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PREDATORY MUSSELS THREATEN **ARIZONA'S NATURAL WATERS**

BY SHAZIA REHMAN, M.S. PG 9

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WEDNESDAY JUNE 25, 2014 9 AM TO 3 PM

(REGISTRATION BEGINS 8:30 AM) UNIVERSITY CLUB OF PHOENIX 39 EAST MONTE VISTA ROAD PHOENIX AZ 85004

AGENDA

Morning: Dr. Nick Hild, Introductions. MCAQD Presentations on Permitting (MCAQD Staff); Inspections (MCAQD Staff); Enforcement Procedures (MCAQD Staff). Lunch Speaker: TBA. Afternoon: Presentations by Industry Professionals: Matt Conway, PING; Greg Bopp, Honeywell Aerospace, and Attorney Mitch Klein, Polsinelli, on "How to Respond to an Inspection." Check the Alliance website for agenda updates. Bring all your questions with you!

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WHO SHOULD ATTEND? If your facility is a Stationary Source located in MARICOPA COUNTY, PINAL COUNTY, or PIMA COUNTY, or you are a consultant working with a regulated source in one of these areas, this seminar is for YOU! Seminar speakers include professionals with industry experience applicable to your situation, and experienced regulators. See agenda (at bottom, left) or visit our website for more details, or call if you have questions about attending. All are welcome. LUNCH and REFRESHMENTS will be included.

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TOP TEN HAZARDOUS WASTE VIOLATIONS

A LISTING OF THE TOP TEN HAZARDOUS WASTE VIOLATIONS IN ARIZONA.

DATA AND PHOTOGRAPHS PROVIDED COURTESY OF THE ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

hat are the most common hazardous waste related violations cited by the Arizona Department of Environmental Quality? This article outlines the "Top Ten" categories of hazardous waste violations, based on information provided to the Journal courtesy of the ADEQ, and is provided as a brief guide to help you assess your facility compliance and avoid these common errors. If you have questions or need specific assistance, contact your regulatory consultant, or contact the ADEQ. ADEQ offers a variety of compliance assistance (www.azdeq.gov).

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IMPROPER TREATMENT OF HAZARDOUS WASTE



CESQG, SQG, LQG Requirement

- Treatment without a permit
- Improperly managing hazardous waste
- Storing more than the allowed limits

9

WEEKLY INSPECTIONS CHECKLIST

Large Quantity Generators, (LQG)

• Inspect hazardous waste containers and storate areas at least weekly; tanks at least daily. Look for leaks and deterioration caused by corrosion or other factors



- Keep a written inspection log
- Include the following information:
 - inspection date
 - inspector's name and signature
 - remarks or corrections
- Inspection log needs to be kept on site for three years from the date of inspection

8

TRAINING

Small Quantity Generator (SQG) 40 CFR 262.34(d)(5)(iii)

• All employees must be thoroughly familiar with proper waste handling and emergency procedures.

Large Quantity Generator (LQG) 40 CFR § 265.16(a)(1)

- Program of classroom instruction or on-the-job training
- Program must be directed by a person trained in hazardous waste management procedures
- Program for facility personnel must include hazardous waste management procedures and training for emergency situations (contingency plan)
- Initial and annual training records must be kept on site Continued on page 12

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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.



he March luncheon was held at Hotel Tucson. Our speaker was Marie Light, Stormwater Program Manager with Pima County Department of Environmental Quality; she discussed their Stormwater Management Program. Our April meeting will be held at Hotel Tucson on April 30th and feature Diana Liverman with the U of A. She will speak on Climate Change in the Southwest.

SAEMS is proud to announce its 2014-2015 environmental studies scholarship awards for future environmental leaders. The SAEMS Scholarship Committee consisted of: B.J. Cordova of Tucson Clean & Beautiful, Inc.; Nancy Turner of Turner Laboratories; and Kim Stone of Sanofi. The committee recently awarded a total of \$10,500 in scholarships to several University of Arizona students:

- 1st Place Undergraduate Student Scholarship Winner:
- Derek Koller 2nd Place (Tie) Undergrad: Kaitlyn A. Elkind, and
- Taylor Sanders 3rd Place (Tie) Undergrad: Chloe Jackson, and
- Rachel Wehr 1st Place Graduate Student Scholarship Winner:
- Valerie Rountree
- Graduate Student Research, Travel, Training & Project funding: Ling-Yee Huang, Chase Voirin, Christopher Olivares, and Daphne J. Szutu
- Honorable Mention: Emily Pecilunas (Undergraduate); Frank Zadroga (Graduate)

Scholarships are awarded based on both merit and financial need. SAEMS scholarship winners, and Honorable Mention interviewees, are also provided a SAEMS membership to encourage interaction with environmental professionals for continued academic and professional growth.

