Summary of Nominations for the Third Contaminant Candidate List

Office of Water (4607M)
EPA 815-R-09-011
August 2009
www.epa.gov/safewater

Table of Contents

Table of Exhibits

List of Acronyms and Abbreviations

ARS	Alternate Crops and Systems (ARS)
ATSDR	Agency for Toxic Substances and Disease Registry
CADW	Canadian Drinking Water Quality
CAS RN	Chemical Abstract Service Registry Number
CCL	Contaminant Candidate List
CCL 3	EPA's third Contaminant Candidate List
CCOHS	Canadian Center for Occupational Health and Safety
CCRIS	Chemical Carcinogenesis Research Information System
CDC	Centers for Disease Control and Prevention
CDPR	California Department of Pesticide Regulation
CEDI/ADI	Cumulative Estimated Daily Intake/Acceptable Daily Intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CESARS	Chemical Evaluation Search and Retrieval System
CICADs	Concise International Chemical Assessment Documents
CPH	Classification of Pesticides by Hazard
CUS/IUR	Chemical update system/inventory update rule
DSSTox	Distributed Structure Searchable Toxicity Public Database Network
EAFUS	Everything Added to Food in the United States
EFDB	Environmental Fate Databases
EMAP	Environmental Monitoring and Assessment Program
EPA	United States Environmental Protection Agency
FAO	Food and Agriculture Organization
FDA	United States Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
GAP	Genetic Activity Profiles

GRAS	Generally Regarded As Safe
HA	Health Advisories
HEAST	Health Effects Assessment Summary Tables
HEDS	Human Exposure Database System
HPV	High Production Volume
HSDB	Hazardous Substances Data Bank
IARC	International Agency for Research on Cancer
ICR	Information Collection Rule
ILO	International Labor Organization
IPCS	International Programme on Chemical Safety
IRIS	Integrated Risk Information System
IRPTC	International Register of Potentially Toxic Chemicals
ITER	International Toxicity Estimates for Risk
JECFA	Joint Expert Committee on Food Additives
JMPR	Joint Meeting On Pesticide Residues
LCSS	Laboratory Chemical Safety Summaries
MPR	Maximum Permissible Risk
MRL	Minimal risk levels (from ATSDR); or, Minimum reporting level, for analytical data
N	Number of samples
NAS	National Academies of Sciences
NAWQA	National water quality assessment (USGS program)
NCEA	National Center for Environment Assessment
NCFAP	National Center for Food and Agricultural Policy
NCOD	National contaminant occurrence database
NDWAC	National Drinking Water Advisory Council
NHANES	National Health and Nutrition Examination Survey (CDC)
NHATS	National Human Adipose Tissue Survey
NIOSH	National Institute for Occupational Safety and Health
NIRS	National Inorganic and Radionuclide Survey

NLM	National Library of Medicine
NOES	National Occupational Exposure Survey
NREC	National Reconnaissance of Emerging Contaminants
NRC	National Research Council
NSF	National Sanitary Foundation
NSI	National Sediment Inventory
NTP	National Toxicology Program
OECD	Organization for Economic Co-operation and Development
OEHHA	California Office of Environmental Health Hazard Assessment
OPP	Office of Pesticide Programs
OPPT	Office of Pollution Prevention and Toxics
PAFA	Priority-based Assessment of Food Additives
PAN	Pesticide Action Network
PBT	Persistent, Bioaccumulative, and Toxic Profiler
PCBs	Polychlorinated biphenyls
PCCL	Preliminary Contaminant Candidate List
PCS	Permit Compliance System
PDP	Pesticide Data Program
PEAC	Palm Top Emergency Action for Chemicals
PELs	Permissible Exposure Limits
PPIS	Pesticide Product Information System
PPMP	Pesticide pilot monitoring program
RAIS	Risk Assessment Information System
REDDs	Reregistration Eligibility Decision Documents
RTECS	Registry of Toxic Effects of Chemical Substances
SCLP	Superfund Contract Laboratory Program
SDWIS	Safe Drinking Water Information System
SIDS	Screening Information Data Sets
SRC	Syracuse Research Corporation
SRD	Source Ranking Database

SRS	Substances Registry System
STORET	STOrage and RETrieval
TEAM	Total Exposure Assessment Methodology Study
TERA	Toxicology Excellence in Risk Assessment
TOPKAT	The Open Practical Knowledge Acquisition Toolkit
TRI	Toxics Release Inventory
TSCA	Toxic Substances Control Act
TSCATS	Toxic Substances Control Act Test Submissions
UCM	Unregulated contaminant monitoring
UCMR	Unregulated Contaminant Monitoring Regulation
UCMR 1	First Unregulated Contaminant Monitoring Regulation
UCMR 2	Second Unregulated Contaminant Monitoring Regulation
UNEP	United Nations Environment Programme
URCIS	Unregulated Contaminant Information System
US	United States of America
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WERF	Water Environment Research Foundation
WHO	World Health Organization

1.0 Introduction

Every five years the United States Environmental Protection Agency (EPA) is required to publish a list of contaminants (1) that are currently unregulated, (2) that are known or anticipated to occur in public water systems, and (3) which may require regulations under the Safe Drinking Water Act (SDWA). This list is known as the Contaminant Candidate List or CCL. SDWA section 1412(b)(1) requires that in the development of the CCL, EPA consider specific data sources and include the scientific community. EPA must evaluate substances identified in section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and substances registered as pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). SDWA also requires the Agency to consider the National Contaminant Occurrence Database established under section 1445(g) of SDWA. SDWA directs the Agency to consult with the scientific community, including the Science Advisory Board (SAB). In addition, it directs the Agency to consider the health effects and occurrence information for unregulated contaminants to identify those contaminants that present the greatest public health concern related to exposure from drinking water.

EPA interprets the criterion that contaminants are known or anticipated to occur in public water systems broadly. In evaluating this criterion, EPA considers not only public water system monitoring data, but also data on concentrations in ambient surface and ground waters, releases to the environment (e.g., Toxics Release Inventory), and production. While such data may not establish conclusively that contaminants are known to occur in public water systems, EPA believes these data are sufficient to anticipate that contaminants may occur in public water systems and support their inclusion on the CCL. The Agency considered adverse health effects that may pose a greater risk to life stages and other sensitive groups which represent a meaningful portion of the population. Adverse health effects associated with infants, children, pregnant women, the elderly, and individuals with a history of serious illness were evaluated. In selecting contaminants for the CCL 3, each of the above requirements was met.

SDWA section 1412(b)(1) also requires EPA to determine whether to regulate at least five contaminants from the CCL every five years. SDWA specifies that EPA shall regulate a contaminant if the Administrator determines that:

- The contaminant may have an adverse effect on the health of persons;
- The contaminant is known to occur, or there is a substantial likelihood that the contaminant will occur in public water systems with a frequency and at levels of public health concern; and
- In the sole judgment of the Administrator, regulation of such contaminant presents a meaningful opportunity for health risk reduction for persons served by public water systems.

Once contaminants have been placed on the CCL, EPA identifies if there are any additional data needs or if there are sufficient information to make a regulatory determination. EPA interprets these criteria for regulatory determination as more rigorous than what is used to place contaminants on the CCL.

EPA developed a multi-step approach to select contaminants for the third CCL (CCL 3), which includes the following key steps:

(1) The identification of a broad universe of potential drinking water contaminants (CCL 3 Universe);

(2) A screening process that uses straightforward screening criteria, based on a contaminant's potential to occur in public water systems and thereby pose a potential public health concern, to narrow the universe of contaminants to a Preliminary-CCL (PCCL); and

(3) A structured classification process (e.g., a prototype classification algorithm model) that objectively compares data and information as a tool and is evaluated along with expert judgment to develop a CCL from the PCCL.

Steps 1, 2, and 3 in the process are described in other support documents: *Final CCL 3 Chemicals: Identifying the Universe* (USEPA, 2009a); *Final CCL 3 Chemicals: Screening to a PCCL* (USEPA, 2009b), and *Final Contaminant Candidate List 3 Chemicals: Classification of the PCCL to the CCL* (USEPA, 2009c)

As part of the process to develop the third Contaminant Candidate List (CCL 3) EPA published a Federal Register notice (71 *FR* 60704 (USEPA, 2006)) requesting the public to submit nominations for chemical and microbial contaminants that should be considered for CCL 3. This document describes EPA's request for contaminant nominations, summarizes the nominations received by EPA, describes EPA's analysis of the nominated contaminants, and reports on their status for the draft and final CCL 3. The specific contaminants nominated are listed in the appendices to this document. Appendix 1 lists the chemical nominations, provides the nominating individual or organization, and describes the rationale for the nomination. Appendix 2 provides similar information for the microbial contaminants. Appendix 3 lists the chemicals nominated and the result of the CCL process for that contaminant. Appendix 4 lists the references cited by the individual or organization nominating the contaminant. More detailed information on the specific contaminants or steps in the CCL process are available on the EPA Web site (www.epa.gov/safewater) and in the CCL 3 support documents cited in this report and that are available in the docket (Docket ID No. EPA-HQ-OW-2007-1189; all documents in the docket are listed on http://www.regulations.gov).

2.0 Requesting Nominations

The Agency sought nominations for contaminants for CCL 3 by framing the Safe Drinking Water Act requirements in a series of questions to document the anticipated or known occurrence in public water systems and the adverse health effects of potential contaminants. The Agency requested that the public respond to these questions and provide the documentation and rationale for including a contaminant for consideration in the CCL 3 process. The questions posed to the public were:

- What are the contaminant's name, CAS number, and/or common synonym (if applicable)?
- What factors make this contaminant a priority for the CCL 3 process? EPA provided examples of factors the public should consider. The examples included: widespread occurrence; anticipated toxicity to humans; potentially harmful effects to susceptible populations (e.g., children, elderly and immunocompromised); potentially contaminated source water (surface or ground water), and/or finished water; releases to air, land, and/or water; contaminants manufactured in large quantities with a potential to occur in source waters.
- What are the significant health effects and occurrence data available, which you believe supports the CCL requirement(s)? To include a contaminant on the CCL SDWA requires that a contaminant may have an adverse effect on the health of persons and is known or anticipated to occur in public water systems.

Nominations were received via the EPA Web site and written submissions. The Agency compiled the information from the nominations process to identify the contaminants nominated, the rationale for the nomination, and to compare the supporting data submitted to information already gathered by EPA. Where new information was of sufficient quality, that information was used in the analysis following the CCL 3 protocols, to select the draft and final CCL 3.

3.0 Nominated Contaminants

The nominations process identified 150 chemical and 24 microbial individual contaminants submitted by 11 organizations and individuals. EPA received four general types of nominations:

- groups of chemicals/compounds,
- specific individual chemicals,
- genera or groups of organisms, and
- specific individual organisms.

The Agency did not require nominators to provide their name or an affiliated organization. One nominator remained anonymous while providing documentation and rationale for the contaminants. The organizations that nominated contaminants were:

- American Society of Microbiology (ASM),
- American Water Works Association (AWWA),
- Association of Metropolitan Water Authorities (AMWA),
- Association of State Drinking Water Administrators (ASDWA),
- Mothers Against Acanthamoeba Disease
- Natural Resources Defense Council, (NRDC),
- Riverkeepers

- State of New Jersey Department of Environmental Protection,
- State of New York Department of Health,
- State of Texas Commission on Environmental Quality

3.1 Chemical Nominations

Several organizations and individuals nominated broad groups representing classes of chemicals (e.g., pharmaceuticals). Some of the nominated groups were quite large and lacked a common mechanism to aggregate health effects or occurrence information across the group. Contaminants were often nominated by more than one individual or organization. There was overlap among nominated groups, and also among specific compounds nominated within groups. For example, perfluorooctanoic acid (PFOA) and its salts were nominated as a group, while another nomination specified PFOA, perfluorooctanoic sulfonate (PFOS) and perfluorobutanoic acid (PFBA). The Agency considered such groups and mixtures in its deliberations of the CCL 3 process but to be able to evaluate CCL 3 occurrence and health effects factors (e.g., potential to occur in a PWS; actual or potential adverse health effects), required linking of data to specific individual contaminants rather than groups of contaminants. Where sufficient data and information were available, specific contaminants from the groups nominated were considered individually in the CCL process. Exhibit 1 summarizes the 23 chemical groups nominated and which organizations nominated them.

Exhibit 1. Nominated Groups of Chemicals

Group	Nominator (s)
Phthalates	ASDWA; NRDC
TPH-total petroleum hydrocarbons	ASDWA
Unregulated aromatic hydrocarbons	ASDWA
Alkylphenol polyethoxylates (APEs)	NRDC
Fuel oxygenates	NYDOH
Solvent Stabilizers	NYDOH
PFOA and its salts; perfluorinated compounds	ASDWA; NJDEP
Unregulated pesticides	ASDWA
Herbicides and their environmental degradation products Herbicides, as a broad class, and specifically (“including but not limited to..”) acetanilide degradates.	NYDOH
Cyanobacterial toxins	ASDWA, AWWA
Microcystins	ASDWA
Disinfection by-products	NYDOH; AWWA (see below)
Nitrosamines/NMOR	AWWA; AMWA
Aggregate of MX related halofuranones	AWWA
Haloacetaldehydes	AWWA
Halonitrimethanes/ Halopicrins	AWWA
Pharmaceuticals and personal care products (PPCPs)	NYDOH
Pharmaceuticals	NYDOH; Riverkeepers
Antibiotics	Riverkeepers
Antimicrobials in Personal Care Products	NYDOH
Steroids/hormones	Riverkeepers
Endocrine disruptors	ASDWA
Human Biomonitoring Databases	NYDOH

3.1.1 Additional Analysis of Nominated Chemical Contaminants

EPA compiled the information submitted with the nominations and compared it to the information that EPA had already gathered as part of the CCL 3 process. The Agency then used the best available information to select the CCL 3. Appendix 3 summarizes the data provided in the nominations and how those contaminants progressed through the CCL 3 process. A total of 150 specific chemicals were identified among the received nominations. (Note, perchlorate was nominated using both the CASRN for perchlorate and the CASRN for ammonium perchlorate; hence effectively, there were 149 chemicals.) Eight of the nominated chemicals are currently regulated in PWSs and therefore are not included in the CCL 3 process. Most of the chemicals identified through the nominations process were already being considered by EPA for listing based on the data EPA collected for the CCL 3 Universe (see Appendix 3).

Using the criteria developed to identify the CCL 3 Universe included 113 of the nominated substances (USEPA, 2009a). Eighty-three chemicals had data available for screening from the Universe to the PCCL (USEPA, 2009b) and 29 passed screening and were modeled for consideration for the CCL (USEPA, 2009c). Sixteen chemicals on the draft CCL 3 list were also nominated (thirteen chemicals plus 3 cyanobacterial toxins), listed in Exhibit 2.

