding. The result is that more than 20% of the nation's bridges are in need of structural repair and almost half of the nation's freeways are in need of resurfacing or replacement. Yet, there is still no unified plans for how to provide the needed funds.

So, gasoline taxes are now, once again, a timely topic! The popular media has been making a big deal of it recently when just as the new year unfolded, OPEC decided to let their oil extraction rates continue to expand so that, eventually, they would be selling their oil so cheap that the U.S. companies that have enjoyed recent revenue from the Balkan fracking fields will have to shut down operations because they won't be able to sell their oil for what it costs to extract it (i.e. estimates are that point is around \$45 per barrel), thereby forcing us to buy more OPEC oil in the future.

Media pundits such as Charles Krauthammer (AZ Republic, 01/11/15) have weighed in (again) on the subject of increasing the gas tax (at the federal level), promoting the idea that the tax shouldn't just be a few more pennies per gallon but rather, let's make it a whole dollar per gallon! His theory is whenever gas prices fall dramatically, the result is that people forget about conserving gas and driving more fuel efficient cars and trucks, and sales of big gas guzzlers ensues until, once again, gas prices rise to a level that forces a change in driving habits. So, Krauthammer proposes to add a buck a gallon to the (federal) tax to keep gas prices at a high enough

level to avert the public's propensity to forget about saving gas. But here is where he goes astray in his ever-voracious campaign against Obama's government (i.e. he blames him for everything, including just a few years ago, Obama's inability to have a policy that would lower gas prices when they approached \$4 a gallon---go figure!).

At the same time he proposes to implement the dollar a gallon "tax", he proposes *not* to give the revenue to the government but rather, to the social security system (SS) while at the same time implement a plan to reduce the amount of individual FICA (income tax going into SS) and offset that with a direct reduction of FICA tax taken out of every paycheck. His reasoning: if the average person burns 12 gallons of gas a week, s/he would pay \$12 a week extra for gas but receive that same \$12 every week in their pay check when their FICA take-out is reduced by \$12. Then, according to Krauthammer, the cash could go directly back into the economy as the pay check gets spent on whatever the wage earner chooses to spend it on.

Under this plan, he says the environment wins--because greenhouse gas is reduced by every driver's efforts to conserve gas; with the buck a gallon tax, still costing a high enough price to promote conservation. The economy wins because the \$12 gets immediately dumped right back into the economy every week, and conservative politics wins because Obama's government doesn't get to direct the "tax" revenues into 'socialistic programs' (his words, not mine), like funding highway transportation infrastructure. But, the loser in this grandiose plan is, highway departments across the U.S., who don't get a dime from the dollar tax!

Gas taxes were first initiated back in the 1920's to help highway departments in all the states utilize 'local' taxpayer/driver monies to pay for roads and infrastructure. Arizona added 18 cents to fund transportation-related projects that the federal taxes didn't take care of. But, that was a long time ago and those 18 pennies per gallon have become sacrosanct: no one in the legislature has even dared to suggest raising the gas tax, even during the few times a democrat sat in the governor's chair. There are reasons for that, although it would be a subject too great for this venue, but suffice it to say, 'no new taxes' has been a platform of every administration since the mid-1980's, and it isn't likely this new one will want to warm to this idea either.

When asked about raising taxes to help balance a flagging budget, newly elected Arizona Governor Doug Ducey' response included the words, "Not on my watch ...." Yes, Governor Ducey's mantra sounded eerily similar to former President Bush's famous words, "read my lips...no new taxes." And we all know how quickly he had

to walk those words back as it became clear that without taxes (and "fees"), there can be no money for government to budget; it

has to come from somewhere lest we continue to leave the debt for future generations while we kick the can a little further down the road.

So, while I am convinced that Krauthammer's plan is total folly---and, in his characteristically far-right-minded ideology, he knows it won't ever fly---the idea that Arizona should increase the gas tax is both timely and appropriate. It is not, however the only way funding could be provided for ADOT to rebuild and maintain our highways and bridges that are in severe need.

Other states have implemented some unique funding policies that might also be considered for Arizona, some that don't involve more new taxes. For instance, Virginia recently repealed its 17.5% state tax on gasoline and replaced it with 3.5% wholesale tax on gasoline because they believe that over the long term, it will supply more dollars for transportation maintenance and upkeep. Minnesota recently proposed keeping its state tax but asking voters to approve adding a wholesale tax of an additional penny per gallon to help bridge the deficit.