Do not forget to mark your calendars the Annual SAEMS RCRA seminar will be held May 15 from 0730 to 1630 at the Hilton East. Registration forms are avail-

able online, and on page 3 of this issue. If you are interested in joining SAEMS or attending an upcoming event please visit our website at www.saems.org/.



WWW.AZAEP.ORG

with Gammage & Burnham, who will talk about the development of Arizona's Energy Plan as well as current legal cases involving NEPA.

Call for nominations of Officers: AZAEP is holding its biennial election of officers (President; Vice President; Secretary; Treasurer). Candidates self-nominate by sending their resumes (two-pages or less) to pat.mariella@asu.edu. All nominations must be received by May 23, 2014.

Did you stop receiving our email notices over the past few months? This month, AZAEP changed email services because our previous provider was unable to explain or fix a problem with inadvertently removing a significant number of addresses from our distribution list. We added the names back into our new email service, but if you are still not receiving our announcements



Dawn Weyer President

The AZAEP monthly L meeting on May 27 (Tuesday) will be held at Grimaldi's Restaurant in Scottsdale (6 to 8 p.m.). The speaker will be Michelle DeBlasi, attorney

of meetings and webinars, we encourage you to go to our website (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. AZAEP is the state chapter of the National Association of Environmental (NAEP).





ormed in 1985, Arizona Hydrological Society (AHS) is a nonprofit organization dedicated to advancing hydrology and water resource research, planning, and development. We strive to provide an open forum for professionals to exchange information, while supporting public understanding, education, and training in the science and technology of hydrology and water resources. Visit the AHS web site for additional information and details at www.azhydrosoc.org.

The Phoenix Chapter will be host Frank Corkhill, ADWR, at their May 13th dinner meeting. Frank will discuss ADWR's new online data portal. The Tucson Chapter will also be meeting on Tuesday, May 13, topic to be announced. The Flagstaff Chapter is busy with conference planning; check web site for meeting updates.

The 2014 AIPG/AHS National Conference: Water & Rocks - the Foundation of Life will be September 13-16, 2014, at the Prescott Conference Center and

O'Day

Resort. The Call for Abstracts has gone out! To submit an abstract for a presentation or poster, please go to http:// Christie www.aipg.org/abstract/ to submit an abstract Executive online by June 2, 2014. Director



ARIZONA CHAMBER of Commerce and Industry WWW.AZCHAMBER.COM

the morning summit - which features a trade show and panel discussions on the latest issues concerning Arizona manufacturers - we will host an afternoon luncheon featuring Governor Janice K. Brewer and those in the manufacturing industry that advance the state economy by producing superior products while providing high-quality jobs. Finally as an added treat, the AMC will be hosting its first ever Gubernatorial Candidate Forum. For registration information go to www.azchamber.com. In view of this event, the Environment Committee Breakfast Meeting, gener-

ally scheduled on the second Wednesday of the month, has been cancelled. The next breakfast meeting will be held on Wednesday June 9th at the Sheraton Phoenix Environment Airport Hotel.



2014, the Arizona Manufacturers Council will present its annual signature event - the Manufacturer of the Year Summit & Awards Luncheon. In addition to

n May 14th

Our next meeting will be in July. For more information about AWMA, check out their website at www.awma.org, or the Grand Canyon Section's website at Mike Sonenberg www.awma-gcs.com



ORWARD.ORG

FOR TRANSFORMATION

s the nation's hottest, driest city, most wouldn't Abelieve that Phoenix boasts an impressive 180-mile canal system. That's more miles than Amsterdam and Venice combined, yet we've turned our back on what could be our strongest community asset.

The Valley's waterways are once again gaining recognition and political will is building to make them a centerpiece of community life. We desert dwellers are taking advantage of emerging opportunities to activate and transform our canal system back into an iconic landmark for our region.

There's increased support for Canalscape, an initiative embracing canals as place-makers for gathering, connectivity and recreation. We're rediscovering that our canals can help us achieve the connectivity of Venice, the diversity of Amsterdam and the strong sense of public interaction as in San Antonio.

Students from Brophy, Central High, St. Francis and Xavier recently created art projects illustrating ways to transform their school communities by enhancing the Grand Canal that currently divides their campuses. These

young stewards of the environment realize that canal development is essential for their community's future. Diane Brossart So should all of us! President



AIR & WASTE MANAGEMENT www. AWMA-GCS.COM

he Air and Waste Management Association Grand Canyon Section had our first meeting of the year on January 30, 2014. Our topic for the meeting was to have an update from regulatory agencies on air quality issues in Arizona.