The Agency evaluated the nominations to identify contaminants not previously considered for the CCL 3 and new pertinent information provided by the public. Nominated contaminants were evaluated to identify and compare supporting information provided with that being used in the CCL 3 process. No new data sources (e.g., databases) were identified in the nominations process (see USEPA, 2009a). The nominations did identify individual, recently published, specialized studies from scientific literature whose data were subsequently incorporated in the CCL 3 evaluation process. These supplemental data provided with the nominations were used to screen the nominated chemicals from the universe and/or score the attributes for those that passed the screen using the CCL 3 process protocols (see USEPA, 2009b). The scored contaminants were then processed through the classification models and the post-model evaluations (see USEPA, 2009c). Those contaminants that were included on the final CCL 3 demonstrated adverse health effects and a potential to occur in PWSs.

Some of the data provided with the nominations allowed EPA to evaluate new or revised health effects or occurrence scores for PCCL contaminants. Of note, the newly identified data allowed three contaminants, metolachlor ethanesulfonic acid, metolachlor oxanilic acid, and N-nitrosodimethylamine, to be scored and added to the draft CCL 3. Data for other contaminants resulted in scores similar to prior scores, or lower scores, or the data were insufficient for scoring.

The draft CCL 3 was published on February 21, 2008 (73 FR 9628, USEPA 2008). EPA provided information and sought comment on the draft list, its efforts to expand and strengthen the underlying CCL listing process, and EPA's efforts to improve the contaminant selection process for future CCLs.

EPA received comments, including additional data to consider, from 177 individuals or organizations on the draft CCL 3 (see USEPA, 2009c and USEPA, 2009d). The EPA SAB and

its Drinking Water Committee also reviewed the draft CCL 3 during 2008, and provided an Advisory to the EPA Administrator (USEPA, 2009e).

EPA evaluated all the data and information on chemical contaminants provided by commenters and collected by the Agency after the draft CCL 3 was published. EPA used the CCL 3 process described above (and in the cited support documents) to evaluate data that became available after the publication of the draft CCL 3 (see USEPA, 2009c). The Agency added contaminants to the Universe, adjusted the contaminants that passed through to the PCCL based on these new data and reevaluated the PCCL using the CCL 3 protocols as described. In sum, 27 chemicals are on the final CCL 3 that were included in nominations. These are listed in Exhibit 2.

Appendix 3 summarizes EPA's analysis of the 150 chemical contaminants that were nominated. Each contaminant is identified by Chemical Abstract Service Registry Number and name. Literature references provided by the nominators are listed and the chemicals CCL 3 status is summarized.

Exhibit 2. Chemicals on the Final CCL 3 Included in Nominations.

Contaminant	Type
1,2,3-Trichloropropane	Paint ingredient
1,4-Dioxane	Solvent
Perchlorate	Propellant; explosive; industrial chemical
Perfluorooctanoic acid (PFOA)	Industrial chemical; consumer products; PPCP
Perfluorooctane sulfonic acid (PFOS)	Industrial chemical; consumer products; PPCP
N-nitrosodiethylamine (NDEA)	DBP
N-nitrosodimethylamine (NDMA)	DBP
N-nitroso-di-n-propylamine (NDPA)	DBP
alpha-Hexachlorocyclohexane (alpha-HCH)	Former pesticide
Metolachlor	Pesticide
Metolachlor ESA	Pesticide degradate
Metolachlor OA	Pesticide degradate
Alachlor ethanesulfonic acid (ESA)	Pesticide degradate
Alachlor oxanilic acid (OA)	Pesticide degradate
Microcystin LR	Naturally occurring cyanotoxin
Anatoxin a	Naturally occurring cyanotoxin
Cylindrospermopsin	Naturally occurring cyanotoxin
Erythromycin	Antibiotic; PPCP
17alpha-estradiol	Estrogenic hormone; PPCP
Equilenin	Estrogenic hormone; PPCP
Equilin	Estrogenic hormone; PPCP
Estradiol (17-beta estradiol)	Estrogenic hormone; PPCP
Estriol	Estrogenic hormone; PPCP
Estrone	Estrogenic hormone; PPCP
Ethinyl Estradiol (17-alpha ethynyl estradiol)	Estrogenic hormone; PPCP

Contaminant	Type
Mestranol	Estrogenic hormone; PPCP
Norethindrone (19-Norethisterone)	Progesteronic hormone; PPCP

3.2 Microbial Nominations

As noted, 24 microbial contaminants were nominated by the public. Twenty-two of the microbes were already included in the CCL 3 Microbial Universe for evaluation in the CCL 3 process. The two additional pathogens nominated were *Methylobacterium (*with two species) and Mimivirus. These were added to the CCL 3 Microbial Universe (USEPA, 2009f). The microbial nominations were subjected to the CCL 3 criteria. Accompanying support documents in the docket describe the screening to a PCCL (USEPA, 2009g) and selecting the draft and final CCL (USEPA, 2009h). These documents also discuss the specific contaminants in more detail. The list of microorganisms nominated is provided in Appendix 2. The pathogens that are on the final CCL 3 that were included in the nominations are listed in Exhibit 3.

Exhibit 3. Pathogens on the Final CCL 3 Included in Nominations

Pathogen
Adenovirus
Caliciviruses
Campylobacter jejuni
Enterovirus
Escherichia coli (0157)
Helicobacter pylori
Hepatitis A virus
Legionella pneumophila
Mycobacterium avium
Naegleria fowleri
Salmonella enterica
Shigella sonnei

4.0 References

USEPA, 2006. Request for Nominations of Drinking Water Contaminants for the Contaminant Candidate List; Notice. **Federal Register.** Vol. 71. No. 199, p. 60704, October 16, 2006.

USEPA. 2008. Drinking Water Contaminant Candidate List 3 – Draft Notice. Federal Register. Vol. 72. No. 35. p.9628. February 21, 2008.

USEPA. 2009a. Final Contaminant Candidate List 3 Chemicals: Identifying the Universe. EPA 815-R-09-006. August 2009.

USEPA. 2009b. Final Contaminant Candidate List 3 Chemicals: Screening to a PCCL. EPA 815-R-09-007. August 2009.

USEPA. 2009c. Final Contaminant Candidate List 3 Chemicals: Classification of PCCL to the CCL. EPA 815-R-09-008. August 2009.

USEPA. 2009d. Final Comment Response Document for the Third Drinking Water Contaminant Candidate List 3 Categorized Public Comments. EPA 815-R-09-010. August 2009.

USEPA. 2009e. SAB Advisory on EPA's Draft Third Drinking Water Contaminant Candidate List (CCL 3). EPA-SAB-09-011. January 2009.

USEPA. 2009f. Final Contaminant Candidate List 3 Microbes: Identifying the Universe. EPA 815-R-09-004. August 2009.

USEPA. 2009g. Final Contaminant Candidate List 3 Microbes: Screening to the PCCL. EPA 815-R-09-005. August 2009.

USEPA. 2009h. Final Contaminant Candidate List 3 Microbes: PCCL to CCL Process. EPA 815-R-09-009. Final. August 2009.

5.0 Appendices

The appendices that follow provide tabulated summaries that present a list of the chemical and microbial contaminants nominated for consideration in CCL 3, a summary of the rational and information the public provided when they nominated the contaminant, and a summary of EPA's consideration of the contaminants and their resultant progression and status in the CCL 3 process. All of the contaminants and information were reviewed to determine if health effects and occurrence information were available and if that information could be used by the Agency to evaluate if it could anticipate that the contaminant may have adverse health effects, whether it may occur in public water systems and may require regulation under SDWA. Appendix 1 and 2 lists the chemical and microbial nominations, respectively. They provide the nominating individual or organization and describe the rationale for the nomination. Appendix 3 lists the chemicals nominated, provides the references cited by the public, summarizes the types of health effects and occurrence data provided, and indicates the result of the CCL process for that contaminant. Appendix 4 provides the bibliographic references and citations provided by the individual or organizations. More detailed information on the specific contaminants or steps in the CCL 3 process are available in the CCL 3 support documents cited in this report and the individual contaminant information sheets that are in the docket.

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
96184	1,2,3-Trichloropropane	NJDEP	Mutagenic; caused benign and malignant tumors in multiple organs in rats and mice in an NTP bioassay. B2 Probable human carcinogen; slope factor = 7 1/(mg/kg-d). NJ health-based drinking water guidance value = 0.005 ug/L; 1999 based on slope factor of 7/mg-kg-day [benign and malignant tumors in rats]. (NJDEP)	NJ study: Detected in excess of health-based drinking water guidance value in 30 of 2,640 private wells and 11 of approximately 260 community water systems between 1999 and 2004 in NJ SOC Waiver Program sampling. Used as a solvent and degreaser, an impurity in nematodicides and soil fumigants. (NJDEP)
123911	1,4-dioxane	AWWA, USEPA Region 3	Used as a stabilizer in TCE, but considered more toxic. Masked in sampling with AA due to it's similarlity to TCE, when TCE is stripped off it remains in the finished water. This is an emerging contaminant. we've issued one Emergency Order at a CERCLA site to protect a water system. (EPA Region 3) Liver and kidney are target organs. Animal studies indicate liver and nasal cancer. IARC: Possibly carcinogenic. EPA: take immediate action of levels exceed 600 ug/L. New York State: MCL = 50 ug/L. California has action level of 3 ug/L. (NYDOH)	One CERCLA remediation site known- Bally site in PA, others may be associated with and TCE site. (EPA Region 3) Stable, persistent, mobile in the environment. Not effectively removed from water using technology designed to remove the solvent to which it is added as a stabilizer. (NYDOH)
611596	1,7-Dimethylxanthine	Riverkeeper	May be toxic to humans and aquatic life. Some OWCs degrade to more persistent compounds and enter surface waters. Combining selected OWCs can produce synergistic effects.	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
57910	17a-estradiol	Riverkeeper	Any organic wastewater contaminant may be toxic, but hormonal compounds may pose significant health risks. a human contraceptive produces estrogenic effects "at extremely low and environmentally relevant levels" [Fent et al, 2006]. Combining compounds may produce synergistic effects. Degradates may pose an even greater risk. [Riverkeepers]	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
57636	17a-ethynyl estradiol	Riverkeeper	Any organic wastewater contaminant may be toxic, but hormonal compounds may pose significant health risks. a human contraceptive produces estrogenic effects "at extremely low and environmentally relevant levels" [Fent et al, 2006]. Combining compounds may produce synergistic effects. Degradates may pose an even greater risk. [Riverkeepers]	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
50282	17b-estradiol	Riverkeeper	Any organic wastewater contaminant may be toxic, but hormonal compounds may pose significant health risks. a human contraceptive produces estrogenic effects "at extremely low and environmentally relevant levels" [Fent et al, 2006]. Combining compounds may produce synergistic effects. Degradates may pose an even greater risk. [Riverkeepers]	None provided

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
68224	19-norethisterone	Riverkeeper	Any organic wastewater contaminant may be toxic, but hormonal compounds may pose significant health risks. a human contraceptive produces estrogenic effects "at extremely low and environmentally relevant levels" [Fent et al, 2006]. Combining compounds may produce synergistic effects. Degradates may pose an even greater risk. [Riverkeepers]	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
90120	1-methylnaphthalene	ASDWA	The toxicity of these compounds has been studied by EPA and ATSDR. (ASDWA)	Among the most frequently detected aromatic compounds in water samples based on a recent study. (Serdar, et al., 1999). Diesel fuel widely used and released. (ASDWA)
91576	2-methylnaphthalene	ASDWA	The toxicity of these compounds has been studied by EPA and ATSDR. (ASDWA)	Among the most frequently detected aromatic compounds in water samples based on a recent study. (Serdar, et al., 1999). Diesel fuel widely used and released. (ASDWA)
80057	4,4'-(1-Methylethylidene)bisphenol (Bisphenol A)	NRDC	Bisphenol A is a monomer used as the building block of polycarbonate plastics and other plastics including epoxy resins. BPA is found in a wide variety of everyday consumer products, such as the coating of food and drink packaging, dental sealants, baby bottles, water bottles, microwave ovenware and eating utensils. As these products age, the polycarbonate polymer breaks down, releasing the BPA monomer. BPA is produced at over one million pounds per year and is frequently found in the environment. BPA releases to the environment in the U.S. totaled 1.4 million pounds in 2004, including 3,538 pounds released directly to water and 132,262 pounds released to the air. A number of recent studies have revealed that early life exposures to low-doses of BPA result in adverse effects later in life. The developing fetus is especially vulnerable. Although many of these studies were done in laboratory animals, the exposures were at environmentally relevant concentrations. • In rats, in utero exposure to BPA causes long-term effects on development of mammary tissue, causing preneoplastic lesions, increased susceptibility to cancer and increased sensitivity to a chemical known to cause breast cancer. , • Perinatal exposure to low levels of BPA causes precancerous prostate lesions (prostatic intraepithelial neoplasia) in rats. The effect appears to result from the failure in exposed animals of a gene to become hypermethylated as the rats age. • Experiments with mice reveal that chronic adult exposure to BPA causes insulin resistance, a common problem in humans that can lead to Type II diabetes and heart disease.	BPA is a water contaminant. A study in Germany found BPA in surface water (0.0005 to 0.41 ug/L), in sewage effluents (0.018 to 0.702 ug/L), in sediments (0.01 to 0.19 mg/kg) and in sewage sludge (0.004 to 1.363mg/kg dw). Cousins et al. (2002) reviewed previously published monitoring data for the United States and found a median reported water concentration of 0.5 ug/l (below the detection limit of the studies) and a 90th percentile of 4.4 ug/l. The same study also suggested a half-life for BPA of 4.5 days in surface water, indicating that BPA can be transported hundreds of kilometers in rivers before levels fall below detection limits.