Oregon is discussing some type of mileage tax whereby 5000 volunteers would be charged 1.5 cents per mile driven while getting a refund on their gas taxes. It's a concept also being studied in California, Minnesota

*Continued on page 10*

Nicholas R. Hild, PhD., is an Emeritus Professor and Sustainability Scientist in the College of Technology and Innovation and the founder of the Environmental Technology Management program at Arizona State University. Dr. Hild has extensive industrial environmental engineering and management experience as well as continuing to be a consulting environmental engineer for the past 40+ years. Reach him at [www.worldsleadingexpert.com](http://www.worldsleadingexpert.com) or email at [drnick@asu.edu](mailto:drnick@asu.edu).

# HILD: SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT

CONTINUED FROM PG 9

and Nevada that has critics saying there are privacy concerns related to the GPS data that would be used to monitor the mileage of participants.

Then, in February, the State of Iowa announced it had passed legislation to increase the tax on a gallon of gas by 10 cents, coming to the conclusion that it was the only fair way that costs for highways and infrastructure repairs and maintenance could be borne by the very people that use it. They join a dozen other states that are considering bills that will raise gas taxes from a nickel to more than 20 cents a gallon, all because of the apparent lack of congressional enthusiasm for sending more funding to the states for maintenance of the transportation infrastructure across the US.

Of course, there are also private funding schemes that might be considered such as those in existence in states that have toll roads. While toll roads have been discussed in Arizona before (i.e. think: the freeway being considered through Indian lands around South Mountain as an alternate to a publicly funded freeway), it is unlikely there will be support from a conservative legislature and governor for this kind of funding mechanism. And, diverting private funds to pick up the tab for public highway and bridge construction or maintenance is unlikely to be supported by either the legislature or taxpayers in general.

No matter which scheme we come up with (taxes, fees, private investments), finding the funds for fixing our transportation infrastructure makes sense now more than ever, on many levels. First, our State deficit cannot be realistically addressed without understanding that only a minor percentage of the current budget---something less than 40%--- can be tapped to fund the deficit; more than 60% of the budget is earmarked for specific programs and are dollars that cannot be diverted elsewhere even if the Governor wanted to. Second, there is a small matter of a 'debt' of \$300+ Million that the past Governor took from schools funding programs that also need to be repaid---and those are dollars not included in the \$1.5 Billion deficit so it is a serious concern that only adds to the dilemma.

Weighing the pros and cons of the various schemes other states have used, it still seems the best reason to look at adding a tax on gasoline is, it is a 'cost' of equal opportunity for all people who use vehicles that require the state to maintain a transportation infrastructure. Those dollars generated from gas taxes should be directly used to support transportation 'systems' in all its needs, thereby not allowing the legislature to pull school funding or other agency funds away from their intended uses. And, it is the same 'tax' for all: whether or not a driver is rich, poor, employed or unemployed, the tax is the same and the monies are directly used for the maintenance of the transportation system that is supported by taxing fuels that the vehicles use for transportation.

Finally, when I proposed raising the gas tax the last time, it was when gas prices were below \$2 a gallon and I said then that the average driver would not notice the 'extra' twenty or thirty cents of new taxes because the price was fluctuating that much over every month or two anyway. Today, when we have seen rapidly falling prices at the pumps, on a weekly basis, the same argument could be made. (Note: I am aware prices are now fluctuating and actually rebounding somewhat during recent weeks, so bear with me)---even with prices rising a few pennies a week, if we added 30 cents a gallon next week, gas would still be a *relative* bargain at \$2.50 or \$2.75 a gallon and even if it begins to rise faster in the coming months, people will feel like it is just part of the uncertainty we have come to expect from our daily grind. After all, we got used to \$3.75 a gallon gas and we got no tax return to the state except the \$.18 cents we've been getting for 35 years. So, after the initial 'shock' and rhetoric fades, the reality of having millions---that would be Millions, with a capital 'M'---of dollars more coming in for the governor's new budget will easily quiet the naysayers. And, if he uses that windfall to fund ADOT highways and bridges, the state could become the first in the nation to meet the safety standards for our transportation systems that the public requires.

And, what a windfall it would be for the new governor to be able to say that at least one part of our state's budget could be counted on for decades to come. And best of all, it will be a great opportunity for us to be able to show how we have gotten out of a deep hole that we won't be expecting to leave to be paid off by our children's, children's, children.