The first speaker was Mr. Ira Domsky from the Maricopa County Air Quality Department, who gave us an update on drivers and issues relating to fine particulate (PM2.5) pollution in the Phoenix metro area. Secondly, Mr. Kale Walch of the Pinal County Air Quality Control District updated us on the West Pinal PM10 and West Central Pinal PM2.5 nonattainment areas

Elections for the 2014 AWMA-GCS board were held by e-mail ballot in February, with the installation of a new chair and vice-chair.

Our second meeting of 2014 was a joint meeting with the Arizona Association of Environmental Professionals, on Tuesday April 22. Colleen McKaughan, EPA Region 9 was our speaker.









ASSOCIATION PAGES

CONTINUED FROM PREVIOUS PAGE



Please congratulate the Gatekeeper Regulatory Roundup conference planning committee led by Nancy Nesky of Gilbane for a job well done. The 10th Annual conference was a great success and we appreciate everyone that participated. One of the conference highlights included the award of \$9,000 in scholarships. Congratulations to our scholarship winners. Speaker's

WWW.EPAZ.ORG

presentations are now posted on the website at www.epaz.org. In Arizona we enjoy beautiful spring time weather before anyone else in the country so what better way to enjoy it than a round of golf that benefits EPAZ's scholarship fund? Our 9th Annual Scholarship Golf Tournament is scheduled for Friday, April 18th at the Foothills Golf Club. Visit www.epaz.org to register

or contact Eddie Martinez at 602.708.9179. Sponsor a hole for only \$195 or get twice the bang for your buck and sponsor a hole and register a foursome for only \$475! Sponsors can contact Karen Walters at 480.815.6732. Our May 8th luncheon meeting will feature a repeat of a presentation that a few

of you missed during the conference. Please join us to learn the latest and greatest regarding ADEQ's Voluntary Remediation Program from Julie Hoskin, VRP Manager.

In June we are coordinating an Air Quality topic featuring the perspective of APS. More details to follow on this very soon. Visit www. epaz.org to register for these events.

EPAZ hosts a monthly luncheon on the second Thursday of the month. Meetings are held from 11:30 AM to 1 PM at the SRP PERA Club. Visit our website to learn of our upcoming topics and to register to attend.





lliance members, guests, ENVIRONMENTAL And several ASU students, toured the Arizona Center for Algae Technology and Innovation (AzCATI) in March. Our host was Dr. Milton Sommerfeld (see photo

below). Our thanks to Dr. Sommerfeld for an impressive presentation and for providing us with a detailed facility tour of the algae research facility.

The Alliance and the Maricopa County Air Quality Department will host the Air Quality Permit Compliance Assistance Seminar in Phoenix on June 25th. If your facility is a stationary source, or you are a consultant working for a regulated source, this seminar is for you! For details, see the advertisement on page 4. For information on the Alliance see our website, Neal Brown or call the Alliance office at 480-422-7392.





JOURNAL OF Environmental Management ARIZONA

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JOURNAL OF Environmental Management ARIZONA

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IT'S ALL ABOUT CHEMISTRY

THE COST OF ENVIRONMENTAL NEGLIGENCE? LARRY OLSON, PHD.

FROM THE EDITOR



fter nearly four decades since the passage of RCRA (the Resource Conservation Land Recovery Act) to regulate the disposal of solid waste and hazardous waste, it is puzzling to consider how frequently significant violations of the regulations still occur. Examples can be found in the Journal's "Newsbriefs" section. In nearly every issue we publish ADEQ or USEPA press releases announcing, for example, a consent agreement, often with a large penalty, on a business for hazardous waste related violations (see,

as an example, this issue page 10, "Allied Tube & Condit to Pay \$130,000 Penalty to Resolve Hazardous Waste Violations in ADEQ's Plating Initiative".) TRAINING

Most businesses, certainly, strive to maintain regulatory compliance--both because it's the law, and for the safety of both their employees and the environment--and a key to maintaining compliance is education and training by skilled environmental professionals. Arizona is fortunate to have a number of highly qualified professionals providing training services--in this issue alone several resources for training are available through our advertisers (please consider contacting one of these if you need this service). **ADEQ COMPLIANCE ASSISTANCE**

ADEQ is a valuable resource for information and compliance assistance. Check their website for information (www.azdeq.gov). Also, see our feature article this issue, the "Top Ten Hazardous Waste Violations" as determined by the Arizona Department of Environmental Quality. Learn from seeing the errors others make--so you don't make the same errors in your facility! Sincerely.

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

JOURNAL OF ENVIRONMENTAL MANAGEMENT ARIZONA JOURNAL OF ENVIRONMENTAL MANAGEMENT ARIZONA EDITORIAL Publisher & Editor; James Thrush, M.S. Env. Mgc., jimthrush@cox.net or 480-422-4430. SUBSCRIBE: chshomepage, com or 480-422-4430. RATES FREE to qualified EHS Professionals, others call. MAILING ADDRESS (NEW): <u>JEMA.PO Box 51852</u>, <u>Phoenix, AZ 55076</u>, ADVERTISING 480-422-4430 v42. *Published 6 inmolyan: Copyright ©2013 by [EMA, PO Box 51852*, <u>Phoenix, AZ 55076</u>, ADVERTISING 480-422-4430 v42. *Published 6 inmolyan: Copyright ©2013 by [EMA, AII right rearved*, 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 warrany or guarantee concerning the accuracy or reliability of the content of JEMA. Readers are encouraged to contact authors, agencies, and advertisen directify for verification charification. Content for informational purposes only, and should not be considered legal or professional advice. Consult your legal consult on environmental and vice. WARNING Serious Legal, environmental, and/or safery consequences can result from non-compliance with environmental and safety regulations and standard safety, environmental, and professional practices.

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COVER PHOTO: HAZARDOUS WASTE DRUM STORAGE AREA. SEE RELATED ARTICLE ON PAGE 5.



SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT

Nicholas R. Hild, PhD.

PLAYING THAT FUNKY MUSIC INCREASES SOLAR CELL EFFICIENCY

It has been interesting to follow the evolution of the solar power industry over the years going back to the late 1970's when a Motorola subsidiary called Solavolt built the first solar cell R & D and manufacturing facility in Arizona. I was a Semiconductor Division Environmental Operations and Compliance Manager at Motorola at that time and was asked to be a part of the research team that was tasked with the responsibility of building solar cells that were based on spin-off semiconductor technology---using silicon substrates (and other III-V materials) and finding ways to maximize the cell's power output while minimizing their cost.

The goal was to make solar power a viable alternative technology that could be cost-competitive with fossil fueled power-it was a time before anyone even thought about reducing our global environmental (carbon) footprint and we felt like young turks on the cusp of a world changing event---we just knew we could make solar power a cost-competitive technology if we could just apply our collective semiconductor knowledge to the task! But, alas, it was not to be, at least, not at that time.

But, read on...The federal government provided research funding for several companies to see what could be done to make solar power viable and competitive so we conducted our research, wrote and published our many technical results in papers in refereed journals and at conferences at the Jet Propulsion Lab in Pasadena and Brookhaven Labs on Long Island, where the government contracts were administered. Thus, my job as the environmental research group director for Solavolt, was to find chemicals that were less toxic and cheaper and, wherever possible, to eliminate the chemicals altogether that were used in the processing of the silicon circuits that produced PV electricity from the arrays that were built.

Together with Solavolt engineers who experimented with 'dry etch' processing in those days, our efforts did, in fact, make a small dent in our goal, in the few years before funding dried up and Solavolt closed up shop. But those efficiency gains were measured in very small increments, a few percent over several years of tweaking processes and reducing energy and chemicals use. So, imagine my surprise when I saw the recent news that researchers at Queen Mary University in London had made an efficiency jump of 40% in solar cell efficiency by making cells with nano materials made of zinc oxide instead of the III-V materials most PV cells have traditionally been made of. And, they were made with laser printers, not with power-hungry polysilicon manufacturing facilities---a technology not even on Bill Gates' radar back in 1978!

What is even more amazing is, their efforts to enhance the power production efficiency of solar cells utilizing high pitched sounds which stimulates those little nano rods to produce more PV electricity! Talk about a quantum leap (no pun intended) in power production!

Study results were first published in the journal Advanced Materials (11/6/13) in a paper titled, "Acoustic Enhancement of Polymer/ZnO Nanorod Photovoltaic Device Performance" co-authored by researchers Safa Shoaee, Joe Briscoe, James R Durrant and Steve Dunn. But, to me, the most interesting results of their study is that high frequencies and pitches found in pop and rock music cause vibrations that enhance energy generation in solar cells that contain clusters of those tiny zinc oxide 'nanorods,' resulting in the increased efficiency of the power output of laser-printed solar cells!

Instead of crystal-grown III-V material substrates, the researchers grew billions of tiny nanorods, made from zinc oxide, then covered them with an active polymer to form the solar cell. Then, by focusing enhanced sound vibrations on the the zinc oxide materials in the nanorod clusters, the researchers were able to show that sound levels as low as 75 decibels could significantly improve solar cell performance. But, they noted that the higher pitches and sounds found in pop and rock music seemed to enhance the production of electricity the most.

