REGIONAL WATER QUALITY NEWSLETTER

DATE: Report for December 2008
Sampling conducted December 2 2008

From the Phoenix, Tempe, Glendale, Peoria, CAP, SRP – ASU Regional Water Quality Partnership

http://enpub.fulton.asu.edu/pwest/tasteandodor.htm

DISTRIBUTION: ACTarvers@FTMCDOWELL.ORG; mary.reker@phoenix.gov; knghiem@csaei.com; Kandis.Knight@asu.edu; gary_moore@tempe.gov; sandra_dewittie@tempe.gov; kspooner@citlink.net; bardizzone@carollo.com; wtrask@mwdh2o.com; jnafsey@mwdh2o.com; JJWilliams@GLENDALEAZ.com; raghunatha.komaragiri@phoenix.gov; mxerxis@scottsdaleaz.gov; mnguyen@ndep.nv.gov; RussellGRhodes@MissouriState.edu; paul.kinshella@phoenix.gov; brian.fayle@phoenix.gov; paul.zelenka@phoenix.gov; patricia.puryear@phoenix.gov; Wontae.Lee@hdrinc.com; kjacobs@ag.arizona.edu; k.kruger@asu.edu; addotson@gmail.com; Hye.Moon@asu.edu; Pedram.Shafieian@asu.edu; Daisuke.Minakata@asu.edu; Billt@gilbert.az.us; paul.mally@phoenix.gov; Braden.Allenby@asu.edu; Rittmann@asu.edu; Jeffrey.Stuck@amwater.com; nina.miller@amwater.com; wayne.janis@asu.edu; jim.holway@asu.edu; gober@asu.edu; rscott@glendaleaz.com; safischer@fs.fed.us; aimee.conroy@phoenix.gov; alan.martindale@cityofmesa.org; alice.brawley-chesworth@phoenix.gov; allison.shepherd@phoenix.gov; AGhosh@PIRNIE.COM; antoniot@ci.gilbert.az.us; anupa.jain@ci.chandler.az.us; arrw716@earthlink.net; awirtz@fs.fed.us; bakerenv@earthlink.net; bardizzone@carollo.com; bhenning@cap-az.com; btalabi@scottsdaleaz.gov; bkmoorhe@srpnet.com; BobCarlson@scwater.com; bonnie.smith@phoenix.gov; Bradley_fuller@tempe.gov; brian.fayle@phoenix.gov; brian.k.watson@phoenix.gov; carl.meyer@phoenix.gov; carlos.padilla@phoenix.gov; cseidel@dswa.net; Charolotte.Jones@cityofmesa.org; chennemann@carollo.com; chris.rounseville@phoenix.gov; Chris_Kincaid/COC@ci.chandler.az.us; christenson.kara@epa.gov; CityofMesaWTP@compuserve.com; cwilson@scottsdaleaz.gov; D'Ann.O'Bannon@phoenix.gov; diwanski@goodyearaz.gov; davev@peoriaaz.com; dempster@asu.edu; dlopez@fs.fed.us; dorothyo@peoriaaz.com; drcrosby@cap-az.com; dwalker@Ag.arizona.edu; dxprigge@srpnet.com; edna.bienz@phoenix.gov; erin.pysell@phoenix.gov; mario_esparza_soto@hotmail.com; francisco.gonzalez@phoenix.gov; frank.blanco@phoenix.gov; gjloomis@fs.fed.us; GMaseeh@PIRNIE.COM; Gregg.Elliott@srpnet.com; goelliot@srpnet.com; grant_osburn@tempe.gov; Greg.Ramon@Phoenix.Gov; gtday@amwater.com; GThelin@carollo.com; guy.carpenter@hdrinc.com; hugiang@asu.edu; Jackie.Strong@ci.chandler.az.us; jdoller@carollo.com; jeffrey.van.hoy@phoenix.gov; jennifer.calles@phoenix.gov; jjwilliams@glendaleaz.com; JohnRK@PeoriaAz.Com; josh_berdeaux@msn.com; kremmel@ci.glendale.az.us; Larry.Duffy@ci.chandler.az.us; laxman.devkota@phoenix.gov; Linda.Bezy-Botma@peoriaaz.gov; Lori.mccallum@ci.chandler.az.us; lroberts@buckeyeaz.gov; luis.manriquez@phoenix.gov; Marisa.Masles@asu.edu; mark.roye@phoenix.gov; matthew.rexing@cityofmesa.org; maureen.hymel@phoenix.gov; mdehaan@dswa.net; Mdew1@mail.ci.tucson.az.us; mhelton@scottsdaleaz.gov; Michael_Bershad@tempe.gov; Milton.Sommerfeld@asu.edu; matt.palenica@phoenix.gov; MURPHYSP@wattsind.com; nancy.milan@ci.chandler.az.us; nicholas.silides@cityofmesa.org; nicoleta.buliga@phoenix.gov; ANUNEZ@SCOTTSDALEAZ.GOV; paul.burchfield@phoenix.gov; paulwestcott@appliedbiochemists.com; pdent@cap-az.com; pfenner@fs.fed.us; Randy.Gottler@phoenix.gov; raymond.schultz@phoenix.gov; robert.hollander@phoenix.gov; robert.goff@ci.chandler.az.us; robert_eck@ci.mesa.az.us; ron.jennings@phoenix.gov; rsgooch@srpnet.com; rscott@glendaleaz.com; rcarpenter@glendaleaz.com; sgrendahl@SCOTTSDALEAZ.GOV; shan.miller@phoenix.gov; sherman_mccutcheon@tempe.gov; SRot@ci.glendale.az.us; srottas@cap-az.com; sacquafredda@dswa.net; steven.schoen@phoenix.gov; susan.potter@phoenix.gov; tara_ford@tempe.gov; terrance.piekarz@phoenix.gov; tgillogly@carollo.com; THockett@GLENDALEAZ.com; thomas.martin@phoenix.gov; thomasdempster@hotmail.com; tjeffer1@ci.tucson.az.us; tkacerek@cap-az.com; tom.doyle@phoenix.gov; Tom_Hartman@tempe.gov; troy.hayes@phoenix.gov; Victoria.Sharp@ci.chandler.az.us; vlee@carollo.com; waerma@bv.com; walid.alsmadi@phoenix.gov; warrens@sqm-inc.com; wendy.chambers@ci.chandler.az.us; wes.cannon@ci.chandler.az.us; wes.taylor@phoenix.gov; wtaylor@mwdh2o.com; William.Hughes@cityofmesa.org; swilson@scottsdaleaz.gov; YoungIl.Kim@asu.edu; yu.chu.hsu@phoenix.gov; LindaW@PeoriaAz.Com; Yongsheng.Chen@asu.edu; keli@asu.edu; jcritt@asu.edu; uiyer@glendaleaz.com; Michael.Helton@amwater.com; Kim.Caggiano@cityofmesa.org; Keith.Greenberg@amwater.com; harry.brown@AMwater.com; mnguyen@ndep.nv.gov; bzachman@dswa.net; hdurbin@dswa.net; Tony.Mardam@ch2m.com; paul.zelenka@phoenix.gov; agrochowski@cap-az.com; bradley_fuller@tempe.gov; JBryck@PIRNIE.COM; Susanne.Neuer@asu.edu; Mohan.Seetharam@asu.edu; Chao-An.Chiu@asu.edu; susan.michael@peoriaaz.gov; tammy.perkins@phoenix.gov; Michael.Kennedy@cityofmesa.org; ZChowdhury@PIRNIE.COM; Shari.Lange@phoenix.gov; nmegonnell@calgoncarbon-us.com; Cynthia.Bain@peoriaaz.gov; Ryan.Rhoades@CH2M.com; jim.kudlinski@srpnet.com; Gambatese.Jason@epamail.epa.gov; charolotte.jones@phoenix.gov

If you wish to receive the *Newsletter* and are not on our list, send your email address to Dr. Paul Westerhoff (p.westerhoff@asu.edu) get a free "subscription".