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
			• BPA has been shown to cause aneuploidy in mouse oocytes. Meiotic aneuploidy is the most common cause of miscarriage in women. • In a small prospective study, researchers in Japan found women with a history of repeated spontaneous miscarriages had higher levels of BPA. The researchers found evidence of aneuploidy in several of the miscarried fetuses in concordance with previous studies showing BPA causes meiotic aneuploidy. • BPA lowers sperm count in adult rats even at extremely low levels.	
15972608	Alachlor	NYDOH	Co-occurrence of parents and degradates may pose health risks beyond those associated with exposure to a single chemical. (NYDOH)	Widespread use of parent compounds and environmental persistence of degradates has resulted in contaminated water supplies nationwide (Barbash, et al., 2001) and within NY (SCDOH, 2002; USGS & NYSDEC, 1998). (NYDOH)
142363539	Alachlor ethanesulfonic acid	NYDOH	Co-occurrence of parents and degradates may pose health risks beyond those associated with exposure to a single chemical. (NYDOH)	Widespread use of parent compounds and environmental persistence of degradates has resulted in contaminated water supplies nationwide (Barbash, et al., 2001) and within NY (SCDOH, 2002; USGS & NYSDEC, 1998). (NYDOH)
171262172	Alachlor oxanilic acid	NYDOH	Co-occurrence of parents and degradates may pose health risks beyond those associated with exposure to a single chemical. (NYDOH)	Widespread use of parent compounds and environmental persistence of degradates has resulted in contaminated water supplies nationwide (Barbash, et al., 2001) and within NY (SCDOH, 2002; USGS & NYSDEC, 1998). (NYDOH)
18559949	Albuterol	Riverkeeper	May be toxic to humans and aquatic life. Some OWCs degrade to more persistent compounds and enter surface waters. Combining selected OWCs can produce synergistic effects.	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
116063	Aldicarb	NRDC, AWWA	Cholinesterase inhibitor. RfD (EPA, mg/kd/d)=0.001. Observed toxic effect with both long-term and single-dose administration is acerylchlinesterase inhibition. Evidence suggests it is not genotoxic or carcinogenic. [AWWA] 'Aldicarb is an N-methyl carbamate insecticide that causes reversible red blood cell and plasma cholinesterase inhibition. This pesticide is classified as Toxicity Category 1 because of its high toxicity through all routes of exposure (oral, dermal and inhalation). Symptoms of acute aldicarb exposure observed in animal studies include decreased motor activity, lacrimation, tremors, salivation, pinpoint pupils, and decreased grip strength. A rat study by EPA/ORD demonstrated that young animals are more susceptible to aldicarb-induced brain cholinesterase inhibition than adults.	A systemic pesticide used to control nematodes in soil and insects and mites on a variety of crops. Degrades mainly by biodegredations and hydolysis, persisting for weeks to months. It is one of the most acutely toxic pesticides in use. Frequently found as a contaminant in groundwater - aldicarb sulfoxide and aldicarb sulfone residuals are found in an approx. 1:1 ration in groundwater. [AWWA] 'EPA placed aldicarb under Special Review in 1984 due to concerns about groundwater contamination. Aldicarb degradation in groundwater is slow. This chemical is persistent and mobile in soil, and degrades in the environment to aldicarb sulfoxide and aldicarb sulfone, both of which are cholinesterase inhibitors. In 1991 EPA established MCLs of 0.003 ppb for

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
			Although it is generally believed that acute high level exposure to aldicarb will not cause chronic health effects, one case study by Grendon et al. (1994) in Washington State documented long-term health problems in men and sheep resulting from a single poisoning incident. EPA has not assessed the risks of chronic exposure to aldicarb in its 2006 Revised Human Health Risk Assessment (HRA). The Agency reasoned that since cholinesterase inhibition due to aldicarb exposure is reversed in less than 24 hours, such an assessment is unnecessary and chronic exposure can be treated as a series of acute exposures. However, EPA mentioned in the Revised HRA that effects such as pale kidneys and hydroceles in the oviducts occurred in dams in a developmental study, symptoms that suggest chronic damage not seen in acute single-exposure cases. In addition, some studies suggest that chronic exposure to aldicarb may have longer-term effects on the immune and nervous systems. Fiore et al (2006) analyzed immune function in two groups of women, one exposed to aldicarb at environmental concentrations in groundwater at levels below 61 ppb (23 subjects), and an unexposed group (27 subjects). No women in either group had known reasons for immune problems. The researchers found a significant association between aldicarb exposure and abnormalities in T-cell subset ratios. Hajoui et al. (1992) also found changes in the percentages of certain T-cell subsets after subchronic, but not chronic exposure. The results of a rat study by Smulders et al. (2003) suggest that exposure to carbamates such as aldicarb may also lead to chronic changes in the nervous system resulting from the inhibition of neuronal nicotinic acetylcholine receptors. A similar study of the carbamates fenoxycarb, carbaryl, and S-ethyl N,N-dipropylthiocarbamate (EPTC), which have the same mechanism of action, showed that increasing the pesticide dose or the length of exposure reduced the rate of reversal of acetylcholine receptor inhibition. Therefore, two mechanisms, cholinesterase inhibition and acetylcholine receptor inhibition may lead to chronic neurotoxicity from exposure to carbamate pesticides such as aldicarb. This raises concerns about chronic low-level exposure such as may result from aldicarb contamination of drinking water. [NRDC]	aldicarb, 0.004 ppb for aldicarb sulfoxide and 0.002 ppb for aldicarb sulfone, but these MCLs never went into effect. Instead, EPA issued a 7 ppb health advisory for each of the aldicarb species and for combined aldicarb residues. EPA based its drinking water risk assessment in the HRA on the highest aldicarb concentrations in groundwater found in eight regions where aldicarb was used. The concentrations ranged from 0 to 24 ppb. The region with no aldicarb detections was removed from the analysis. Surface water concentrations, on the other hand, were derived from models for lack of sufficient monitoring data. Acute dietary exposure estimates from food alone exceeded the level of concern for children 1 to 2 years old (159% of the acute Population Adjusted Dose, or aPAD), and children 3 to 5 years old (129% aPAD), so that any additional exposures from drinking water would increase these risks of concern. The highest exposure from groundwater calculated for the regions where this pesticide was detected was 945% aPAD for the 95th percentile of the most exposed population sub-group. For the general U.S. population and other sub-groups, exposure ranged from 20% aPAD to 393% aPAD. It is clear from EPA's own analysis that aldicarb is a water contaminant that poses health risks of concern at levels found in food and drinking water. Given that food exposure alone exceeds levels of concern for children, drinking water exposure creates an additional unacceptable risk. EPA must move to establish a protective MCL for aldicarb. [NRDC]

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
1646884	aldicarb sulfone	AWWA	Cholinesterase inhibitor. RfD (EPA, mg/kd/d)=0.001. Observed toxic effect with both long-term and single-dose administration is acerylchlinesterase inhibition. Evidence suggests it is not genotoxic or carcinogenic.	A systemic pesticide used to control nematodes in soil and insects and mites on a variety of crops. Degrades mainly by biodegredations and hydolysis, persisting for weeks to months. It is one of the most acutely toxic pesticides in use. Frequently found as a contaminant in groundwater - aldicarb sulfoxide and aldicarb sulfone residuals are found in an approx. 1:1 ration in groundwater
1646873	aldicarb sulfoxide	AWWA	Cholinesterase inhibitor. RfD (EPA, mg/kd/d)=0.001. Observed toxic effect with both long-term and single-dose administration is acerylchlinesterase inhibition. Evidence suggests it is not genotoxic or carcinogenic.	A systemic pesticide used to control nematodes in soil and insects and mites on a variety of crops. Degrades mainly by biodegredations and hydolysis, persisting for weeks to months. It is one of the most acutely toxic pesticides in use. Frequently found as a contaminant in groundwater - aldicarb sulfoxide and aldicarb sulfone residuals are found in an approx. 1:1 ration in groundwater
319846	Alpha-HCH	AWWA	Can cause respitory difficulty, skin irritation, skin senitization scabis and pediculosis	Component of benzene hexachloride a former insecticide. Degradeded more rapidly under anaerobic conditions. Hydrolysis half life ranges between 92 to 71 hours in natural waters (but may be even slower). A Canadian study found levels in finished water.
7790989	Ammonium Perchlorate	NRDC	Interferes with function of the thyroid; blocks iodide uptake into the gland. Causes neurodevelopmental deficits (detailed in comments). Several studies demonstrate human exposure and toxic effects (Blount et al., 2006; Brechner et al., 2000; Schwartz et al, 2001). Studies indicate that DWEL of 24.5 ppb is inadequate. (NRDC)	Widespread contamination may be exposing millions to perchlorate throughout the country. Detected in PWSs of 26 states and two territories under UCMR 1. Detections range from 4 - 420 ppb; mean = 10 ppb. Major state studies performed in Arizona, California, Massachusetts and Texas. EPA lists 109 sites of known perchlorate releases in 29 states. U.S. Government Accountability Office report (May 2005) lists perchlorate release sites and detections in PWSs and private wells. [18 refs in text] (NRDC)

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
64285069	Anatoxin-a	ASDWA, AWWA	A high degree of uncertainty remains as to the sufficiency of the uncertainty factors applied during extrapolation from animals to humans (factor 10), when considering the observed species (human–animal) differences in organic anion transporter profile (Fischer et al., in press) and hence kinetic and dynamic dissimilarities (Batista et al., 2003). Despite these caveats, it appears that for the time being, the WHO guidance value for drinking water with 1.0 µg MC-LR/l should provide for sufficient protection of the consumer. In contrast, the application of guidance values for BGAS (Gilroy et al., 2000) appears misguided as the TDIs of infants and children, as well as adult consumers, are readily exceeded due to repeated contamination of BGAS and consumer dependent variation in daily BGAS consumption. (AWWA) Many states have had algal blooms severe enough to prompt public health concerns. (ASDWA)	Significant amount of data on occurrence, health effects and treatment of cyanobacterial toxins. A national review would help to coalesce the data. (ASDWA)
1912249	Atrazine	NYDOH	Co-occurrence of parents and degradates may pose health risks beyond those associated with exposure to a single chemical. (NYDOH)	Widespread use of parent compounds and environmental persistence of degradates has resulted in contaminated water supplies nationwide (Barbash, et al., 2001) and within NY (SCDOH, 2002; USGS & NYSDEC, 1998). (NYDOH)
86500	Azinphos-methyl	NRDC	This organophosphate pesticide is classified as toxicity category 1 for oral exposure. Exposure to azinphos-methyl causes plasma, red blood cell and brain cholinesterase inhibition, with symptoms including headache, nausea, vomiting, dizziness, anxiety, muscle tremors and weakness. Studies by Souza et al. (2004, 2005) found that azinphos-methyl affected human placental enzymatic activity, which may have adverse consequences for fetal development. , Exposure to organophosphate pesticides (OPs) such as azinphos-methyl has been associated with lower performance on neurobehavioral tests in exposed adults. Children are more vulnerable than adults to the neurotoxic effects of OPs and may suffer developmental effects from low-level chronic exposures.	Azinphos-methyl has a high potential to pollute surface waters due to runoff and spray drift. , Data on environmental concentrations of azinphos-methyl in the United States are limited, but studies in South Africa suggest that under certain conditions azinphos-methyl may also reach high concentrations (40 ppb) in groundwater. EPA indicated in its drinking water assessment in the Interim Reregistration Eligibility Decision (IRED) document for azinphos-methyl that the estimated environmental concentration (EEC) of this pesticide in surface water is 16 ppb at typical application rates in peaches. This concentration is over three times the acute drinking water level of comparison (DWLOC) the agency calculated for infants less than a year old (5 ppb), and over twice the DWLOC for children 1-6 years (6 ppb). The highest annual mean concentrations in surface water according to monitoring data and EPA models ranged from 0.27 ppb to 7.2 ppb. The latter concentration exceeds the chronic DWLOC the agency calculated for infants less than a year old (7 ppb). While EPA argued in the IRED that the phase-out of the peach use will eliminate drinking water risks of concern, EPA is still allowing the use of

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
				azinphos-methyl on apples (the most frequently treated crop) at application rates equal to or higher than those for peaches (1.0-1.5 lb ai/A per application, 4.5 lb ai/A per year maximum on apples vs. 1.125 lbs ai/A per application, 4.5 lbs ai/A per year maximum on peaches). Furthermore, the total amount of azinphos-methyl used on apples (890,000 lb active ingredient) is over seven times the amount used on peaches (120,000 lb). Therefore, the EPA assessment indicates that azinphos-methyl poses a risk to drinking water supplies. While EPA has issued a four-year limited registration for azinphos-methyl use on apples and seven other crops, the Agency has stated that these registrations may be extended, thus creating the need to regulate azinphos-methyl as a drinking water contaminant.
25057890	Bentazone	AWWA	Long term studies have not indicated a carcinogenic potential	Broad specturm herbicide used on a variety of crops - very mobile in soils and moderately persistent in the environement
85687	Benzyl butyl phthalate (BBP)	NRDC, ASDWA	BBP is used as a plasticizer for PVC and other plastics. End uses include PVC floorings and wall coverings, expanded leather, PVC foams, films, sealing and adhesive systems. BBP is a high production volume chemical, produced in volumes of over 1 million pounds per year. BBP is an anti-androgenic endocrine disruptor with developmental and reproductive toxicities. Post-pubertal and adult exposures in rat studies are without apparent effects except at high doses, however, exposures in pregnant rats have been shown to adversely affect development of the male reproductive tract. Adverse effects include a cluster of outcomes that has been called “phthalate syndrome” and includes underdeveloped or absent reproductive organs, retained nipples, cryptorchidism, decreased anogenital distance (AGD), hypospadias, and decreased or abnormal sperm. DINP does not bind to the androgen receptor and these effects are likely mediated through interference with testosterone synthesis. , In humans, Swan et al. (2005) found associations between exposure to phthalates and one of the most sensitive endpoints for anti-androgen exposure, anogenital distance. Although this endpoint is well-recognized in animal studies, it is not a standard measurement in humans. However, a decrease in AGD precedes a common birth defect in the penis, hypospadias. In this study, the researchers found that prenatal maternal urinary levels of the phthalate metabolites monoethyl phthalate (MEP), monobenzyl	There are multiple studies showing BBP detections in surface waters: •Canada: up to 1 ug/l (ENVIRODAT 1993) •Mississippi River south of St. Louis: up to 2.4 ug/l (Gledhill et al. 1980) •Lake Scandarello, Italy: up to 6.6 ug/l (Vitali et al. 1997) •Rhine River and its tributaries: up to 5.2 ug/l (ECPI 1996) •Inflow and outflow from sewage treatment plants in Sweden and Norway: up to 2.4 ug/l and 0.58 ug/l, respectively (ECPPI 1996, NIWR 1996) The full extent of BBP contamination of water in the U.S. is not known, but the fact that it is present at detectable levels in surface waters indicates the need for EPA to conduct water monitoring studies and to take appropriate regulatory action. (NRDC) Frequently detected in surface waters. (ASDWA)