# ASSOCIATIONS PAGES

CONTINUED FROM PAGE 8



WWW.AWMA-GCS.COM

The Air and Waste Management Association-Grand Canyon Section had our first meeting of the year and social mixer on February 28, at Pizza People Pub, 1326 North Central Avenue in Phoenix. We discussed the last year for our section, ideas for the future, and nominations for board positions for this year.

We are currently in contact with speakers to and have a few things in the works for our program for 2015. We will continue to host "happy hour" mixers at Pizza People Pub on the last Thursday of every month. Please attend and meet your fellow colleagues! All environmental professionals are welcome, regardless of membership in AWMA. The next mixer will be at 5 pm on Thursday, March 26, at Pizza People Pub. Free parking and light rail are nearby. The event is free, but please RSVP to me at [msonenberg@swca.com](mailto:msonenberg@swca.com) so we can have an accurate head count.

Meeting information will be posted on our website and sent to our members when it becomes available. For more information about AWMA-GCS, please visit us at <http://awma-gcs.com>.

Mike Sonenberg, PE  
Chair



WWW.EPAZ.ORG

Thank you to all who participated in our 11<sup>th</sup> Annual Gatekeeper Regulatory Roundup conference. During the conference EPAZ awarded our 2015 Scholarships, so we are happy to announce our winners! Heather Stancl (ASU), Gloria Jimenez (U of A), David Verhelst (ASU), Megan Gladbach (Johnson CC/Prescott CC), Katie Cloud (NAU), Derek Koller (U of A).

### Upcoming Events:

**April 9, 2015** Luncheon will feature Carmen A. Marriott J.D., ETC Compliance Solutions (former Raytheon Attorney) and she will be presenting, 'What's happening around the world with Hazardous Waste? (the good, the bad and the ugly).'

**May 14, 2015** Luncheon. Status Update on the Resolution Copper Project, presented by David Richins, Principal Advisor - Government Affairs, Resolution Copper.

**June 11, 2015** The City of Phoenix's 100 Member PPT - A Recipe for Success in Stormwater, presented by Lisa Farinas, City of Phoenix and Julie Chivington-Buck, CDM Smith.

EPAZ hosts monthly luncheon meetings on the second Thursday of the month from 11:30 AM to 1:00 PM at the SRP PERA Club. For the most up to date information, event details and reservations please visit our website at [www.epaz.org](http://www.epaz.org).

Lisa Culbert  
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Larry Olson, PhD.

## IT'S ALL ABOUT CHEMISTRY

# GREEN PLASTICS

Plastics have changed the world in ways both good and bad. In 1930, Dr. Wallace Carothers of DuPont, invented Neoprene and then shortly thereafter nylon. Around this time polyethylene, polystyrene and other polymers also began to be produced commercially. And the modern world has never been the same.

Humans had been using natural polymers such as natural rubber, horns, and waxes for centuries, but the ability to transform polymers or make new ones had only begun in the 19<sup>th</sup> century with the discovery of vulcanized rubber by Goodyear in 1839 and polyvinyl chloride (PVC) as a white solid inside a flask of vinyl chloride gas that had been exposed to sunlight. But the real revolution in plastics didn't begin until the 20<sup>th</sup> century.

Plastics have unique properties that can be exploited in myriad ways. They can be very strong yet lightweight, chemical and light resistant, useable over a wide range of temperatures, and able to be thermoformed, extruded, and molded. Almost 400 million tons of plastic are produced worldwide each year and converted into textile fibers, automotive parts, medical devices, and packaging. The new Boeing Dreamliner is made from about 50% advanced composite plastics resulting in a weight savings of 20%. Newly developed bioresorbable plastic implants have been used instead of plates, screws or pins to promote bone healing without the need for future surgical removal. The list of new applications is endless.

But there are problems with plastics as well. Almost all plastic is made from oil – and although we seem to be awash in oil these days, it remains a limited and non-renewable resource. Around 7% of global oil and gas feedstocks are used as the components of plastics or to provide the energy to make them. In the U.S. about 6.5% of plastic is recycled every year and 7.7% is combusted in waste to energy facilities. It is hard to recycle plastics because there are so many different chemical compositions. Every hour 2.5 million bottles are thrown away and end up in landfills where even after hundreds of years they may still not be fully degraded.