SUMMARY: EVALUATION AND RECOMMENDATIONS

1. MIB and Geosmin levels are below 10 ng/L at all WTPs.
2. Major WTPs on the SRP South Canal are off-line
3. TOC levels in most finished waters are below 2 mg/L. This is in part due to the low TOC of the surface water, which is primarily from the Verde River at this time of year.
4. EDC/PPCP sampling data from October 2008 continues to show very low levels in our water supply relative to finished drinking water, and other national studies.
5. Three sources of information are provided on EDCs. A federal meeting on EDC toxicity. A USGS perspective in a AP story that contrasts with the interpretations of a new AwwaRF report on EDC/PPCP toxicity (this is very good report that should be purchased) – a brief summary is provided here.

Table 1

SRP/CAP OPERATIONS - Values in cfs, for December 2, 2008

System	SRP Diversions	CAP
Arizona Canal	395	0
South Canal	0	0
Pumping	139	0
Total	534	0

- **SRP is releasing water from both Verde and Salt River Systems**. Salt River release from Saguaro Lake: 8cfs; Verde River release from Bartlett Lake: 492 cfs.

Table 2 - Water Treatment Plants – December 2, 2008

Sample Description	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
24th Street WTP Inlet	**<2.0**	**5.4**	**5.9**
24th Street WTP Treated	**<2.0**	**<2.0**	**3.3**
Deer Valley Inlet	**3.8**	**5.3**	**3.7**
Deer Valley WTP Treated	**<2.0**	**3.0**	**3.3**
Val Vista Inlet			
Val Vista WTP Treated –East			
Val Vista WTP Treated -West			
Union Hills Inlet	**<2.0**	**<2.0**	**<2.0**
Union Hills Treated	**<2.0**	**<2.0**	**<2.0**
Tempe North Inlet	**2.7**	**5.8**	**7.4**
Tempe North Plant Treated	**3.6**	**5.9**	**4.9**
Tempe South WTP			
Tempe South Plant Treated			
Greenway WTP Inlet	**2.2**	**8.1**	**<2.0**
Greenway WTP Treated	**<2.0**	**4.4**	**<2.0**
Glendale WTP Inlet	**3.3**	**6.0**	**5.5**
Glendale WTP Treated	**<2.0**	**<2.0**	**<2.0**
Glendale WTP Treated (Lab)			

Table 3 - Canal Sampling – December 2, 2008

System	Sample Description	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
CAP	Waddell Canal	**8.5**	**<2.0**	**<2.0**
	Union Hills Inlet	**<2.0**	**<2.0**	**<2.0**
	CAP Canal at Cross-connect			
AZ Canal	Salt River @ Blue Pt Bridge			
	Verde River @ Beeline	**<2.0**	**<2.0**	**<2.0**
	AZ Canal above CAP Cross-connect	**2.7**	**<2.0**	**<2.0**
	AZ Canal below CAP Cross-connect	**2.5**	**2.2**	**2.4**
	AZ Canal at Highway 87	**3.7**	**3.3**	**<2.0**
	AZ Canal at Pima Rd.	**2.4**	**5.1**	**3.2**
	AZ Canal at 56th St.	**4.3**	**6.2**	**3.2**
	AZ Canal - Inlet to 24th Street WTP	**<2.0**	**5.4**	**5.9**
	AZ Canal - Central Avenue	**3.3**	**5.6**	**5.2**
	AZ Canal - Inlet to Deer Valley WTP	**3.8**	**5.3**	**3.7**
	AZ Canal - Inlet to Glendale WTP	**3.3**	**6.0**	**5.5**

Table 4 - Reservoir Samples – December 2, 2008

Sample Description	Location	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
Lake Pleasant (Nov08)	Eplimnion	**12.0**	**<2.0**	**<2.0**
Lake Pleasant (Nov08)	Hypolimnio	**8.1**	**<2.0**	**<2.0**
Verde River @ Beeline		**<2.0**	**<2.0**	**<2.0**
Bartlett Reservoir	Epilimnion	**<2.0**	**<2.0**	**<2.0**
Bartlett Reservoir	Epi-near dock	**<2.0**	**<2.0**	**<2.0**
Bartlett Reservoir	Hypolimnio	**<2.0**	**<2.0**	**4.9**
Salt River @ BluePt Bridge				
Saguaro Lake	Epilimnion	**3.3**	**3.3**	**6.2**
Saguaro Lake	Epi - Duplicate	**3.3**	**2.9**	**2.9**
Saguaro Lake	Epi-near doc	**4.6**	**4.2**	**7.0**
Saguaro Lake	Hypolimnio	**5.1**	**2.3**	**6.9**
Havasu (Nov08)		**<2.0**	**3.3**	**<2.0**