Dr. Dunn, who was the Project Manager for the study noted that... "after investigating systems for converting vibrations into electricity this is a really exciting development that shows a similar set of physical properties can also enhance the performance of a photovoltaic...the key for us was not only that the random fluctuations from the sound didn't cancel each other out, but also that some frequencies of sound seemed really to amplify the solar cell output - so that the increase in power was a remarkably big effect considering how little sound energy we put in."

Realizing that different sound levels would require more research, they turned their efforts to playing music instead of dull flat sounds because that helped them to explore the effect of different pitches on electrical output. The biggest difference they measured was when they played pop music rather than classical, which they came to realize was because the acoustic solar cells responded best to the higher pitched sounds present in pop music.

There is no mention of how the "music" can be a part of solar panel installations or whether or not there is research being conducted on how all that high pitched music will be tolerated by the neighbors. But, imagine what iTunes and other internet music providers are telling their marketing teams right now: we can provide a plethora of music selections that are high pitched and guaranteed to increase the efficiency of solar panels if you just tell us exactly what decibel levels you need and the best pitch for those acoustics and we will deliver that 24/7 (well, at least during the hours of sunshine time).

Which leaves us with a critical question: if playing loud music makes future solar cells generate more electricity, will it have a positive or negative impact on the lives of our children's, children?

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 or email at drnick@asu.edu.



PREDATORY MUSSELS THREATEN ARIZONA'S NATURAL WATERS; NEW LAW PROVIDES PROTECTION

by Shazia Rehman, M.S.

Arizona's "Don't Move a Mussel Law", enacted in 2009, oversees protection of natural waters from predatory mussels thought to have arrived in the US on European shipping vessels, spreading from the eastern Great Lakes to the western seaboard. These predatory mussels threaten Arizona's natural waters. Potential damage from these mussels includes pollution of shoreline with shells, reduction in fisheries and disruption of the food chain due to scarce resources of plankton and nutrients in freshwater. Overpopulation of quagga mussels can potentially create an ecological shift.

On a larger scale the impacts of invasive quagga mussel have damaged infrastructure, "...clogging water intake structures, such as pipes and screens, thereby impacting pumping capabilities for power and water treatment plants." In the mid-west, millions of dollars have been spent to repair damage created by quagga mussels (www.azgfd.gov).

In early 2007, the quagga mussel (dreissena bugensis) and the zebra mussel (dreissena polymorpha) were detected at Lake Mead (www.azgfd.net). The quagga mussel is distinctive, with a stripe or zig-zag shape on the outer shell. According to the Arizona Game and Fishing Department, "a single adult quagga mussel can produce up to one million larvae in a single year" (www.azgfd.net). The quagga mussel is a filter feeder, utilizing cilia and an internal siphon to draw water in and to filter algae and phytoplankton as a food source. These mussels colonize quickly on any hard surface or wet substrate, creating problems for boaters. The mussel clings to the wet surface of the boat motor, rudder, propellor, anchor, etc. through strong filaments known as "byssus" or more commonly, the "beard".

INVASIVE

The quagga and zebra mussels have dispersed to other water bodies through watercraft and other human-related water activities. To protect the environment, Arizona law gives authority to the Arizona Game and Fish Department to enforce safe practices to reduce invasive mussels and other invasive aquatic species provided in the Arizona's Aquatic Invasive Species (AIS) Interdiction Act (HB2157), 2009. Previously, boaters were voluntarily utilizing the clean, drain, and dry method for cleaning watercraft after boating in waters infested with quagga mussels.

In July 2013, Director's Orders were passed by Arizona Legislature, regulating practices of boaters, and establishing the "CLEAN-DRAIN-CLEAN-DRY" procedure as mandatory practice for decontaminating water boats and controlling infestation. The measures were authorized by the Aquatic Invasive Species Interdiction Act (HB2157). Below are the highlights of the requirements:

SINGLE DAY BOATERS

Single day boaters are required to follow four steps before leaving the vicinity of a water officially listed as having quagga and/or zebra mussels:

CLEAN

Remove any clinging material such as plants... and mud from anchor, boat, motor and trailer

DRAIN

Remove the plug... and drain the water from the bilge, live-well, and... other compartments that could hold water. Drain water from the engine and engine cooling systems

DRY

Ensure watercraft, vehicle, equipment, or conveyance are allowed to dry completely

WAIT 5 DAYS

Before launching your watercraft... wait at least five days – this waiting period is essential to kill residual larvae...

Reference: www.azgfd.net

LONG TERM BOATERS

Control procedures for long-term boaters include decontamination protocols:

1. Remove any clinging material such as plants, animals and mud from anchor, boat, motor, equipment and trailer (CLEAN). 2. Remove the plug (if applicable) and drain the water from the bilge, live-well, and any other compartments that could hold water. Drain water from the engine ...(DRAIN).