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
			phthalate (MBzP), mono butylphthalate (MBP) and monoisobutyl phthalate (MiBP) were significantly associated with reduced AGD and ano-genital index (AGI = AGD/bodyweight) in male infants. (NRDC) CDC (2005) has documented health effects. (ASDWA)	
98136993	bromochloroacetaldehyde	AWWA		This class of disinfection by-products was the third highest in concentration (albeit, not as high as THMs or HAAs). Except monochloro- (difficult to analyze) and monobromo-(not studied yet), all others are easily measured by conventional methods.
5589968	bromochloroacetic acid	NYDOH	Known to cause adverse health effects. (NYDOH)	These four HAAs typically constitute 20-50% of total chlorine and bromine containing HAA observed in finished waters (Roberts, et al., 2002). (NYDOH)
83463621	Bromochloroacetonitrile	AWWA	None provided	- None provided
26482315	bromochloronitromethane	AWWA		This class was studied by Plewa (University of Illinois) and DeAngelo (USEPA). Plewa found some of them to be 1-2 orders of magnitude more toxic than the HAAs by his assays. Their concentration is 1-2 orders of magnitude lower than that of the HAAS.
71133147	bromodichloroacetic acid	NYDOH	Known to cause adverse health effects. (NYDOH)	These four HAAs typically constitute 20-50% of total chlorine and bromine containing HAA observed in finished waters (Roberts, et al., 2002). (NYDOH)

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
918014	bromodichloronitromethane	AWWA	None provided	This class was studied by Plewa (University of Illinois) and DeAngelo (USEPA). Plewa found some of them to be 1-2 orders of magnitude more toxic than the HAAs by his assays. Their concentration is 1-2 orders of magnitude lower than that of the HAAS.
563702	bromonitromethane	AWWA	None provided	This class was studied by Plewa (University of Illinois) and DeAngelo (USEPA). Plewa found some of them to be 1-2 orders of magnitude more toxic than the HAAs by his assays. Their concentration is 1-2 orders of magnitude lower than that of the HAAS.
1689845	Bromoxynil	AWWA	RfD (EPA, mg/kd/d)=0.02. Developmental or reproductive toxin, moderate acute (PAN)	Occurrence (0.046 ppb 95%ile)
6804075	Carbadox	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. Some antibiotics are suspected carcinogens. (Mackie et al, 2006; Health Canada 2001)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
298464	Carbamazepine	NYDOH	Emerging contaminant of possible health concern. (NYDOH)	NYDOH surveyed the New York city watershed; in nearly every WWTP effluent sample. Kolpin, et al, 2002 reported similar findings. Mobile and stable in the environment. (NYDOH)
63252	Carbaryl	NRDC, AWWA	Known carcinogenic. 10-6 cancer risk 40 µg/L. Primary exposure route is through ingestion (WHO report). [AWWA] 'This N-methyl carbamate pesticide is a neurotoxic acetylcholinesterase inhibitor and a "likely" carcinogen according to the Office of Pesticide Programs Cancer Assessment Review Committee. The systemic effects of carbaryl include headache, dizziness, weakness, shaking, nausea, stomach cramps, diarrhea, and sweating. Effects may also include loss of appetite, weakness, weight loss, and general malaise. Carbaryl is particularly toxic to the developing nervous system of fetuses, infants, and young children. Exposure to elevated levels of carbaryl may cause developmental neurotoxicity and "significant changes in some of the morphometric measurements of the brain". [NRDC]	In the referenced USGS report detected at concentrations above 0.1 µg/L with frequencies of ~1% in agricultural streams and ~15 % in urban streams and at concentrations below 0.1µg/L with frequencies of ~10% in agricultural streams and ~50 % in urban streams Solubility: 120 mg/L half-life: 17 days in soil & 11 days in water annual use 9 million lbs. [AWWA] 'Approximately 3.9 million pounds of carbaryl active ingredient are used annually in the U.S. When EPA issued its Revised Risk Assessment for carbaryl in 2003, its water assessment did not consider non-agricultural sources of carbaryl, which constitute a total of 40% of carbaryl use by weight, and which are the dominant sources of surface water carbaryl pollution. Despite ignoring non-agricultural uses, the carbaryl health risk assessment in the Interim Reregistration Eligibility Decision (IRED) found that acute surface water risks presuming maximum label application rates exceeded the drinking water level of concern (DWLOC) for children and the general population when combined with estimated food exposures. U.S. Geological Survey National Water-Quality Assessment (USGS NAWQA) monitoring data presented in the carbaryl assessment

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
				demonstrated that streams draining urban areas had both higher concentrations of carbaryl and more frequent detections, when compared with streams draining agricultural or mixed land use areas. It is clear that contamination of water is predominantly from non-agriculture uses of carbaryl, and that by not considering these uses, the Agency dramatically underestimated the amount of carbaryl in drinking water (Estimated Environmental Concentration, or EEC), which is likely to be two-times higher than EPA estimates. Twenty-one (21) percent of surface water samples in the NAWQA database contained detectable levels of carbaryl. EPA discussed in its IRED the limitations of existing monitoring data:"Carbaryl is fairly mobile, but is not likely to persist or accumulate in the environment. As such, it is difficult for monitoring studies to detect peak concentrations that can occur. EPA determined that currently available monitoring studies for carbaryl are limited in this regard, and did not use them to define peak values for carbaryl." As a result of these data limitations, EPA used models to estimate drinking water EECs for currently registered uses in the carbaryl IRED. The Agency reported that the acute drinking water EECs ranged from 23 to 410 ppb for acute exposure, and from 1.3 to 23 ppb for chronic exposure, which exceeded the acute DWLOC for children 1-2 years old (7.4 ppb) and for the general population (200 ppb). This is especially concerning, given that these calculations are likely to underestimate risk by excluding non-agricultural uses of carbaryl, which comprise 40% of total carbaryl used. Therefore, it is likely that actual EEC's are even higher, possibly 40% higher, than what the Agency calculates. The high toxicity of carbaryl, coupled with the high exceedances of acceptable levels in drinking water, make this level of risk to infants and children unacceptably high. Given the limitations in the monitoring data that the Agency has acknowledged, and the fact that the highest EEC estimated by EPA models was 55 times the acute DWLOC for children 1 to 2 years old, it is clear that carbaryl presents risks of concern from drinking water exposure and should be regulated as a drinking water contaminant by establishing an MCL. [NRDC]
16887006	Chloride	Riverkeeper	Road salting leads to degradation of vegetation and habitat; drinking water impacts. (Riverkeeper)	Road salts can enter air, soil, groundwater and surface water from direct or snowmelt run-off and release from surface soils and/or wind-borne spray. NYCDEP reports that most of the Croton watershed have displayed steady increases in conductivity since the 1990s. (Riverkeeper)

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
1794849	chloronitromethane	AWWA	None provided	This class was studied by Plewa (University of Illinois) and DeAngelo (USEPA). Plewa found some of them to be 1-2 orders of magnitude more toxic than the HAAs by his assays. Their concentration is 1-2 orders of magnitude lower than that of the HAAS.
1897456	Chlorothalonil	AWWA	None provided	Fungicide used on a variety of crops. Can be degraded both aerobically and anaerobically with half-lives ranging between .2 - 9 days Chlorothalonil has been identified in groundwater in 2 US states.
2921882	Chlorpyrifos	NRDC, AWWA	Chlorpyrifos is an organophosphate pesticide used at approximately 21-24 million pounds active ingredient (a.i.) annually in the United States. Most chlorpyrifos is used in agriculture on crops such as corn and cotton, but other uses include golf courses, road medians, food processing plants, manufacturing plants, ship holds, railroad boxcars, and non-structural wood treatments. Chlorpyrifos is applied aerially, by chemigation, groundboom, hand wand, airblast sprayer, and other methods. With chlorpyrifos and other developmental neurotoxic chemicals, risk to the fetus, infant, and child comes primarily from the timing of exposure. Even a very small dose, for even a short duration, during a developmental period of vulnerability will result in permanent neural dysfunction. There is no demonstrated reliable threshold of safety for this highly toxic chemical, as indicated in the IRED, where a no-effect level could not be determined for developmental neurotoxicity. However, there is demonstrated evidence of neuropathology and increased vulnerability of fetuses when exposed to chlorpyrifos . EPA has acknowledged this susceptibility in the chlorpyrifos Human Health Risk Assessment: “In conclusion, the weight of the evidence raises concern for an increase in both the sensitivity and susceptibility of the fetus or young animal to adverse biochemical, morphological, or behavioral alterations from chlorpyrifos treatment during brain development. With respect to cholinesterase inhibition, an increase in sensitivity of the young compared to adults was seen all along the dose response curve, even at relatively low doses.” [NRDC]	Broad-spectrum organophosphorus insecticide. Stronly absorbed by soil and does not readily leach from it - persists in soil for 60 - 120 days and biodegrades - non-polar nature - has a low solubility in water and great tendency to partition from aqueous into organic phases.[AWWA] 'Although EPA said in the IRED that the drinking water risk is below the level of concern, the Agency noted that there have been cases of high levels of drinking water well contamination associated with localized applications of chlorpyrifos as a subterranean termiticide. This was addressed, EPA said, by eliminating all termiticidal uses. However, despite EPA’s assertions that only termiticidal use leads to water contamination problems, USGS and others have found contamination of ground and surface water with chlorpyrifos and its metabolites, and EPA’s own modeling shows that it is likely that in certain areas of heavy use, chlorpyrifos (and its metabolites) present significant water risks. There is no evidence that the water risks of chlorpyrifos and its metabolites are limited to termiticidal use. There is extensive evidence of the potential of chlorpyrifos to contaminate surface and groundwater. Combined USGS data for state, local, national, and multi-state studies that measured chlorpyrifos concentrations in surface water detected the pesticide at 7 of 108 (6%) sites sampled. Chlorpyrifos has medium runoff potential due to its relatively low water solubility, 2 mg/L , . A chlorpyrifos flux as a percentage of use of 0.15 has been measured in the Minnesota River. Chlorpyrifos is also, of course, used in non-agricultural settings, and can thus drift or runoff directly into surface water bodies in areas of high population density. Data from the Mid-Continent Pesticide Study show that chlorpyrifos was present in the ground water in 4.2% of the wells sampled. Chlorpyrifos has been detected in 0.6% of wells sampled, according to the U.S. EPA's Pesticides in Ground

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
				Water Database. Long (1989) detected chlorpyrifos in the ground water of 30% of 56 sites examined beneath pesticide mixing and loading facilities in Illinois. The maximum concentration detected was 0.5 ppb. Water monitoring sample sites are not necessarily correlated with chlorpyrifos use sites, and in particular, may miss sites where multiple fields are treated with chlorpyrifos resulting in pooled runoff into a common water source. In fact, the IRED states, "it is not clear that they [monitoring data] represent the most vulnerable groundwater where chlorpyrifos is used most intensively" (IRED p.18). Monitoring of surface water is likely to be subject to the same problem. Levels of chlorpyrifos in pooled runoff sites are likely to be many times higher than single field sites. Similarly, data collection is not timed to correspond with worst-case scenarios, such as closely following chlorpyrifos applications, or following large storm runoff events, and thus most often misses these highly toxic environmental exposures. Using the PRZM/EXAMS screening model, EPA estimated that 90-day average and peak chlorpyrifos concentrations were 6.7 and 40 ppb respectively. Meanwhile, acute DWLOCs for infants less than a year old, children 1-6 years and females 13 to 50 years ranged from 0.9 to 9 ppb. Chronic DWLOCs for these population groups ranged from 0.2 to 0.72 ppb. EPA's modeling estimates therefore show that chlorpyrifos exposure in drinking water has the potential to exposed vulnerable groups of the population to unacceptable levels of this chemical. [NRDC]
57625	Chlortetracycline	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
57885	Cholesterol	Riverkeeper	Any organic wastewater contaminant may be toxic, but hormonal compounds may pose significant health risks. a human contraceptive produces estrogenic effects "at extremely low and environmentally relevant levels" [Fent et al, 2006]. Combining compounds may produce synergistic effects. Degradates may pose an even greater risk. [Riverkeepers]	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
85721331	Cipro-floxacin	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
53418	cis-Androsterone	Riverkeeper	Any organic wastewater contaminant may be toxic, but hormonal compounds may pose significant health risks. a human contraceptive produces estrogenic effects "at extremely low and environmentally relevant levels" [Fent et al, 2006]. Combining compounds may produce synergistic effects. Degradates may pose an even greater risk. [Riverkeepers]	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
76573	Codeine	Riverkeeper	None provided	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
360689	Coprostanol	Riverkeeper	Any organic wastewater contaminant may be toxic, but hormonal compounds may pose significant health risks. a human contraceptive produces estrogenic effects "at extremely low and environmentally relevant levels" [Fent et al, 2006]. Combining compounds may produce synergistic effects. Degradates may pose an even greater risk. [Riverkeepers]	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
486566	Cotinine	Riverkeeper	May be toxic to humans and aquatic life. Some OWCs degrade to more persistent compounds and enter surface waters. nCombining selectedd OWCs can produce synergistic effects.	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
143545908	cylindrospermopsin	ASDWA, AWWA	A high degree of uncertainty remains as to the sufficiency of the uncertainty factors applied during extrapolation from animals to humans (factor 10), when considering the observed species (human–animal) differences in organic anion transporter profile (Fischer et al., in press) and hence kinetic and dynamic dissimilarities (Batista et al., 2003). Despite these caveats, it appears that for the time being, the WHO guidance value for drinking water with 1.0 µg MC-LR/l should provide for sufficient protection of the consumer. In contrast, the application of guidance values for BGAS (Gilroy et al., 2000) appears misguided as the TDIs of infants and children, as well as adult consumers, are readily exceeded due to repeated contamination of BGAS and consumer dependent variation in daily BGAS consumption. 'Cyanobacteria (algal toxins). Potential severe acute hepatotoxicity at low concentrations and possible liver damage. (AWWA) Many states have had algal blooms severe enough to prompt public health concerns. (ASDWA)	Significant amount of data on occurrence, health effects and treatment of cyanobacterial toxins. A national review would help to coalesce the data. (ASDWA)