Table 5 - Water Treatment Plants – December 02, 2008

Sample Description	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-m)	TDN	DOC removal (%)
24th Street WTP Inlet	2.55	0.066	2.61	0.45	
24th Street WTP Treated	1.73	0.030	1.74	0.43	32
Deer Valley Inlet	2.55	0.063	2.46	0.46	
Deer Valley WTP Treated	1.84	0.030	1.65	0.45	28
Val Vista Inlet					
Val Vista WTP Treated –East					
Val Vista WTP Treated -West					
Union Hills Inlet	2.62	0.040	1.51	0.57	
Union Hills Treated	2.07	0.021	1.02	0.51	21
Tempe North Inlet	2.54	0.066	2.61	0.49	
Tempe North Plant Treated	1.99	0.039	1.97	0.43	22
Tempe South WTP					
Tempe South Plant Treated					
Greenway WTP Inlet	2.61	0.065	2.49	0.37	
Greenway WTP Treated	1.96	0.018	0.92	1.56	25
Glendale WTP Inlet	2.56	0.066	2.58	0.46	
Glendale WTP Treated	1.21	0.016	1.31	1.24	53

DOC = Dissolved organic carbon
UV254 = ultraviolet absorbance at 254 nm (an indicator of aromatic carbon content)
SUVA = UV254/DOC
TDN = Total dissolved nitrogen (mgN/L)

Table 6 - Organics in Canal Systems

Sample Description	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-m)	TDN
Waddell Canal	3.09	0.048	1.54	0.45
Union Hills Inlet	2.62	0.040	1.51	0.57
CAP Canal at Cross-connect				
Salt River @ Blue Pt Bridge				
Verde River @ Beeline	2.60	0.073	2.79	0.35
AZ Canal above CAP Cross-connect	2.69	0.077	2.86	0.42
AZ Canal below CAP Cross-connect	2.71	0.075	2.77	0.43
AZ Canal at Highway 87	2.67	0.077	2.89	0.43
AZ Canal at Pima Rd.	2.61	0.072	2.75	0.37
AZ Canal at 56th St.	2.51	0.067	2.68	0.48
AZ Canal - Inlet to 24th Street WTP	2.55	0.066	2.61	0.45
AZ Canal - Central Avenue	2.44	0.066	2.71	0.47
AZ Canal - Inlet to Deer Valley WTP	2.55	0.063	2.46	0.46
AZ Canal - Inlet to Glendale WTP	2.56	0.066	2.58	0.46
AZ Canal - Inlet to Greenway WTP	2.61	0.065	2.49	0.37

Table 7 - Reservoir Samples – December 02, 2008

Sample Description	Location	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-m)	TDN
Lake Pleasant	Eplimnion				
Lake Pleasant	Hypolimnion				
Verde River @ Beeline		2.60	0.073	2.79	0.35
Bartlett Reservoir	Epilimnion	3.18	0.079	2.50	0.34
Bartlett Reservoir	Epi-near dock				
Bartlett Reservoir	Hypolimnion	3.17	0.079	2.50	0.37
Salt River @ BluePt Bridge					
Saguaro Lake	Epilimnion	4.99	0.113	2.26	0.64
Saguaro Lake	Epi - Duplicate	4.92	0.113	2.29	0.63
Saguaro Lake	Epi-near doc				
Saguaro Lake	Hypolimnion	4.94	0.112	2.26	0.58
Verde River at Tangle					
Havasu					