3. Physically remove all visible attached mussels from boat surfaces, motors, impellers, outdrives, rudders, anchors and through-hull fittings (CLEAN, again).

4. Flush engine and cooling system and any other throughhull fittings with hot water that is exiting those areas at 140 F for 10 to 30 seconds.

5. Keep the boat out of water (DRY) and ensure all areas of the boat are dry, including bilge, through-hull fittings and engine, for a minimum of eighteen (18) consecutive days during the months of November through April and seven (7) consecutive days from May through October (azgfd.net, 2014).

The new regulations and the CLEAN-DRAIN-DRY method will help ensure safe and consistent practices by boaters and fisherman. Also, the regulations will safeguard Arizona waters and assist in curtailing dispersal of invasive quagga mussels.

To learn more about the Director's Orders, visit the AZ Game and Fish website: www.azgfd.gov/mussels.

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NEWS BRIEFS

ALLIED TUBE & CONDUIT TO PAY \$130,000 PENALTY TO RESOLVE HAZARDOUSE WASTE VIOLATIONS IN ADEQ'S PLATING INITIATIVE

✤ Arizona Department of Environmental Quality officials announced recently that Allied Tube & Conduit Corp. will pay a \$130,000 penalty as part of a consent judgment entered in Maricopa County Superior Court for hazardous waste violations at its Phoenix facility.

Allied Tube and Conduit, located at 2525 N. 27th Ave., was cited for a total of 15 violations, including nine different violations of storing hazardous waste without a permit. ADEQ inspectors found standing liquid and yellowish-brown staining on the concrete beneath the hexavalent chromium plating tank and broken fluorescent lamps on the ground in the hazardous materials area.

Allied manufactures fence and mechanical tubing, sprinkler pipe, metal building studs and metal engineered trusses.

"Their unlawful management of hazardous waste put employees and the environment at risk but they were very cooperative with our staff in reaching a resolution in the case," ADEQ Director Henry Darwin said.

The settlement with Allied brings to 13 the number of electroplating facilities in Arizona brought into compliance with hazardous waste rules through enforcement proceedings under ADEQ's "Plating Initiative."

ADEQ launched the plating initiative in 2008 after facility inspections beginning in 2004 determined that many facilities were not in compliance with the Arizona Hazardous Waste Act, which regulates hazardous waste in the state.

ARIZONA STATE UNIVERSITY AWARDED \$5 MILLION IN FEDERAL FUNDS TO BETTER UNDERSTAND IMPACTS OF NANOMATERIALS

The U.S. Environmental Protection Agency announced recently a \$5 million research grant to Arizona State University to better understand the impacts of nanomaterials throughout their life cycle—from design, manufacture, use and disposal.

"While nanomaterials have shown great potential in electronics, medicine and other fields, we still know relatively little about their effects on human health and the environment," said Jared Blumenfeld, EPA's Regional Administrator for the Pacific Southwest. "ASU's research will help minimize these risks and enable the design of safer products."

"Nanomaterials provide clear benefits for many products, but there remains a big knowledge gap about how, or if, nanomaterials are released from consumer products into the environment as they move through their life cycles," said Paul Westerhoff, Associate Dean of Research for ASU's Ira A. Fulton Schools of Engineering and Professor in the School of Sustainable Engineering and the Built Environment. "We hope to help industry make sure that the kinds of products that engineered nanomaterials enable them to create are safe for the environment"

Arizona State University's research will evaluate the trade-offs between using nanomaterials to improve the functionality of consumer products and the potential risks to humans and the environment. The research proposed will address the knowledge gaps that prevent the safe development of nano-enabled products, and has the potential to improve design and processes of products with nanomaterials. Nanomaterials by definition are less than approximately 100 nanometers, too small to be seen with the naked eye or even with conventional lab microscopes.

Materials engineered to such a small scale are often referred to as engineered nanomaterials (ENMs), which can take on unique optical, magnetic, electrical, and other properties

The University of California, Santa Barbara also received \$4.9 million to develop an online tool to evaluate life cycle impacts of chemicals which industry, academia and other decision makers can use to make more informed decisions about chemical and product design.

In September 2012, EPA partnered with the National Science Foundation (NSF) to encourage collaboration in applying principles of sustainability to chemical management issues, including design, manufacture, use, and disposal. In 2013, NSF awarded more than \$16 million in grants to Yale University, University of Kansas, University of Arizona and Colorado State University for research on sustainable molecular design of chemical alternatives. These grant awards further EPA's and NSF's commitment to increase knowledge of chemical life cycles and sustainable chemistry.