There is a new approach, however. Polymers can be derived from renewable plant resources such as carbohydrates which yield glucose that can be fermented to produce lactic acid. With the right catalysts, one can make polyactide or PLA, a polymer which has

properties similar to polyethylene or polystyrene. When ready for disposal, PLA can be hydrolyzed back to lactic acid and ultimately to carbon dioxide and water.

Vegetable oils contain triglycerides and the long chain fatty acids can be used as monomers for polymerization reactions. But separating the various naturally occurring triglycerides can be expensive. Genetic engineering has promised new breakthroughs in this area, increasing the concentration of oleic acid to over 92% in sunflower oil. This unsaturated fatty acid can be functionalized by reactions at the carbon-carbon double bond and used to make polyurethanes which are biodegradable.

Bioplastic products on the market now such as bottles, bedding, carpets, and packaging materials are made from renewable feedstocks including corn, potatoes, and rice. Not all bioplastic materials are biodegradable. Some can biodegrade in landfills or composting piles or in aquatic environments. Others require special environments.

The challenge is how to retain all the advantages that we have come to rely upon with plastics while minimizing the environmental damage. Our status quo is really not where we want to be, but there is reason to hope that the future could look very different.



Larry Olson, PhD., Associate Professor, Arizona State University Environmental Technology Management Program. Dr. Olson holds a Ph.D. in Chemistry from the University of Pennsylvania, and is an environmental chemist with interests in remediation technologies and international environmental management. He can be reached at 480-727-1499, or by email at [Larry.Olson@asu.edu](mailto:Larry.Olson@asu.edu).

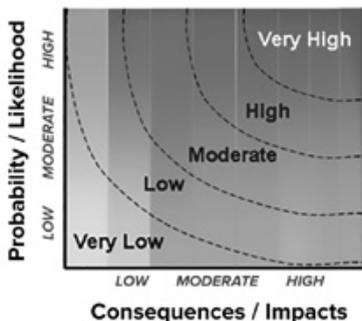
# ARE WE PREPARED?

## CASE STUDY OF A FULL SCALE HAZMAT RESPONSE EXERCISE

By Danny Peterson, PhD

We all like to think that we are prepared for any emergency or disaster that could befall our organization or facilities. We have completed an exhaustive threat and vulnerability analysis. Where possible, we have mitigated the threats we could. We then categorized threats and vulnerabilities so that we could prioritize those risks in accordance with severity and probability.<sup>1</sup>

Intuitively, those risks that have a very high probability and consequence should rise to the top of our preparedness efforts. The question now arises as to exactly what will entail our preparedness efforts?



In the parlance of emergency management, preparedness is a term with a loaded meaning—one that goes beyond common usage. According to the National Response Team (NRT), “Emergency preparedness is a continuous process with three integral functions: planning, training, and exercising.”<sup>2</sup>

Following an exhaustive mitigation of threats and vulnerabilities, we are ready to enter the preparedness phase of emergency management. Not all threats and vulnerabilities can be avoided.

The first step in preparedness is planning, i.e., authoring and publishing a comprehensive emergency operations plan (EOP) or set of plans addressing the actionable threats/vulnerabilities we identified above (see figure 1, Planning Meeting).



The second step is to conduct training so that personnel can safely and effectively complete their duties as spelled out in the EOP (see figure 2, Training on Available Equipment).

The third step is to validate our planning and training efforts. This can be accomplished most effectively through well planned and executed exercises.

The benefits of a strong exercise program are many and varied. The NRT identifies the following as just some of these benefits:<sup>3</sup>

- Readiness for response is increased in the event of an actual emergency
- Procedural and policy gaps are identified.
- Conflicts are revealed.
- Roles and responsibilities are confirmed.
- Resource needs are identified.
- Effectiveness of training is evaluated and additional training needs are identified.
- Modifications and improvements to emergency plans, procedures, and action



Figure 2—Training on equipment that will be available

checklists are identified based upon the lessons learned from the exercise.

- Hazardous materials responders practice working together as a team.
- Public support is likely to increase for the overall emergency management program.