EDC/PPCP Data from October 2008 Sampling

Sample Name	Acetaminophen	Caffeine	Carbamazepine	Cotinine	DEET	Diazepam	Fluoxetine	Hydrocodone	Meprobamate	Pentoxifylline	Primidone	Oxybenzone
Lab Blank	0.00	0.00	0.37	0.00	2.90	0.59	0.94	0.00	0.00	0.00	0.00	5.45
Field Blank	0.39	1.74	0.42	0.00	2.69	0.54	0.86	0.00	0.00	0.38	0.00	3.68
WTP Influent	0.00	2.59	1.85	0.00	7.70	0.00	0.83	0.00	0.00	0.00	1.04	3.20
WTP post sedimentation	0.00	1.00	0.36	0.52	2.58	0.00	0.83	0.00	0.00	0.00	0.00	3.76
WTP post chlorination	0.00	2.08	0.40	0.56	3.08	0.00	0.84	0.00	0.00	0.27	1.12	4.74
Waddel Canal	0.37	10.20	4.60	2.56	16.90	0.00	0.00	0.00	2.34	0.00	0.00	7.98
Blue Point Bridge	0.00	7.16	0.84	0.00	18.80	0.60	0.00	0.00	0.00	0.00	0.00	18.90
Blue Point Bridge- Duplicate	0.00	7.67	0.70	1.29	20.80	0.65	0.00	0.00	0.00	0.00	0.00	21.00
Verde River at Beeling highway	0.00	2.77	1.17	0.00	13.10	0.00	0.00	0.00	0.00	0.00	0.00	4.73
WWTP influent	123000.00	56400.00	1250.00	1230.00	2460.00	6.07	26.40	17.60	598.00	11.80	42.20	1150.00
WWTP effluent before UV	0.00	34.70	1010.00	2.32	231.00	5.08	4.49	48.70	330.00	0.00	153.00	21.80
WWTP effluent before UV - Dup	0.00	32.90	888.00	2.71	234.00	6.16	4.78	50.20	383.00	6.81	176.00	24.00
WWTP effluent after UV	17.30	40.90	867.00	6.63	195.00	5.63	4.72	51.30	450.00	7.00	147.00	21.80

Sample Name	Sulfamethoxazole	Erythromycin	Trimethoprim	Ibuprofen	Naproxen	Dilantin	Triclosan	Diclofenac	TBBA	Sucralose
Lab Blank	0.00	0.37	0.90	1.82	0.00	0.00	0.00	0.00	1.36	1.19
Field Blank	0.00	0.00	0.91	0.97	0.00	0.71	0.00	0.00	0.00	0.00
WTP Influent	1.37	0.33	1.83	0.00	0.41	4.17	1.93	0.00	4.05	108.00
WTP post sedimentation	0.26	0.35	1.34	0.00	0.00	0.00	0.17	0.00	0.00	26.40
WTP post chlorination	0.00	0.34	1.05	5.01	0.00	0.00	1.24	0.00	0.00	19.90
Waddel Canal	3.84	0.00	2.31	0.00	0.00	5.00	0.42	0.00	0.00	278.00
Blue Point Bridge	0.25	0.00	4.07	0.00	0.00	4.86	1.92	0.00	0.00	47.90
Blue Point Bridge- Duplicate	0.00	0.00	4.09	0.00	0.19	0.00	0.32	0.00	0.00	30.50
Verde River at Beeling highway	1.29	0.00	3.03	0.00	0.00	0.00	0.67	0.00	0.00	88.70
WWTP influent	1890.00	59.80	3220.00	22400.00	7690.00	952.00	5400.00	1300.00	0.00	38600.00
WWTP effluent before UV	2050.00	205.00	523.00	0.00	11.70	467.00	31.30	189.00	0.00	14600.00
WWTP effluent before UV - Dup	2190.00	213.00	592.00	16.70	10.40	439.00	45.00	205.00	0.00	12000.00
WWTP effluent after UV	1430.00	266.00	497.00	10.40	13.40	335.00	28.90	61.10	0.00	7620.00