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
67035227	Dehydronifedipine	Riverkeeper	May be toxic to humans and aquatic life. Some OWCs degrade to more persistent compounds and enter surface waters. nCombining selectedd OWCs can produce synergistic effects.	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
1007289	deisopropylatrazine	NYDOH	Co-occurrence of parents and degradates may pose health risks beyond those associated with exposure to a single chemical. (NYDOH)	Widespread use of parent compounds and environmental persistence of degradates has resulted in contaminated water supplies nationwide (Barbash, et al., 2001) and within NY (SCDOH, 2002; USGS & NYSDEC, 1998). (NYDOH)
6190654	desethylatrazine	NYDOH	Co-occurrence of parents and degradates may pose health risks beyond those associated with exposure to a single chemical. (NYDOH)	Widespread use of parent compounds and environmental persistence of degradates has resulted in contaminated water supplies nationwide (Barbash, et al., 2001) and within NY (SCDOH, 2002; USGS & NYSDEC, 1998). (NYDOH)
84742	Di(n-butyl) phthalate	NRDC, ASDWA	DBP is an anti-androgenic endocrine disruptor with developmental and reproductive toxicities. Post-pubertal and adult exposures in rat studies are without apparent effects except at high doses. However, exposures in pregnant rats have been shown to adversely affect development of the male reproductive tract. Adverse effects include a cluster of outcomes that has been called “phthalate syndrome” and includes underdeveloped or absent reproductive organs, retained nipples, cryptorchidism, decreased anogenital distance (AGD), hypospadias, and decreased or abnormal sperm. DBP does not bind to the androgen receptor and these effects are likely mediated through interference with testosterone synthesis. In humans, Swan et al. found associations between exposure to phthalates and one of the most sensitive endpoints for anti-androgen exposure, anogenital distance (AGD). Although this endpoint is well-recognized in animal studies, it is not a standard measurement in humans. However, a decrease in AGD precedes a common birth defect in the penis, hypospadias. In this study, the researchers found that prenatal maternal urinary levels of the DBP metabolite, monobutyl phthalate (MBP), were significantly associated with reduced AGD and anogenital index (AGI = AGD/bodyweight) in male infants. Other effects noted in animal studies which are not thought to be mediated by decreases in testosterone include an increase in fetal mortality and changes in the expression of some genes in the testes, such as c-kit. Changes in gene expression have been shown to occur at very low doses doses that are below those associated with the gross anatomical changes noted in phthalate syndrome. (NRDC) CDC (2005) has documented health effects. (ASDWA)	DBP is a plasticizer found in numerous consumer products including cosmetics, hair sprays, nail polish, shampoos, lotions, and fragrances. DBP also is used as a solvent for oil-soluble dyes, insecticides, peroxides, and other organics as an antifoam agent as a fiber lubricant in the textile industry as a solvent/plasticizer for nitrocellulose lacquers and as epoxy resins. DBP is produced at over one million pounds per year and there is widespread potential for human exposure from discharges to water. DBP has been previously detected in drinking water in Poland and surface water in Germany. A recent study of water in southern California found DBP in raw and finished drinking water samples. (NRDC) Frequently detected in surface waters. (ASDWA)

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
3397624	diaminochloro triazine	NYDOH	Co-occurrence of parents and degradates may pose health risks beyond those associated with exposure to a single chemical. (NYDOH)	Widespread use of parent compounds and environmental persistence of degradates has resulted in contaminated water supplies nationwide (Barbash, et al., 2001) and within NY (SCDOH, 2002; USGS & NYSDEC, 1998). (NYDOH)
333415	diazinon	ASDWA	Detected levels near EPA Health Advisory	Detected in Lake Whatcom, Washington study near EPA Health Advisory level. (ASDWA)
3039132	dibromoacetaldehyde	AWWA	None provided	This class of disinfection by-products was the third highest in concentration (albeit, not as high as THMs or HAAs). Except monochloro- (difficult to analyze) and monobromo-(not studied yet), all others are easily measured by conventional methods.
5278955	dibromochloroacetic acid	NYDOH	Known to cause adverse health effects. (NYDOH)	These four HAAs typically constitute 20-50% of total chlorine and bromine containing HAA observed in finished waters (Roberts, et al., 2002). (NYDOH)
1184890	dibromochloronitromethane	AWWA	None provided	This class was studied by Plewa (University of Illinois) and DeAngelo (USEPA). Plewa found some of them to be 1-2 orders of magnitude more toxic than the HAAs by his assays. Their concentration is 1-2 orders of magnitude lower than that of the HAAS.
598914	dibromonitromethane	AWWA	None provided	This class was studied by Plewa (University of Illinois) and DeAngelo (USEPA). Plewa found some of them to be 1-2 orders of magnitude more toxic than the HAAs by his assays. Their concentration is 1-2 orders of magnitude lower than that of the HAAS.
1918009	Dicamba	AWWA	Slight expected toxicity. Some aquatic plants are highly sensitive to dicamba, with EC50 values for sensitive species between 0.1 and 0.2 ppm toxic to many terrestrial broadleaf and conifer species, less toxic to grasses. Based on acute toxicity tests dicamba is classified as slightly toxic to experimental mammals. Livestock may graze dicamba-treatead areas withtou restriction, unless they are actively producing milk. Meat animals must be removed from treated areas 30 days before slaughter (C&P Press 1998). Based on an acute oral LD50 of 2740 mg/kg in rats, the U.S. EPA places dicamba in Category III (Rowland 1998). This category is associated with a code word of CAUTION that indicates that the compound may be harmful if swallowed (US. EPA 1998).	Herbicide used in the control of annual and perennial broadleaf weeds, brush, and vines in rangeland and non-cropland areas. Halftimes of dicamba in soil usually are between 1 and 6 weeks (Cox 1994, Muller and Buser 1997).Dicamba was detected in 0.32% of stream samples and 0.12% of samples from major aquifers (USGS 1998) highest level detected was 0.00016 mg/L. In an agricultural area where herbicides are used extensively, dicamba was found in 17%- 55% of water samples from farm ponds and dugout waters (Grover et al. 1997). USGS (1998) found dicamba in 0.11%-0.15% of the groundwaters surveyed. The maximum level detected was 0.0025 mg/L no apparent correlation between the prevalence of dicamba in groundwater from agricultural areas (0.11%) compared with non-agricultural urban areas (0.35%). Several additional studies summarized in SERA (1994b) and studies published in the more recent liberatura (Miller et al. 1995, Ritter et al. 1996) report higher frequencies of occurrence of dicamba in groundwater from

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
				agricultural areas. Dicamba is relatively volatile, and this process may be a significant factor in the dispersion of dicamba in the enviroment. In a recent review, Majewski and Capel (1995) cite te occurrence of dicamba, along with several other pesticides in rain water at sites distant from any known agricultural application.Halftimes of dicamba in soil between 1 and 6 weeks (Cox 1994, Muller and Buser 1997) at a level of 10 mg/kg in sandy loam soil, dicamba caused a transient decrease in nitrification after 2 but not 3 weeks of incubation
79027	dichloroacetaldehyde	AWWA	None provided	This class of disinfection by-products was the third highest in concentration (albeit, not as high as THMs or HAAs). Except monochloro- (difficult to analyze) and monobromo-(not studied yet), all others are easily measured by conventional methods.
7119893	dichloronitromethane	AWWA	None provided	This class was studied by Plewa (University of Illinois) and DeAngelo (USEPA). Plewa found some of them to be 1-2 orders of magnitude more toxic than the HAAs by his assays. Their concentration is 1-2 orders of magnitude lower than that of the HAAS.

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
62737	Dichlorvos (DDVP)	NRDC	Dichlorvos, or DDVP, is an organophosphate insecticide widely used in agriculture. Like other organophosphates, dichlorvos is an acetylcholinesterase inhibitor. DDVP exposure may cause symptoms such as nausea, vomiting, dizziness, muscle spasms, and seizures. According to a 2000 EPA Cancer Assessment review, there is suggestive evidence that dichlorvos may cause cancer. The National Toxicology Program has stated that there is "clear evidence" of carcinogenic activity of dichlorvos in a mice study. One study has linked dichlorvos exposure to leukemia in children under 15. Another study has also found an association between dichlorvos exposure and leukemia in adult men. Furthermore, EPA has determined that "dichlorvos has been shown to be a direct acting mutagen by common in vitro bacterial genetic toxicity assays and in vitro mammalian test systems."	Dichlorvos is soluble in water and may enter surface waters in runoff. However, no data on its occurrence in surface waters has been collected there is also little data on dichlorvos in groundwater. Two other pesticides, naled and trichlorfon, degrade to dichlorvos in the environment and represent additional inputs of dichlorvos to water. However, monitoring data on these two pesticides is also very limited. Given the lack of monitoring data, EPA used IR-PCA PRZM/EXAMS models to calculate estimated drinking water concentrations (EDWCs) of dichlorvos in surface water. The models produced estimates that were below the EPA level of concern. However, the complete lack of monitoring data raises questions about whether an exclusive reliance on modeling results is appropriate for a neurotoxic and potentially carcinogenic pesticide such as dichlorvos. EPA should collect data monitoring data for dichlorvos by requiring such data from the registrants or commissioning its own studies to better assess drinking water risks and set an MCL if necessary.
115322	Dicofol	NRDC	Dicofol is an organochlorine pesticide used in agriculture, primarily on cotton and citrus crops. Approximately 860,000 pounds of active ingredient are used every year. Animal studies have found that dicofol causes toxicity in the liver, adrenal glands, kidneys, thyroid, reproductive organs, heart and stomach. Liver and thyroid effects occurred at relatively low doses (100 ppm and 10 ppm, respectively). Dicofol is a possible human carcinogen. Dicofol has shown endocrine disruptor activity in vivo and in vitro. This chemical has been shown to interfere with blastocyst implantation in rats.	EPA used its SCI-GROW model to estimate dicofol concentrations in groundwater and calculated a 90-day average peak concentration of 0.069 ppb. An overall mean surface water concentration of 0.5 ppb was estimated with the PRZM-EXAMS model. Both concentrations were below the Drinking Water Levels of Comparison (DWLOCs) for children and the general U.S. population for both acute and chronic exposure. However, there are some important shortcomings in EPA's assessment of dicofol exposure and risk. The first problem with the assessment is related to the way EPA calculated the Reference Dose (RfD). EPA is supposed to apply an additional safety factor of 10x to the RfD calculation to protect infants and children, who may have increased susceptibility to health effects from chemical exposures compared to adults. The Agency reduced the FQPA safety factor of 10x to 3x based on the lack of increased pre-natal or post-natal susceptibility to dicofol in developmental toxicity studies. However, EPA stated that a developmental neurotoxicity study was necessary because dicofol produced neurotoxicity in rats and such a study might identify an endpoint for dietary risk. Despite lacking such a study, EPA improperly reduced the safety factor to 3x. If the 10x factor had been

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
				applied as mandated by the Food Quality Protection Act, a more protective acute RfD of 0.015 mg/kg day-1 would have been chosen instead of the 0.05 mg/kg day-1 dose EPA used in its assessment. Had EPA applied the 10x safety factor, dicofol exposure from food alone would have exceeded the acute RfD and the EPA level of concern for all population groups (see Table 1). This would have resulted in a DWLOC of zero (0), so that any drinking water exposure would have been of concern. Table 1. Comparison of acute dietary exposure values from food at the 99.9th percentile Population ~ Exposure (mg/kg/day) ~ % of Acute RfD With 3x safety factor* ~ % of Acute RfD With 10x safety factor** US Population ~ 0.017523 ~ 35%~ 117% Non-nursing infants (1 year old) ~ 0.044923 ~ 90% ~ 299% Children (1-6 years old) ~ 0.034919 ~ 70% ~ 233% Children (7-12 years old) ~ 0.024705 ~ 49% ~ 165% *With 3x safety factor RfD = 0.05 mg/kg/day **With 10x safety factor RfD = 0.015 mg/kg/day The unwarranted reduction of the FQPA safety factor also affected the outcome of the chronic dietary exposure assessment. As shown in Table 2, if the 10x factor had been applied, chronic exposures from food alone for infants and children 1 to 6 years old would have exceeded the level of concern. Therefore, any drinking water exposure would have been of concern as well. Table 2. Chronic Dietary Food Exposure and Risk Estimate to Dicofol (from food alone) Population ~ Exposure (mg/kg/day) ~ % of Chronic RfD With 3x safety factor* ~ % of Chronic RfD With 10x safety factor** US Population ~ 0.000076~ 19% ~ 63% Non-nursing infants (1 year old) ~ 0.000129 ~ 32% ~ 108% Children (1-6 years old) ~ 0.00015 ~ 38% ~ 125%

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
				Children (7-12 years old) ~ 0.000104 ~ 26% ~ 87% *With 3x safety factor RfD = 0.0004 mg/kg/day **With 10x safety factor RfD = 0.00012 mg/kg/day Another shortcoming in the EPA assessment is that the Agency relied on models to estimate environmental concentrations in surface and groundwater, but did not have a robust set of monitoring data. EPA should require the collection of surface and groundwater monitoring data in areas where dicofol is applied. The Agency should use these data to corroborate its exposure estimates and make a regulatory determination for dicofol under the SDWA.
84662	Diethyl phthalate (DEP)	NRDC, ASDWA	In animal studies, DEP has been shown to cause increases in kidney and liver weight. DEP causes death at high doses. In humans, Swan et al. (2005) found associations between exposure to phthalates and one of the most sensitive endpoints for anti-androgen exposure, ano-genital distance. Although this endpoint is well-recognized in animal studies, it is not a standard measurement in humans. However, a decrease in AGD precedes a common birth defect in the penis, hypospadias. In this study, the researchers found that prenatal maternal urinary levels of the DEP metabolite, monoethyl phthalate (MEP), was significantly associated with reduced AGD and ano-genital index (AGI = AGD/bodyweight) in male infants. MEP has not been associated with the development of "phthalate syndrome" in male rats exposed in utero. (NRDC) CDC (2005) has documented health effects. (ASDWA)	DEP is a plasticizer used in a wide variety of consumer products. DEP is used in photographic films, blister packaging, toothbrushes, toys, nail polish, fragrances and other cosmetics, and pharmaceutical coatings. DEP is a high production volume chemical, produced in volumes of over 1 million pounds per year. DEP has been detected in raw and finished drinking water samples in Southern California. ATSDR also reported measurable levels of DEP in groundwater and surface waters at NPL sites. (NRDC) Frequently detected in surface waters. (ASDWA)
1672464	Digoxigenin	Riverkeeper	May be toxic to humans and aquatic life. Some OWCs degrade to more persistent compounds and enter surface waters. nCombining selectedd OWCs can produce synergistic effects.	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
20830755	Digoxin	Riverkeeper	May be toxic to humans and aquatic life. Some OWCs degrade to more persistent compounds and enter surface waters. nCombining selectedd OWCs can produce synergistic effects.	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
28553120	Diisononyl phthalate (DINP)	NRDC	DINP is a plasticizer used in a number of consumer products including building materials such as flooring and wood veneers, artificial leather, wires and tubing, and children's toys. DINP is a high production volume chemical, produced in volumes of over 1 million pounds per year. DINP is an anti-androgenic endocrine disruptor with developmental	The Institute for Health and Consumer Protection (IHCP) of the European Chemicals Bureau has estimated a half life in surface water for DINP of 50 days. According to the IHCP, 82 percent of any DINP discharged by sewage treatment plants will be adsorbed on to sludge, 10 percent will be degraded and 1 percent will be stripped to air. The remaining 7 percent will be released in the effluent. Given the widespread use and high