An example of a well planned and executed full-scale exercise was conducted on December 5, 2014 on ASU—Poly, Williams-Gateway campus. The exercise was code named “Wreck and Release” signifying an accident with a resultant release of a hazardous material. The focus of this exercise was on interagency coordination and management of a complex incident. The scenario involved a simulated light aircraft crashing into the Central Receiving building. To enhance realism of the scenario, an actual aircraft fuselage was used (see figure 3—Aircraft Fuselage). This building also stores hazardous and low level nuclear waste.



Figure 3—Aircraft Fuselage

Mesa and Gilbert Fire departments responded and discovered that two occupants of the aircraft had left the scene and self-presented to the Gilbert Emergency Medical Facility. The students were enrolled at Chandler-Gilbert Community College and flying a locally based training airplane owned and operated the University of North Dakota. At about this time, the Polytechnic Emergency Response Team assembled in the Emergency Operations Center to assume command. Upon initial scene characterization, the initial entry team discovered radiological emissions coming from around, and just inside of, the facility loading dock and entry to storage areas (see figure 4—Initial Entry Team).

At this point, the 91st Civil Support Team out of Papago Park responded to assist the local fire departments in characterizing threats and hazards to response personnel. Following this part of the exercise, ASU’s HAZMAT team was called in to mitigate all spills and releases.

The major evaluation nodes of this exercise were as follows:

- Response and interoperability of: Fire with CST/ASU; Emergency Response Team with command at the scene and Airport Authority.
- Airport Authority’s communication with Chandler Gilbert Community College and University of North Dakota (UND) regarding the student pilots.
- Test ASU notification system



Figure 4--Initial entry

- Mitigate possible chemical and radiological spill and release
- Debrief and capture any positive and/or negative findings surrounding the exercise.

Each of these evaluation nodes was thoroughly evaluated. While these areas are specific to this exercise developed to evaluate the planning and training efforts within this organization, the greater picture here is the value and benefits accrued from this experience. The readiness for a disaster such as this or any other, for that matter, has clearly been enhanced. Potential areas for procedures and policy improvements were identified. This was totally anticipated



Figure 5--News media in front of Emergency Operations Center

since this was the first joint effort by this team. Minor conflicts were noted that were easy to solve, mostly around communication. This having been the first major exercise involving the local campus Emergency Response Team, there were understandably new connections that were forged. This led to a solidification of new roles and responsibilities. Significant lessons learned will be case materials for enhancing the existing EOPs. Being a hazmat scenario, local responders were able to meet on the metaphorical battlefield to ensure

Danny Peterson is a Professor of Practice and faculty member in the College of Public Service and Community Solutions, School of Public Administration at the ASU Downtown Campus. He teaches graduate and undergraduate courses including Comprehensive Emergency Management and is an Operations Executive in the ASU Center for Emergency Management and Homeland Security (CEMHS). Dr. Peterson can be reached at 480-727-1100 or by email at DrP@asu.edu.

FOOTNOTES:

- 1 <http://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/mrgnc-mngmnt-pnnng/mrgnc-mngmnt-pnnng-fig04>
- 2 Developing a Hazardous Materials Exercise Program—A Handbook for State and Local Officials. Sept 1990 National Response Team
- 3 Ibid.

the safety of responders and the public alike. Finally, thanks to numerous media teams, this exercise received top visibility in the local news including television (see figures 5 & 6—Media).

The final take away? Many different agencies and jurisdictions worked together, met, and got to know one another—this alone is a big win. Familiarity among responders enhances response effectiveness and efficiency!



Figure 6--Decon with media close at hand

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## 2015 GATEKEEPER REGULATORY ROUNDUP



The Environmental Professionals of Arizona (EPAZ) and the Arizona Emergency Response Commission (AZSERC) co-hosted the 2015 Gatekeeper Regulatory Roundup February 3 - 4. Over 200 environmental professionals attended. The event included networking opportunities, vendor booths, and an extensive list of speakers and presentations, with Keynote speaker Jim Paxon, Arizona Game & Fish, speaking

on "Living With Fire" on Feb. 3, and Nancy J. Selover, Ph.D., State Climatologist, providing an "Update on AZ Drought Conditions and Impacts of Monsoon Flooding in Arizona" on Feb. 4.

For more information on the GRR visit the EPAZ website at [www.epaz.org](http://www.epaz.org).



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### LUNCHEON FEATURING:

Speaker: David Richins, Resolution Copper  
Topic: Status Update on the Resolution Copper Project.  
Location: SRP Pera Club, 1 E. Continental Drive, Tempe, AZ 85281

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