Sample Name	Estradiol		Ethynyl Estradiol	Testosterone		Progesterone	
Lab Blank	0.00		0.00	0.01		0.10	
Field Blank	0.00		0.00	0.03		0.00	
WTP Influent	0.00		0.27	0.03		0.00	
WTP post sedimentation	0.00		0.00	0.02		0.10	
WTP post chlorination	0.00		0.06	0.03		0.00	
Waddel Canal	4.52		0.00	0.04		0.09	
Blue Point Bridge	0.00		0.11	0.04		0.18	
Blue Point Bridge- Duplicate	0.00		0.22	0.03		0.20	
Verde River at Beeling highway	0.00		0.00	0.18		0.12	
WWTP influent	119.00		19.20	65.90		9.30	
WWTP effluent before UV	0.55		0.35	0.14		0.10	
WWTP effluent before UV - Dup	0.00		0.66	0.08		0.10	
WWTP effluent after UV	0.00		0.19	0.02		0.14	

Values highlighted in color indicate values higher than previously noted (pink) and an example of a compound that is well removed/transformed during water treatment (yellow).

http://dels.nas.edu/best/risk_analysis/workshops.shtml

Board on Environmental Studies and Toxicology

NATIONAL RESEARCH COUNCIL
SIXTH WORKSHOP OF THE STANDING COMMITTEE ON
RISK ANALYSIS ISSUES AND REVIEWS
CHARACTERIZING THE POTENTIAL HUMAN TOXICITY FROM LOW DOSES OF PHARMACEUTICALS IN DRINKING WATER: ARE NEW RISK ASSESSMENT METHODS OR APPROACHES REQUIRED?
Public Meeting: December 11-12, 2008
National Academy of Sciences
2101 Constitution Avenue, NW
Lecture Room
Washington, DC 20418
PUBLIC AGENDA – December 11, 2008

9:00 Introduction and Purpose of the Workshop Bernard Goldstein, Committee Chair
9:05 Overview of EPA's Goals for the Workshop Peter Preuss, Director National Center for Environmental Assessment, EPA
Suzanne Rudzinski, Deputy Director
Office of Science and Technology, EPA
9:15 Overview of Workshop Format and Issues to be Discussed Joyce Tsuji
Committee

THE FDA REVIEW PROCESS FOR PHARMACEUTICALS

9:20 Considerations Regarding Drug Approval Process at FDA Raanan Bloom
Center for Drug Evaluation and Research, FDA

Charles Eirkson, III
Center for Veterinary Medicine, FDA

EXPOSURE TO PHARMACEUTICALS IN DRINKING WATER

10:00 What's in Our Water? Rolf Halden

Arizona State University

10:40 ***BREAK***

ARE PHARMACEUTICALS DIFFERENT FROM OTHER ENVIRONMENTAL CONTAMINANTS

10:50 What Makes Pharmaceuticals Potentially Different? David Cragin
Merck

WHAT DATA ARE POTENTIALLY AVAILABLE ON PHARMACEUTICALS

11:30 Are Pharmaceuticals Data-Rich Compounds? Roger Meyerhoff
Lilly Research Laboratories

12:00 The Value of Human Clinical Studies for Risk Assessment Philip Guzelian
University of Colorado

12:30 ***LUNCH BREAK***

1:30 ***PANEL DISCUSSION*** *– [Speakers, Committee Members, and Invited Panelists (Edmund Crouch, Cambridge Environmental, Inc.; Ronald Hines, Medical College of Wisconsin; Edward Sargent, University of Medicine and Dentistry of New Jersey and EV Sargent LLC; Rick Schnellmann, Medical University of South Carolina; Lauren Zeise, California EPA). Questions to be addressed include the following: Are drug safety databases adequate for chronic, low-dose exposure assessments? Are data available that allow us to use chemical-specific data rather than general defaults that we typically rely on for other environmental contaminants?]*

RISK ASSESSMENT OF PHARMACEUTICALS

2:15 Risk Assessment Practices at EPA Peter Preuss, Director
National Center for Environmental Assessment

2:35 Issues in Identifying Margins of Exposure for Pharmaceuticals in Joe Rodricks
Drinking Water and in Evaluating their Adequacy ENVIRON