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
			and reproductive toxicities. Post-pubertal and adult exposures in rat studies are without apparent effects except at high doses, however exposures in pregnant rats have been shown to adversely affect development of the male reproductive tract. Adverse effects include a cluster of outcomes that has been called "phthalate syndrome" and includes underdeveloped or absent reproductive organs, retained nipples, cryptorchidism, decreased anogenital distance (AGD), hypospadias, and decreased or abnormal sperm. DINP does not bind to the androgen receptor and these effects are likely mediated through interference with testosterone synthesis. , In humans, Swan et al. (2005) found associations between exposure to phthalates and one of the most sensitive endpoints for anti-androgen exposure, ano-genital distance. Although this endpoint is well-recognized in animal studies, it is not a standard measurement in humans. However, a decrease in AGD precedes a common birth defect in the penis, hypospadias. In this study, the researchers found that prenatal maternal urinary levels of the DINP metabolite, monoisobutyl phthalate (MiBP), was significantly associated with reduced AGD and ano-genital index (AGI = AGD/bodyweight) in male infants.	production volumes of DINP, these releases could pose risks for water quality. However, there does not appear to be surface water monitoring data for DINP in the United States. EPA should attempt to fill this data gap and establish an MCL for DINP if appropriate.
108203	diisopropyl ether	NYDOH	Can cause adverse effects on the liver, kidney and CNS. (NYDOH)	Use of oxygenates other than MtBE expected to increase (Shih, et al., 2004; NEIWPCC, 2001). Mobile in the environment. (NYDOH)
42399417	Diltiazem	Riverkeeper	May be toxic to humans and aquatic life. Some OWCs degrade to more persistent compounds and enter surface waters. nCombining selectedd OWCs can produce synergistic effects.	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
564250	Doxy-cycline	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
76420729	Enalaprilat	Riverkeeper	May be toxic to humans and aquatic life. Some OWCs degrade to more persistent compounds and enter surface waters. nCombining selectedd OWCs can produce synergistic effects.	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
115297	Endosulfan	NRDC	Endosulfan is an organochlorine insecticide and acaricide. Technical grade endosulfan is made of both alpha and beta stereoisomers whose toxicity is manifested through blockage of inhibitory GABA (gamma amino butyric acid) gated chloride channels, resulting in over-stimulation of the central nervous system. Endosulfan is a recognized neurotoxin and endocrine disruptor , making even extremely low-dose exposures of very great concern, especially to vulnerable populations such as children and fetuses. Endosulfan is similar in its acute oral toxicity to the related insecticides aldrin and dieldrin, except that it is slightly more toxic than these substances in female laboratory animals. Inhalation of endosulfan dust by humans has been associated with slight nausea, confusion, excitement, flushing, and dry mouth . Nine employees who had been working with 50-percent water-wettable endosulfan powder for only a few days had convulsions . Endosulfan is a significant endocrine disruptor and reproductive toxicant. This pesticide increases the rate of testosterone breakdown and excretion. In immature rats, endosulfan causes significant dose-related decreases in sperm counts, and causes sperm deformities at low exposure levels. In fish, endosulfan elevates levels of thyroxine and suppresses levels of triiodothyronine, probably by inhibiting the conversion of thyroxine to T3. The developing brain is potentially most severely affected by this pesticide via altered levels of critical neurotransmitters such as dopamine, noradrenaline and serotonin the altered neurotransmitter levels are associated with deficits in learning and memory.	The EPA estimates that 1.4 million pounds of endosulfan are applied annually to US crops. According to the EFED risk assessment for the RED on endosulfan, monitoring data show widespread contamination of surface water. EPA modeled surface water contamination and calculated acute estimated environmental concentrations ranging from 4.49 ppb to 23.86 ppb. Chronic EECs ranged from 0.53 ppb to 1.5 ppb. The acute and chronic EEC for endosulfan in groundwater was 0.012 ppb. EPA concluded in the RED that “residues of endosulfan in drinking water are of concern” for acute exposure for infants less than one year old and for children 1-6 years old. EPA determined that exposure from food alone created risks of concern for children 1 to 6 years old and set a DWLOC of zero (0) ppb for this population. EPA proposed mitigation measures to address risks from endosulfan contamination of drinking water (110-foot setbacks for ground applications, 3-foot vegetative buffers, and reductions in application rates). However, the implementation of required mitigation measures to reduce pesticide risks is rarely monitored or enforced. Given the risk indicated in the drinking water exposure assessment, EPA should require more widespread monitoring for endosulfan and take regulatory action to establish an MCL for endosulfan.
93106606	Enrofloxacin	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
517099	Equilenin	Riverkeeper	Any organic wastewater contaminant may be toxic, but hormonal compounds may pose significant health risks. a human contraceptive produces estrogenic effects "at extremely low and environmentally relevant levels" [Fent et al, 2006]. Combining compounds may produce synergistic effects. Degradates may pose an even greater risk. [Riverkeepers]	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
474862	Equilin	Riverkeeper	Any organic wastewater contaminant may be toxic, but hormonal compounds may pose significant health risks. a human contraceptive produces estrogenic effects "at extremely low and environmentally relevant levels" [Fent et al, 2006]. Combining compounds may produce synergistic effects. Degradates may pose an even greater risk. [Riverkeepers]	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
114078	Erythoromycin-H20	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
50271	Estriol	Riverkeeper	Any organic wastewater contaminant may be toxic, but hormonal compounds may pose significant health risks. a human contraceptive produces estrogenic effects "at extremely low and environmentally relevant levels" [Fent et al, 2006]. Combining compounds may produce synergistic effects. Degradates may pose an even greater risk. [Riverkeepers]	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
53167	Estrone	Riverkeeper	Any organic wastewater contaminant may be toxic, but hormonal compounds may pose significant health risks. a human contraceptive produces estrogenic effects "at extremely low and environmentally relevant levels" [Fent et al, 2006]. Combining compounds may produce synergistic effects. Degradates may pose an even greater risk. [Riverkeepers]	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
637923	ethyl-tert-butyl ether	NYDOH	Can cause adverse effects on the liver, kidney and CNS. (NYDOH)	Use of oxygenates other than MtBE expected to increase (Shih, et al., 2004; NEIWPCC, 2001). Mobile in the environment. (NYDOH)
2164172	Fluometuron	AWWA	RfD (EPA, mg/kd/d)=0.013. Possible carcinogen slight acute (PAN)	Occurrence (0.046 ppb 95%ile (USGS)
54910893	Fluoxintine	Riverkeeper	May be toxic to humans and aquatic life. Some OWCs degrade to more persistent compounds and enter surface waters. nCombining selectedd OWCs can produce synergistic effects.	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
25812300	Gemfibrozil	Riverkeeper	May be toxic to humans and aquatic life. Some OWCs degrade to more persistent compounds and enter surface waters. nCombining selectedd OWCs can produce synergistic effects.	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
2163680	hydroxyatrazine	NYDOH	Co-occurrence of parents and degradates may pose health risks beyond those associated with exposure to a single chemical. (NYDOH)	Widespread use of parent compounds and environmental persistence of degradates has resulted in contaminated water supplies nationwide (Barbash, et al., 2001) and within NY (SCDOH, 2002; USGS & NYSDEC, 1998). (NYDOH)

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
154212	Lincomycin	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
330552	Linuron	NRDC	Linuron is a urea-based herbicide used primarily on soybeans (79 percent of usage). It has been shown to cause non-malignant testicular and liver tumors in animals. Investigation of the testicular tumors revealed that this herbicide acts by blocking the function of male androgens. In animals, at relatively low doses, linuron is a recognized anti-androgen. This chemical has been shown in laboratory studies to decrease male sex organ weights, cause testicular atrophy, delay puberty, and increase estrogen levels in males.	About 400,000 pounds of linuron are used in U.S. agriculture each year. This herbicide persists for 1-5 months in soil, and has been shown to run off of fields into surface and groundwater supplies. EPA concluded in its Reregistration Eligibility Decision (RED) that linuron exceeded the Levels of Concern (LOC) for groundwater quality. EPA also expressed "moderate concerns" for drinking water supply systems relying on surface water sources. Several factors in EPA's drinking water exposure assessment raise concerns about groundwater contamination. In the groundwater portion of the assessment, data were present for only four states: Georgia, Missouri, Virginia, and Wisconsin. In Georgia linuron was found in groundwater in concentrations up to 5 ppb. EPA later cast doubt on the reliability of the data and removed it from consideration in the final RED, basing its decision on new information received from the State of Georgia. Valid groundwater detections in Missouri (up to 1.9 ppb), Virginia (up to 1.31 ppb in 4 of 8 wells) and Wisconsin (up to 2.7 ppb) may seriously underestimate linuron levels throughout the country because these three states are not among the 16-20 states where linuron is most heavily used. The sixteen states listed on page 3 of EPA's Overview of Linuron Risk Assessment appear to account for well over 80% of linuron use in the United States, so the complete absence of any data on groundwater in any of these states is a critical data gap. The USGS has also reported on areas where linuron is most heavily used on a per-acre basis. The USGS maps indicate that Indiana, Ohio, Michigan, Delaware, and Maryland are heavy use states. These states are not among the ones from which groundwater data are available. Strangely, only one of these (Michigan) is listed by EPA as among heavy use states. Casting further doubt on EPA's estimates of the risks of linuron in drinking water sources is the fact that the model used for surface water assessment was not tested against any data whatsoever. The exposure estimates (18 ppb) for infants and children exceed EPA's chronic DWLOC (6 ppb) by three-fold. This result is of particular concern in light of the serious flaws in the drinking water risk assessment that conspire to underestimate the actual risk. EPA admits that "residues of linuron and its metabolites in drinking water may represent a

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
				chronic human health risk…" (p. 42). Since linuron is not regulated under the Safe Drinking Water Act water supply systems are not required to sample or analyze for it. This is a particular problem because EPA admits that drinking water treatment is unlikely to remove linuron and its degradates. The Agency must move rapidly to collect more data on linuron in water and must make a high priority of regulating linuron under the Safe Drinking Water Act (SDWA).
121755	Malathion	AWWA	None provided	Commonly used insecticide - log n-octanol-water partition coefficient 2.36 - 2.89, solubility in water 145 mg/L at 25 oC. WHO states that the presence of malathion in drinking water under usual conditions is unlikely to represent a hazard to human health and has not proposed a guideline in drinking water
7439965	Manganese	NRDC	At high doses manganese is known to cause neurological damage resulting in an illness which closely resembles Parkinson's disease. Somewhat lower doses have been shown to cause subtle neurologic problems such as delayed reaction time, tremors, and memory impairment. In addition to the neurologic effects, exposure may cause respiratory problems such as an increased susceptibility to bacterial infections and bronchitis. A recent report of a cross-sectional investigation of intellectual function in 142 10-year-old children in Bangladesh, who had been consuming well water with an average concentration of 793 ppb found that water manganese was associated with reduced scores on standardized intelligence testing. In the United States, roughly 6% of domestic wells have manganese concentrations that exceed 300 ppb. The authors concluded that in both Bangladesh and the United States, some children are at risk for manganese-induced neurotoxicity from drinking contaminated water. In addition, prenatal exposure to manganese is associated with delayed psychomotor development in children.	Manganese was included in CCL1, but EPA made the determination not to regulate it. However, recent neurological and developmentnal data that was not available during the assessment of the CCL1 contaminants support the inclusion of manganese in CCL3.

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
93652	Mecoprop	ASDWA	None provided	Detected in Lake Whatcom, Washington study near EPA Health Advisory level. (ASDWA)
72333	Mestranol	Riverkeeper	Any organic wastewater contaminant may be toxic, but hormonal compounds may pose significant health risks. a human contraceptive produces estrogenic effects "at extremely low and environmentally relevant levels" [Fent et al, 2006]. Combining compounds may produce synergistic effects. Degradates may pose an even greater risk. [Riverkeepers]	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
657249	Metformin	Riverkeeper	May be toxic to humans and aquatic life. Some OWCs degrade to more persistent compounds and enter surface waters. nCombining selectedd OWCs can produce synergistic effects.	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
298000	Methyl parathion	AWWA	Methyl parathion interferes with the normal way that the nerves and brain function. Exposure to very high levels of methyl parathion for a short period in air or water may cause death, loss of consciousness, dizziness, confusion, headaches, difficult breathing, chest tightness, wheezing, vomiting, diarrhea, cramps, tremors, blurred vision, and sweating. Rfd (EPA, mg/kd/d)=0.00025.Acute toxicity, chlolinestarase inhibitor (PAN)	Methyl parathion is a pesticide used to kill insects on crops. Occurrence (0.006 ppb 95%ile and 0.061 max (USGS)
51218452	Metolachlor	NYDOH	Co-occurrence of parents and degradates may pose health risks beyond those associated with exposure to a single chemical. (NYDOH)	Widespread use of parent compounds and environmental persistence of degradates has resulted in contaminated water supplies nationwide (Barbash, et al., 2001) and within NY (SCDOH, 2002; USGS & NYSDEC, 1998). (NYDOH)
171118095	Metolachlor ethanesulfonic acid	NYDOH	Co-occurrence of parents and degradates may pose health risks beyond those associated with exposure to a single chemical. (NYDOH)	Widespread use of parent compounds and environmental persistence of degradates has resulted in contaminated water supplies nationwide (Barbash, et al., 2001) and within NY (SCDOH, 2002; USGS & NYSDEC, 1998). (NYDOH)
152019733	Metolachlor oxanilic acid	NYDOH	Co-occurrence of parents and degradates may pose health risks beyond those associated with exposure to a single chemical. (NYDOH)	Widespread use of parent compounds and environmental persistence of degradates has resulted in contaminated water supplies nationwide (Barbash, et al., 2001) and within NY (SCDOH, 2002; USGS & NYSDEC, 1998). (NYDOH)
101043372	Microcystin LR	ASDWA, AWWA	Cyanobacteria toxin that causes blood to spill into liver tissue. This bleeding can lead swiftly to death. (AWWA) Many states have had algal blooms severe enough to prompt public health concerns. (ASDWA)	Significant amount of data on occurrence, health effects and treatment of cyanobacterial toxins. A national review would help to coalesce the data. (ASDWA)