U.S. GOVERNMENT ANNOUNCES \$1 BILLION FOR ABANDONED URANIUM MINE CLEAN UP ON THE NAVAJO NATION

✤ A settlement was announced recently by the U.S. Environmental Protection Agency and the U.S. Department of Justice secured approximately \$1 billion in funds to cleanup 10 percent of abandoned uranium mines on the Navajo Nation.

The funds, going to both the EPA and the Navajo Nation, will be used to clean up contamination, which includes radioactive waste near communities, resulting from approximately 50 uranium mines that were operated by Kerr McGee during the Cold War.

"The painful legacy of abandoned uranium mines on the Navajo Nation is one big step closer to being remedied through today's historic \$1 billion settlement," said Jared Blumenfeld EPA's Regional Administrator for the Pacific Southwest. "Working together with our partners at Navajo EPA, we will be able to clean up 50 uranium mines throughout the reservation."

The settlement requires Anadarko and Kerr McGee to pay a total of \$5.15 billion to resolve fraudulent conveyance claims based on allegations that the defendants sought to evade their liability for environmental contamination at toxic sites around the country. Of this total, approximately \$4.4 billion will be used for environmental cleanup. This is the largest amount of money ever awarded in a bankruptcyrelated settlement for environmental cleanup.

NOTE: See related column, page 11, "It's All About Chemistry"



Larry Olson, PhD.

IT'S ALL ABOUT CHEMISTRY

THE COST OF ENVIRONMENTAL NEGLIGENCE

Recent headlines announced one of the largest settlements in history for actions related to environmental negligence. Anadarko Petroleum Corp agreed on April 3, 2014 to pay \$5.15 billion to settle claims related to environmental pollution originally caused by Kerr-McGee Corporation, a company that Anadarko acquired in 2006.

But the story is more complicated than that. Prior to the purchase by Anadarko, Kerr-McGee had spun off one of its units, Tronox, which produced titanium dioxide pigments, and transferred all of Kerr-McGee's chemical business and the liability for decades of pollution in more than 20 states to the newly independent company. Shortly thereafter, the remaining oil and gas assets of Kerr-McGee were purchased for \$18 billion in cash and assumption of debt by Anadarko. It didn't take long for Tronox to sink under the mounting costs of trying to deal with Kerr-McGee's environmental legacy and it declared bankruptcy in 2009.

Tronox sued Anadarko and Kerr-McGee claiming that they could not evade their responsibilities for cleaning up polluted sites through a fraudulent transfer of liabilities. Tronox was allowed to emerge from bankruptcy in 2011 by assigning its interests to a litigation trust that represented the Department of Justice, EPA, 11 states, the Navajo Nation and other entities. In December 2013, a federal judge declared that Anadarko and Kerr-McGee were liable for environmental cleanup costs estimated to be between \$5.1 and \$14 billion. The settlement was finalized at \$5.15 billion in April, the largest amount for an environmental clean-up in history. Deputy Attorney General James Cole said that Kerr-McGee "tried to shed its responsibility for this environmental damage and stick the United States taxpayers with the huge cleanup bill" and U.S. Attorney Preet Bharara called Kerr-McGee's actions a "corporate shell game."

Among the largest settlements are for two sites that affect Arizona. The Navajo Nation will receive approximately \$1 billion to cleanup abandoned Kerr-McGee uranium mines in the Lukachukai Mountains and Ambrosia Lake area dating back to 1952 and a uranium disposal cell in Shiprock, New Mexico. An additional \$1+ billion will go to clean up the BMI site in Henderson, Nevada that has been contaminated with hexavalent chrome and perchlorates that have affected groundwater, Lake Mead and the Colorado River.

The Anadarko case is only the most recent example of the huge costs of environmental negligence. British Petroleum was hit with the largest criminal fine in U.S. history, \$4.5 billion, for its part in the Deepwater Horizon blowout in 2010. But litigation is ongoing and the company now estimates it could be liable for as much as \$42 billion in fines and liability. Another huge criminal fine, \$110 million for environmental violations, was assessed to Walmart in 2013 for disposing of pesticides returned by customers into public sewers and landfills. In March of 2014, Alpha Natural Resources, the nation's second largest coal producer, was fined \$27.5 million for "egregious violations of the nation's Clean Water Act" involving discharge from washing and treating coal directly into surface waters. ANR also agreed to spend \$200 million to upgrade wastewater treatment systems.

The list could continue for many different industries, across all the states. The details may differ, but more often than not, once all the facts are in, we look back at a case and say "what were you thinking?" This is one area where the proverb "an ounce of prevention is worth a pound of cure" certainly holds true.