3:15 Possible Roles of Pharmacokinetic and Pharmacodynamic Data in Harvey Clewell
Evaluating Margins of Exposure The Hamner Institutes for Health Sciences

3:55 ***BREAK***

4:15 **PANEL DISCUSSION** *– [Speakers, Committee Members, and Invited Panelists (Edmund Crouch, Cambridge Environmental, Inc.; Ronald Hines, Medical College of Wisconsin; Edward Sargent, University of Medicine and Dentistry of New Jersey and EV Sargent LLC; Rick Schnellmann, Medical University of South Carolina; Lauren Zeise, California EPA). Questions to be addressed include the following: What point of departure is most appropriate for quantifying potential hazard from exposure to low doses of pharmaceuticals? How can the likely more extensive pharmacologic information on pharmaceuticals be used to evaluate potential effects at low doses? Does the application of uncertainty factors, particularly for potentially sensitive populations, differ for pharmaceuticals? What factors would make the application different? Can the pharmacologic data be used to develop pharmacokinetic models to evaluate the impact of metabolic enzyme polymorphisms and other interindividual differences at low doses? How best do we characterize the potential for adverse effects in the general population—including groups sensitive because of age, gender, genetics, or other factors—from chronic low doses of pharmaceuticals and their breakdown or metabolic products?]*

5:15 Public Comment

5:30 ***ADJOURN PUBLIC SESSION***

PUBLIC SESSION – DECEMBER 12, 2008

INTERNATIONAL PERSPECTIVE

9:00 European Perspective on Risk Assessment of Pharmaceuticals Hans Sanderson
National Environmental Research Institute of Denmark

SINGLE CHEMICAL VS CUMULATIVE RISK ASSESSMENT

9:30 Considerations for Single Chemical vs Mixture Risk Assessment Christopher Borgert
Applied Pharmacology and Toxicology, Inc.,
University of Florida

DATA GAPS AND CHALLENGES

10:00 EPA's Perspective on Data Gaps and Challenges Hal Zenick
Director, National Health and Environmental Effects Research Laboratory

10:30 **PANEL DISCUSSION** – *[Speakers, Committee Members, and Invited Panelists (Edmund Crouch, Cambridge Environmental, Inc.; Ronald Hines, Medical College of Wisconsin; Edward Sargent, University of Medicine and Dentistry of New Jersey and EV Sargent LLC; Rick Schnellmann, Medical University of South Carolina; Lauren Zeise, California EPA). Questions to summarize discussion at workshop and to focus on overall approach to pharmaceuticals and distinguish how pharmaceuticals are different from other environmental chemicals and whether standard risk assessment practices would need to be modified. Such questions would include the following: Does the pharmacologic activity of a pharmaceutical inherently change assumptions about how to assess human risk from low-dose exposures? As one moves from a single-chemical risk assessment to a multi-chemical risk assessment, what are the key questions to ask to focus the assessment? What are the potential approaches for evaluating the combined effect of pharmaceuticals?]*

11:30 Public Comment

12:00 ***ADJOURN WORKSHOP***

Drinking Water

U.S. Geological Survey Study Detects Organic Chemical Mixes in Drinking Water

The U.S. Geological Survey (USGS) said Dec. 5 that an alphabet soup of organic compounds from pesticides to fragrances that it detected in some public drinking water sources may eventually require new standards to protect human health and new treatment technologies to remove them.

Up to 45 compounds were found in some samples, Greg Delzer, the USGS scientist who led the research from 2002 and 2005, said at a briefing. Some of the compounds found in the study conducted under the National Water Quality Assessment Program are neither regulated nor monitored under the federal Safe Drinking Water Act.

The study, Man-Made Organic Compounds in Source Water of Nine Water Systems that Withdraw from Streams, 2002-2005, found chemicals such as pesticides, gasoline hydrocarbons, personal care and domestic-use products, water disinfection products, and manufacturing additives, Delzer noted.

Pesticides Common in Samples.