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
17157481	monobromoacetaldehyde	AWWA	None provided	This class of disinfection by-products was the third highest in concentration (albeit, not as high as THMs or HAAs). Except monochloro- (difficult to analyze) and monobromo-(not studied yet), all others are easily measured by conventional methods.
107200	monochloroacetaldehyde	AWWA	None provided	This class of disinfection by-products was the third highest in concentration (albeit, not as high as THMs or HAAs). Except monochloro- (difficult to analyze) and monobromo-(not studied yet), all others are easily measured by conventional methods.
77439760	MX	AWWA, NYDOH	High Potential Toxicity. [AWWA]. Induces thyroid and bile duct tumors; animal studies indicate carcinogenicity. DBP that has been shown to cause advserse health outcomes (carcinogenicity) (NYDOH)	Found in Massachusetts drinking water at 4-80 ng/L (Wright, et al., 2002). In 12 water treatment plants, representing all 9 EPA regions, MX found in finished water at a median concentration of 20 ng/L and a 75%ile of 60 ng/L. (Krasner, et al., 2006). Found in drinking water in Japan, UK, and Finland. (NYDOH)
91203	naphthalene	ASDWA	The toxicity of these compounds has been studied by EPA and ATSDR. (ASDWA)	Among the most frequently detected aromatic compounds in water samples based on a recent study. (Serdar, et al., 1999). Diesel fuel widely used and released. (ASDWA)
14797558	nitrate	ASDWA, TCEQ	Adverse health effects on infants and pregnant or nursing women. (TXCEQ, ASDWA)	Issue of chloranimation and nitrification. Texas study indicated half of water systems using chloramines had detectable nitrite, and as many as 10% detected nitrite in excess of the MCL in at least one sample. (TXCEQ, ASDWA)
14797650	nitrite	ASDWA, TCEQ	Adverse health effects on infants and pregnant or nursing women. (TXCEQ, ASDWA)	Issue of chloranimation and nitrification. Texas study indicated half of water systems using chloramines had detectable nitrite, and as many as 10% detected nitrite in excess of the MCL in at least one sample. (TXCEQ, ASDWA)
55185	N-Nitrosodiethylamine (NDEA)	AMWA, AWWA	Probable human carcinogen. (AMWA)	This class of non-halogenated disinfection by-products includes the aggregate of all nitrosamines measurable by a single method and NMOR. NMOR is the second most prevalent nitrosamine found in wastewater and has been found in an effluent-impacted river used as a drinking water supply. NMOR can be analyzed for by all nitrosamine methods except for the one developed by the EPA. (AWWA) Disinfection by-product. Occurrence may increase with increased chloramination (AMWA)
62759	N-nitrosodimethylamine	ASDWA, AMWA, AWWA	Probable human carcinogen. (AMWA) DHHS has determined NDMA "may reasonably anticipated to be a human carcinogen." (ASDWA)	This class of non-halogenated disinfection by-products includes the aggregate of all nitrosamines measurable by a single method and NMOR. NMOR is the second most prevalent nitrosamine found in wastewater and has been found in an effluent-impacted river used as a drinking water supply. NMOR can be analyzed for by all nitrosamine methods except for the

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
				one developed by the EPA. (AWWA) Disinfection by-product.Occurrence may increase with increased chloramination (AMWA) Found in groundwater associated with rocket fuel; may be a DBP. (ASDWA)
621647	N-Nitrosodi-n-propylamine (NDPA)	AMWA, AWWA	Probable human carcinogen. (AMWA)	This class of non-halogenated disinfection by-products includes the aggregate of all nitrosamines measurable by a single method and NMOR. NMOR is the second most prevalent nitrosamine found in wastewater and has been found in an effluent-impacted river used as a drinking water supply. NMOR can be analyzed for by all nitrosamine methods except for the one developed by the EPA. (AWWA) Disinfection by-product.Occurrence may increase with increased chloramination. (AMWA)
25154523	Nonylphenol (NP)	NRDC	An estimated 450,000,000 pounds of Alkylphenols and polyethoxylates (APEs) are produced annually in the United States, and about half that amount is estimated to be released to wastewater. Alkylphenols were first reported to be estrogenic in the 1930s. In 1991, publication of the effects of nonylphenol on cultured human breast cancer cells led to health concerns. Estrogenic effects have also been shown in the mouse. Estrogenic effects are present at tissue concentrations of 0.1 µM for octylphenol and 1 µM for nonylphenol. A recombinant yeast screen using the human estrogen receptor has shown similar results.	Alkylphenols and polyethoxylates do not break down effectively in sewage treatment plants or in the environment. Instead they degrade to alkylphenols and alkylphenol ethoxylates, which persist for longer. Nonylphenol and its ethoxylates, and other alkylphenols, have been detected in wastewater and in waterways.
9016459	Nonylphenol ethoxylate (NPE)	NRDC	These compounds include: An estimated 450,000,000 pounds of Alkylphenols and polyethoxylates (APEs) are produced annually in the United States, and about half that amount is estimated to be released to wastewater. Alkylphenols were first reported to be estrogenic in the 1930s. In 1991, publication of the effects of nonylphenol on cultured human breast cancer cells led to health concerns. Estrogenic effects have also been shown in the mouse. Estrogenic effects are present at tissue concentrations of 0.1 µM for octylphenol and 1 µM for nonylphenol. A recombinant yeast screen using the human estrogen receptor has shown similar results.	Alkylphenols and polyethoxylates do not break down effectively in sewage treatment plants or in the environment. Instead they degrade to alkylphenols and alkylphenol ethoxylates, which persist for longer. Nonylphenol and its ethoxylates, and other alkylphenols, have been detected in wastewater and in waterways.
70458967	Norfloxacin	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
27193288	Octylphenol (OP)	NRDC	These compounds include: An estimated 450,000,000 pounds of Alkylphenols and polyethoxylates (APEs) are produced annually in the United States, and about half that amount is estimated to be released to wastewater. Alkylphenols were first reported to be estrogenic in the 1930s. In 1991, publication of the effects of nonylphenol on cultured human breast cancer cells led to health concerns. Estrogenic effects have also been shown in the mouse. Estrogenic effects are present at tissue concentrations of 0.1 µM for octylphenol and 1 µM for nonylphenol. A recombinant yeast screen using the human estrogen receptor has shown similar results.	Alkylphenols and polyethoxylates do not break down effectively in sewage treatment plants or in the environment. Instead they degrade to alkylphenols and alkylphenol ethoxylates, which persist for longer. Nonylphenol and its ethoxylates, and other alkylphenols, have been detected in wastewater and in waterways.
9036195	Octylphenol ethoxylate (OPE)	NRDC	These compounds include: An estimated 450,000,000 pounds of Alkylphenols and polyethoxylates (APEs) are produced annually in the United States, and about half that amount is estimated to be released to wastewater. Alkylphenols were first reported to be estrogenic in the 1930s. In 1991, publication of the effects of nonylphenol on cultured human breast cancer cells led to health concerns. Estrogenic effects have also been shown in the mouse. Estrogenic effects are present at tissue concentrations of 0.1 µM for octylphenol and 1 µM for nonylphenol. A recombinant yeast screen using the human estrogen receptor has shown similar results.	Alkylphenols and polyethoxylates do not break down effectively in sewage treatment plants or in the environment. Instead they degrade to alkylphenols and alkylphenol ethoxylates, which persist for longer. Nonylphenol and its ethoxylates, and other alkylphenols, have been detected in wastewater and in waterways.
79572	Oxytetracycline	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
	Paroxetine metabolite	Riverkeeper	May be toxic to humans and aquatic life. Some OWCs degrade to more persistent compounds and enter surface waters. nCombining selectedd OWCs can produce synergistic effects.	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
14797730	Perchlorate	Anonymous	None provided -	None provided -
375224	Perfluorobutanoic acid	ASDWA, USEPA Region 3	Suspected toxicity, Risk assessment in progress refer to OPPT's PFOA web site Also associated checmicals PFOS and PFBA should be included with PFOA (AWWA) Health effects data limited. (ASDWA)	Used in stain resistance coatins in food processing and in numerous processes for flame retardant foams, surfactants in polymer manufacturing and numerous other manufacturing uses. PFOS was phased out by 3M, in 2002 due to toxicity. PFOA and PFBA replaced PFOS in many application, but all three are highly persistant in the environment and appear to accumulate in the blood proteins of humans with a half life of about 4 years. (AWWA) Low, but consistently detectable levels in water systems in a number of states. (ASDWA)

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
335671	Perfluorooctanoic acid	ASDWA, NJDEP, USEPA Region 3	Suspected toxicity, Risk assessment in progress refer to OPPT's PFOA web site Also associated checmicals PFOS and PFBA should be included with PFOA (nominator) EPA and NJDEP assessing health effects. (NJDEP) Health effects data limited. (ASDWA)	Used in stain resistance coatins in food processing and in numerous processes for flame retardant foams, surfactants in polymer manufacturing and numerous other manufacturing uses. PFOS was phased out by 3M, in 2002 due to toxicity. PFOA and PFBA replaced PFOS in many application, but all three are highly persistant in the environment and appear to accumulate in the blood proteins of humans with a half life of about 4 years. (nominator) 2006 Occurrence data from NJ indicate PFOA was quantitated at 65% of water systems sampled (78% of systems if non-quantifiable detects are considered). Concentrations ranged from 0.003 ppb to 0.039 ppb. (NJDEP) Low, but consistently detectable levels in water systems in a number of states. (ASDWA)
1763231	Perfluorooctanoic sulfonate	ASDWA, NJDEP, USEPA Region 3	Suspected toxicity, Risk assessment in progress refer to OPPT's PFOA web site Also associated checmicals PFOS and PFBA should be included with PFOA (nominator) EPA and NJDEP assessing health effects. (NJDEP) Health effects data limited. (ASDWA)	Used in stain resistance coatins in food processing and in numerous processes for flame retardant foams, surfactants in polymer manufacturing and numerous other manufacturing uses. PFOS was phased out by 3M, in 2002 due to toxicity. PFOA and PFBA replaced PFOS in many application, but all three are highly persistant in the environment and appear to accumulate in the blood proteins of humans with a half life of about 4 years. (nominator) 2006 Occurrence data from NJ indicate PFOS was quantitated at 30% of water systems sampled (57% of systems if non-quantifiable detects are considered). Concentrations ranged from 0.0023 ppb to 0.019 ppb. (NJDEP) Low, but consistently detectable levels in water systems in a number of states. (ASDWA)
61949777	Permethrin, trans	AWWA	IARC classified as group 3 for expected toxicity. No human data regarding carcinogenicity and is not genotoxic	Mixture of 4 stereoisomers (trans and cis). Contact insectide used for a broad ranges of pests. Water solubility 0.2 mg/L and log octanol water partition coefficient 6.5. Surface waters may become contaminated when applied directly for mosquito control. Soil half-life approx. 28 days.Occurrence 0.006 ppb 95%ile (USGS). Concentrations as high as 0.8 mg/L have been detected in surface water. Levels in drinking water have not been reported. WHO has not established a drinking water guideline as it is believed to occur below levels of concern

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
732116	Phosmet	NRDC	Organophosphate. Neurotoxic; causes red blood cell, plasma, serum and brain Cholinesterase inhibition; mutagenic. May affect fetal development. Suggestive evidence of carcinogenicity. NRDC disagrees with EPA's determination of a NOAEL as presented in IRED. (NRDC)	1.25 M lobs/year applied to apples, peaches, walnuts, almonds and pears. Mobile in runoff; has potential to contaminate drinking water sources. IRED drinking water assessment based on limited monitoring data estimating concentrations from 0.4 to 140 ppb and basis of PAD are flawed (details in submitted comments.) [NRDC]
57830	Progesterone	Riverkeeper	Any organic wastewater contaminant may be toxic, but hormonal compounds may pose significant health risks. a human contraceptive produces estrogenic effects "at extremely low and environmentally relevant levels" [Fent et al, 2006]. Combining compounds may produce synergistic effects. Degradates may pose an even greater risk. [Riverkeepers]	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
1610180	prometon	ASDWA	Detected levels near EPA Health Advisory	Detected in Lake Whatcom, Washington study near EPA Health Advisory level. (ASDWA)
114261	Propoxur	NRDC	None provided -	- None provided
129000	pyrene	ASDWA	The toxicity of these compounds has been studied by EPA and ATSDR. (ASDWA)	Among the most frequently detected aromatic compounds in water samples based on a recent study. (Serdar, et al., 1999). Diesel fuel widely used and released. (ASDWA)
13233324	Radium 224	AWWA, Anonymous	Radium is a class A carcinogen, that is, a demonstrated carcinogen in human populations. It is biochemically similar to calcium and barium when ingested, and concentrates in bone. The USEPA has established a Maximum Contaminant Level (MCL) for radium in public drinking water supplies. The MCL is 5 pCi/L for combined radium, which is defined as the sum of Ra-226 and Ra-228 (USEPA 2000a). The MCL for gross alpha-particle activity is 15 pCi/L. However, due to its short half life (3.66 days), the concentration of Ra-224 is not included in the definition of combined radium as posed by USEPA. Because of its short half life, much of the ingested Ra-224 decays on bone surfaces, where it may have enhanced effectiveness (Mays et al. 1985 Schleien 1992). Re-evaluation by USEPA indicates that lifetime cancer risk from ingestion of Ra-224 is less than that from ingestion of an equal amount of Ra-226 or Ra-228, but greater than that suggested in the Mays et al study (USEPA 1999). The concern is that previously undetected presence of Ra-224 may pose an additional, quantifiable radium health risk that currently is not accounted for by the 5-pCi/L MCL for combined radium in drinking water.	Extensive monitoring in the State of New Jersey over the past several years has established the presence of unsupported Ra-224 as the significant source of the elevated alpha-particle radioactivity (Parsa 1998). A follow-up national survey by the USEPA and USGS has demonstrated that Ra-224 may be present in significant quantities in ground water (Focazio et al. 2001). Since then, the USEPA has issued a Notice of Data Availability (NODA) recommending the gross alpha-particle analysis of public water supplies be performed within 48-72 hours from the sample collection time to capture the contributions from Ra-224 (USEPA 2000b). A recent study by USGS, NJDEP, and NJDHSS confirms that Ra-224 contributes considerable gross alpha-particle activity to drinking water produced from the New Jersey Coastal Plain aquifer system (Szabo et al. 2005). Radium-224 occurrence in drinking water should be expected in any area of the country that is geologically similar to New Jersey. 'In Final Radionuclides in Water Rule on December 7, 2000 (USEPA 2000a), USEPA agrees that Ra-224 is a health concern and believes that collecting data to determine if Ra-224 is of national concern is the appropriate next step for detemining if Ra-224 should be regulated separately. It states that “The