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.

TOP TEN HAZARDOUS WASTE VIOLATIONS CONTINUED FROM PAGE 5



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EMERGENCY COORDINATOR / CONTINGENCY PLAN

SQG 40 CFR § 262.34(d)(5)(i)

- At all times there must be at least one employee either on the premises or on call with the responsibility for coordination of all emergency response measures.
- The emergency coordinator or designee must respond to any emergencies that arise (fire, spill, surface water contamination)
- Required emergency information must be posted next to telephones

LQG 40 CFR § 265.55

- At all times there must be at least one employee either on the premises or on call with the responsibility for coordination all emergency response measures.
- The emergency coordinator must be thoroughly familiar with all aspects of the facility's contingency plan, all operations and activities at the facility, the location and characteristics of waste handled, the location of all records, and facility layout. The emergency coordinator must have the authority to commit the resources needed to carry out the contingency plan.
- The contingency plan must include up-to-date contact information for all persons eligible to be an emergency coordinator (listed by primary). Information must include: Name, Phone number (office and home), Address.

6

UNIVERSAL WASTE STORAGE ISSUES

SQG & LQG requirement



5

EMERGENCY EQUIPMENT

SQG & LQG requirement

- 40 CFR 265 Subpart C: The facility must be equiped with the required emergency equipment and maintained to minimize possibility of fire, explosion, or release. Emergency equipment includes:
 - Internal communications or alarm system
 - Telephone or walkie-talkies capable of summoning emergency
 - assistance from local emergency authorities
 - Portable fire extinguishers, spill control equipment, and decontamination equipment



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- Water at adequate volume and pressure to supply water or sprinklers or water spray systems

- Adequate aisle spacing
- "No Smoking" sign

4

PROPERLY LABELING AND DATING

SQG & LQG requirement



- Marked with the words "Hazardous Waste"
- Dated with the accumulation start date



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CESQG, SQG, LQG requirement



2

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OPEN CONTAINERS OF HAZARDOUS WASTE

SQG, LQG requirement

• Must be closed, except when actively adding or removing waste



Continued on page 14

TOP TEN HAZARDOUS WASTE VIOLATIONS CONTINUED FROM PAGE 13

1

FAILURE TO PERFORM A WASTE DETERMINATION

*CESQG, SQG, LQG requirement*Must be kept on file and updated accordingly



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NEWS BRIEFS CONTINUED FROM PAGE 10

EPA ISSUES 2012 TOXIC RELEASE INVENTORY DATA FOR PACIFIC SOUTHWEST REGION

✤ Nationally, total releases of toxic chemicals decreased 12 percent from 2011-2012, according to the U.S. Environmental Protection Agency's (EPA) annual Toxics Release Inventory (TRI) report and Pacific Southwest state fact sheets published recently. "Our yearly analysis of chemicals being used by industry helps residents understand which chemicals are used in their neighborhoods," said Jared Blumenfeld, EPA's Regional Administrator for the Pacific Southwest. "This year we have enhanced our fact sheet system to aid in getting TRI information about specific locations."

New for this year is an updated fact sheet system that allows users to explore customized data. Scroll down at the link www.epa.gov/tri to enter your zip code, city, or county, and the new tool will create a fact sheet to show you toxic releases near you.

The annual TRI report provides citizens with critical information about their communities. The TRI Program collects data on certain toxic chemical releases to the air, water, and land, as well as information on waste management and pollution prevention activities by facilities across the country.

The TRI data reports are submitted annually to EPA, states, and tribes



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by facilities in industry sectors such as manufacturing, metal mining, electric utilities, and commercial hazardous waste. Many of the releases from facilities that are subject to TRI reporting are regulated under other EPA program requirements designed to limit harm to human health and the environment.

A total of 257Arizona facilities reported a total of 86 million pounds of toxic chemical releases during 2012. Arizona's total reported on-site and off-site releases decreased when compared to 2011 data. Highlights of data from 2012 in Arizona show that since 2011:

- · Air: Air releases decreased 22 percent
- · On-Site Land: On-site land releases decreased 13 percent
- · Underground Injection: Underground Injection releases did not change
- Water: Water releases did not change
- \cdot Off-Site Transfers: Off-site Transfers increased 68 percent

The annual data is from the EPA's Toxics Release Inventory, one of the EPA's largest publicly available databases. The chemical information in the inventory is calculated by industrial facilities and reported to the EPA. Total releases include toxic chemicals discharged by facilities to air, water, land, and underground, and the amount transferred off-site for disposal. Pollution controls apply to many of the reported releases. Reporting facilities must comply with environmental standards set by local, state and federal agencies.



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