The chemicals most commonly found in source water samples were chloroform, a by-product of water treatment; the herbicides atrazine and simazine; deethylatrazine, a compound that results from atrazine's breakdown in the environment; and the fragrance HHCB, used in numerous household and personal products such as perfumes, laundry detergents, cleaners, and air fresheners, he said.

Researchers also found more than 75 percent of the samples from both water sources and treated drinking water contained five or more of the same chemicals, he said.

According to the study , the combined toxicity of the chemicals may be greater than that of any single contaminant in the mix.

“Continued research is needed because human-health benchmarks are based on toxicity for individual compounds,” it said. The effects of mixtures of compounds at low levels “are not well understood,” the study noted. The research did not look at implications to ecosystems or aquatic health, according to USGS.

Chemical Concentrations Were Low.

Delzer said 95 percent of the 134 compounds detected were individually at concentrations lower than 1 part per billion (ppb). Delzer likened 1 ppb to “one thimbleful of water in an Olympic-sized pool.”

About half of the chemicals were found both in samples of source water—raw water at the intake of public systems—and treated water in the systems, the study said. The agency tested water in Colorado, Georgia, Indiana, Maryland, Massachusetts, Nevada, North Carolina, Oregon, and Texas.

The study said the findings could be used, for example, to develop source-water protection strategies and toxicity information for unregulated compounds.

The study's findings are preliminary, Tim Miller, chief of the USGS Office of Water, told BNA Dec. 5. “We'd like to get closer to [sampling] 25 or 30 surface water locations,” he said.

The study also noted that these low-level detections do not necessarily raise a human health concern but indicate what types of chemicals are found in different areas of the country. Recent scientific advances have enabled researchers to detect a variety of contaminants at low concentrations—up to 1,000 times lower than drinking-water standards and other human-health benchmarks, it said.

Levels Vary With Seasons.

Concentrations of the contaminants may vary with seasons, depending on factors such as when pesticides are applied to crops, the study said, while wastewater discharges may be a relatively constant source of chemicals such as chloroform and HHCB.

“Probably the majority of compounds were not detected on a regular basis,” Miller said.

The study also noted that some of the compounds have been monitored for source and treated water for only a short time, and “continued research is needed to better understand the sources, transport mechanisms, fate in the environment and possible effects” on ecology and human health.

The briefing was sponsored by the Environmental and Energy Study Institute, formed by a group of Congress members in 1984 to conduct studies and make policy recommendations.

By Bill Pritchard

The USGS study Man-Made Organic Compounds in Source Water of Nine Water Systems that Withdraw from Streams, 2002-2005 is available at http://pubs.usgs.gov/fs/2008/3094/pdf/fs2008-3094.pdf.

A new report has arrived from AwwaRF, “Toxicological Relevance of EDCs and Pharmaceuticals in Drinking Water” project 3085/91238 has been published.

Toxicological Relevance of EDCs and Pharmaceuticals in Drinking Water

This has did some excellent research on EDC/PPCPs. They calculated a Minimum margin of safety (MOS) based upon maximum occurrence of EDC/PPCPs in finished drinking water. MOS values >100 has a low level of concern for developmental effects, for example

- Meprobamate: MOS = 6,000
- Sulfamethoxazole: MOS = 6,000,000
- Diazapam: MOS = 110,000
- Fluoxetine: MOS = 41,000
- Atenolol: MOS = 2,700
- Bisphenol A: MOS = 72,000
- Nonylphenol: MOS = 16,000

The report includes a nice summary of estrogenicity response in biological screening. All drinking waters had EEq values < 1 ng/L. In contrast EEq values for coffee and vegetable juice were 1-3 ng/L and 11-17 ng/L, respectively. Beer had EEq values of 0.8 to 140 ng/L. Soy based

products had very high estrogenicity: soy sauce (28-510 ng/L), soy baby formula (1500-1900 ng/L) and soy milk (1900-4200 ng/L).

The report concludes “The evaluation of toxicological relevance provided here indicates that, although some pharmaceuticals and potential EDCs were detected in U.S. drinking waters, there is no evidence of human health risk from consumption of these waters.”

They have a very good list of recommendations for utilities. I highly suggest utilities get this report.