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
				Agency plans to collect additional occurrence information for Ra-224, which may involve coordination with the USGS, and will evaluate whether future regulatory action or guidance is necessary".
66357355	Ranitidine	Riverkeeper	May be toxic to humans and aquatic life. Some OWCs degrade to more persistent compounds and enter surface waters. nCombining selectedd OWCs can produce synergistic effects.	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
80214831	Roxithromycin	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
98105998	Sarafloxacin	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
7440235	Sodium	Riverkeeper	Road salting leads to degradation of vegetation and habitat; drinking water impacts. (Riverkeeper)	Road salts can enter air, soil, groundwater and surface water from direct or snowmelt run-off and release from surface soils and/or wind-borne spray. NYCDEP reports that most of the Croton watershed have displayed steady increases in conductivity since the 1990s. (Riverkeeper)
7647145	Sodium chloride	Riverkeeper	Road salting leads to degradation of vegetation and habitat; drinking water impacts. (Riverkeeper)	Road salts can enter air, soil, groundwater and surface water from direct or snowmelt run-off and release from surface soils and/or wind-borne spray. NYCDEP reports that most of the Croton watershed have displayed steady increases in conductivity since the 1990s. (Riverkeeper)
122112	Sulfadimethoxine	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
127797	Sulfamerazine	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
57681	Sulfamethazine	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
144821	Sulfamethizole	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
723466	Sulfamethoxazole	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
72140	Sulfathiozole	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
75854	tert-amyl alcohol	NYDOH	Can cause adverse effects on the liver, kidney and CNS. (NYDOH)	Use of oxygenates other than MtBE expected to increase (Shih, et al., 2004; NEIWPCC, 2001). Mobile in the environment. (NYDOH)
919948	tert-amyl ethyl ether	NYDOH	Can cause adverse effects on the liver, kidney and CNS. (NYDOH)	Use of oxygenates other than MtBE expected to increase (Shih, et al., 2004; NEIWPCC, 2001). Mobile in the environment. (NYDOH)
994058	tert-amyl methyl ether	NYDOH	Can cause adverse effects on the liver, kidney and CNS; carcinogen. (NYDOH)	Use of oxygenates other than MtBE expected to increase (Shih, et al., 2004; NEIWPCC, 2001). Mobile in the environment. (NYDOH)
75650	tert-butyl alcohol	NYDOH, NJDEP	Can cause adverse effects on the liver, kidney and CNS. (NYDOH) Kidney toxicity; kidney tumors in male rats in NTP bioassay. Toxic to thyroid and bladder in male and female mice; thyroid tumors in male and female mice. Health-based groundwater criterion of 100 ug/L based on nephropathy in female rats in NTP study; NTP LOAEL from kidney study = 175 mg/kg-d; Group C possible human carcinogen. Applied UF of 10,000 from LOAEL and 10 for poss. carc., assuming RSC of 20% (NJDEP)	NJ Study: Occurs in GW. Octanol enhancer, co-contaminant with MTBE, other uses. Detected in 36 out of 3,048 private wells. Min: 10 ppb; max: 251 ppb; mean: 67 ppb. (NJDEP) Use of oxygenates other than MtBE expected to increase (Shih, et al., 2004; NEIWPCC, 2001). Mobile in the environment. (NYDOH)
58220	Testosterone	Riverkeeper	Any organic wastewater contaminant may be toxic, but hormonal compounds may pose significant health risks. a human contraceptive produces estrogenic effects "at extremely low and environmentally relevant levels" [Fent et al, 2006]. Combining compounds may produce synergistic effects. Degradates may pose an even greater risk. [Riverkeepers]	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]
60548	Tetracycline	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
75967	tribromoacetic acid	NYDOH	Known to cause adverse health effects. (NYDOH)	These four HAAs typically constitute 20-50% of total chlorine and bromine containing HAA observed in finished waters (Roberts, et al., 2002). (NYDOH)
464108	tribromonitromethane (bromopicrin)	AWWA	None provided	This class was studied by Plewa (University of Illinois) and DeAngelo (USEPA). Plewa found some of them to be 1-2 orders of magnitude more toxic than the HAAs by his assays. Their concentration is 1-2 orders of magnitude lower than that of the HAAS.

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
52686	Trichlorfon	NRDC	Neurotoxic; cholinesterase inhibitor. Associated with kidney, lung and gastrointestinal abnormalities. Anemia reported; caused a statistically significant increase in mononuclear cell leukemia. Also a developmetnal toxicant. Although a group E carcinogen, NRDC feels there is evidence of potential carcinogenicity. (NRDC)	Despite cancelled feed and food crop uses, still approved for agricultural uses. Detected in Georgia groundwater in 12 of 179 wells up to 10 ppb. Highly mobile in soil. RED does not address drinking water exposure. (NRDC)
75876	trichloroacetaldehyde	AWWA	None provided	This class of disinfection by-products was the third highest in concentration (albeit, not as high as THMs or HAAs). Except monochloro- (difficult to analyze) and monobromo-(not studied yet), all others are easily measured by conventional methods.
76062	trichloronitromethane (chloropicrin)	AWWA	None provided	This class was studied by Plewa (University of Illinois) and DeAngelo (USEPA). Plewa found some of them to be 1-2 orders of magnitude more toxic than the HAAs by his assays. Their concentration is 1-2 orders of magnitude lower than that of the HAAS.
101202	triclocarban	NYDOH	Used in high volume; limited data; similar to halogenated biphenyls, suggesting potential endocrine, developmental and reproductive risk. (NYDOH)	Documented in surface waters and wastewater, but data limited. In common use; largely unchanged by wastewater treatment. (NYDOH)
55335063	triclopyr	ASDWA	Detected levels near EPA Health Advisory	Detected in Lake Whatcom, Washington study below EPA Health Advisory level. (ASDWA)
3380345	Triclosan	NRDC, NYDOH	Triclosan is a broad spectrum antimicrobial agent that is widely used in personal care products such as soaps, toothpastes, cosmetics, skin creams and deodorants kitchen accessories such as cutting boards and utensils and in textiles such as sportswear, shoes and carpets. Triclosan is produced at over one million pounds per year. The chemical structure of triclosan is similar to other endocrine disrupting compounds and potential breakdown products of triclosan include dioxins. Recently, low levels of triclosan were found to interfere with the metamorphosis of frogs. Exposure to as little as 0.15 micrograms/l triclosan caused an earlier metamorphosis than normal, with effects on the tadpole brain and tail. Triclosan activates the human pregnane X receptor (hPXR), which is involved in the enzymatic metabolism of steroids and xenobiotics. (NRDC) Potential endocrine disruptor; structurally similar to polybrominated diphenyl ethers, dioxins and furans. There are substantial in vitro data on the mammalian pharmacokinetics of triclosan interactions	Triclosan has been found in wastewater treatment effluent and drinking water sources. Triclosan was detected in Louisiana sewage treatment plant effluent at 10-21 ng/l. Boyd (2004) reported triclosan concentrations of ND – 29 ng/l in two stormwater canals in New Orleans. Triclosan has also been detected in raw and finished drinking water samples from Southern California. (NRDC) Widespread occurrence in surface water and biota (Kolpin, et al., 2002 and others) and some detections in ground water. Ubiquitous in Not effectively removed from wastewater by conventional treatment. Ubiquitous and used in high volume as disinfectant in personal care products. Occurs in plasma and human breast milk. (NYDOH)

Appendix 1: Chemical Nominations

			Supporting Information	
CASRN	**Common Name**	**Nominator**	**Health Effects**	**Occurrence**
			with molecular and biochemical receptor targets. Subchronic and chronic whole animal studies are sparse. (NYDOH)	
738705	trimethoprim	NYDOH, Riverkeeper	Emerging contaminant of possible health concern. 25th ranked presciption medicine in the US. (NYDOH) Known or suspected toxicity. [Riverkeepers]	NYDOH surveyed the New York city watershed; in each of four WWTP effluent sampled and at high frequency. Detected as high as 8,090-37,000 ng/L. USGS detected in groundwater at concentrations ranging from 0.1-100 ng/L in Long Island. Median NREC concentration 103 ng/L. Relatively stable and moderately mobile. (NYDOH) Detected in 80% of 139 streams in 30 states indicates widespread exposure. Meets definition of "emerging contaminants" because not historically considered contaminant but present on a global scale. [Riverkeepers]
1401690	Tylosin	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
21411530	Virginiamycin	Riverkeeper	Low level introduction of antibiotics into the environment promotes the proliferation of antibiotic-resistant genes in bacteria. (Mackie et al, 2006)	Ability to survive wastewater treatment and biodegradation. Detected in 80% of 139 streams in 30 states indicates widespread exposure.
81812	Warfarin	Riverkeeper	None provided	The FDCA does not permit dispensing prescription drugs to the public via effluent discharges into water supplies, but this is what is occurring in NYC and elsewhere with no control or oversight. [Riverkeepers]

Appendix 2: Microbial Nominations

Supporting Information					CCL 3 Process Status			
Microbial Contaminant (organism or toxin)	**Nominator**	**Health Effect**	**Occurrence**	**Additional Information**	**Universe**	**PCCL**	**Draft CCL 3**	**Final CCL 3**
Adenovirus	AWWA	Although many adenoviruses replicate efficiently in the intestine, only the enteric adenoviruses 40 and 41 have been recognized as important causes of gastroenteritis in children. Adenoviral gastroenteritis occurs mostly in children under the age of 2, particularly during the first year of life. Symptoms are watery diarrhea and sometimes vomiting. Other susceptible populations are at risk.	Over a 1 year period [June 2002-03] adenoviruses were detected in 5.32% of treated drinking water and 22.22% of river water samples using nested PCR. Most of the river samples were serotypes 40 and 41 and three drinking water samples were 40 and 41. [van	*EPA Notes: This group was included on the Final CCL 3.*	Yes	Yes		Yes
Adenovirus (enteric serotypes)	ASDWA	None Provided.	None Provided.		Yes	Yes		Yes
Astrovirus	ASDWA	None Provided.	None Provided.		Yes			
Campylobacter jejuni	AWWA	Major enteric pathogen: infant mortality. C. jejuni infections peaks during infancy and again in young adults aged 15-44 years. Acute self-limited gastrointestinal illness, characterized by diarrhea, fever, and abdominal cramps. However, one in 1000 infections may lead to Guillian-Barre syndrome. Fluoroquinolone resistance has been reported in C.jeuni since the 1980s in Europe and since 1995 in USA.	1980-2003 there have been 20 waterborne Campylobacter outbreaks reported, involving 11,608 cases [Martin et al]. In May 2000, E.coli 157:H7 and C. jejuni contaminated the drinking supply in Walkerton, Ontario. Seven people died and over 2,000 were ill [Holme 2003]		Yes	Yes	Yes	Yes
Coxsackieviruses	AWWA	Health effects are aseptic meningitis, febrile illness, vomiting, pleurodynia, respiratory illness, myocarditis, possible chronic sequelae	Frequently detected in water. Common in sewage	*EPA Notes: The final CCL 3 includes enterovirus. The CDC includes the polioviruses, coxsackieviruses, echoviruses, and other enteroviruses under this group.*	Yes (as Enterovirus)	Yes (as Enterovirus)		Yes (as Enterovirus)

Appendix 2: Microbial Nominations

Supporting Information					CCL 3 Process Status			
Microbial Contaminant (organism or toxin)	**Nominator**	**Health Effect**	**Occurrence**	**Additional Information**	**Universe**	**PCCL**	**Draft CCL 3**	**Final CCL 3**
Cyanobacteria	AWWA	A high degree of uncertainty remains as to the sufficiency of the uncertainty factors applied during extrapolation from animals to humans (factor 10), when considering the observed species (human–animal) differences in organic anion transporter profile (Fischer et al., in press) and hence kinetic and dynamic dissimilarities (Batista et al., 2003). Despite these caveats, it appears that for the time being, the WHO guidance value for drinking water with 1.0 µg MC-LR/l should provide for sufficient protection of the consumer. In contrast, the application of guidance values for BGAS (Gilroy et al., 2000) appears misguided as the TDIs of infants and children, as well as adult consumers, are readily exceeded due to repeated contamination of BGAS and consumer dependent variation in daily BGAS consumption Cyanobacteria (algal toxins). Potential severe acute hepatotoxicity at low concentrations and possible liver damage	None Provided.		Yes	Yes	Yes	Yes
E. coli (toxigenic)	AWWA	People have died because of waterborne outbreaks with this group of organisms. Mortality 1991-2002 2 deaths	Several outbreaks in the US and around the worlk. E. coli recovered from 188 drinking water sources with 15 were pathogenic serotypes. References list causes of drinking water outbreaks in the United States. 1961-1970 4 outbreaks and 188 cases 1971-2000	*EPA Notes: E. coli is included on the final CCL 3.* Most strains of E. coli O157:H7 will not be detected by currently approved methods used for regulatory monitoring within the	Yes	Yes	Yes	Yes

Appendix 2: Microbial Nominations

Supporting Information					CCL 3 Process Status			
Microbial Contaminant (organism or toxin)	**Nominator**	**Health Effect**	**Occurrence**	**Additional Information**	**Universe**	**PCCL**	**Draft CCL 3**	**Final CCL 3**
				water industry.				
Echoviruses	AWWA	Health effects are aseptic meningitis, seizure and coma in some children, vomiting, respiratory illness, myocarditis. Each year in the United States, an estimated 30 million non-polio enterovirus infections cause aseptic meningitis hand, foot, and mouth diseases and non-specific upper respiratory diseases- the most common causes of these infections are echoviruses	Common in sewage and also detected in treated drinking water	*EPA Notes: The final CCL 3 includes enterovirus. The CDC includes the polioviruses, coxsackieviruses, echoviruses, and other enteroviruses under this group.*	Yes			
Encephalitozoon hellem	AWWA	ibid.	ibid.		Yes	Yes (as Microsporidia)		
Encephalitozoon intestinalis	AWWA	The prevalenece of E. bieneusi infections among HIV-infected patients reached up to 50% during the years 1993-2001, however the administration of antiretroviral therapy can result in remission of HIV-associated intestinal microsporidiosis. Although predominantly described among adults suffering from immunodeficiency due to HIV infection, E. bieneusi infections are also reported from HIV-naegative patients who were immuocompr0mised due to underlying disease or therapeutic immunosuppression when undergoing organ transplantation. E. cuniculi, persons with exposure to infected rabbits have become infected. Patients undergoing organ transplantation. E. hellum has been diagnosed in around 50 HIV infected persons. Has also been identified on two occasions in	Detection of E. bieneusi and confirmation to the species level achieved by PCR and subsequent sequence analysisof part of the ssrRNA gene in surface water but not ground water samples. None of the E. cuniculi strains found in humans have been detected in surface water, however, the mouse strain was identified by PCR in one of 50 water samples from Switzerland. E. intestinalis has been identified by sequence analysis of PCR amplicons from surface water and ground water and from samples of source water. Also from species-specific PCR in zebra mussels from a river.	In addition to the E. intestinalis and hellem, there are two other species that should be included in the the name of contaminant. They are Encephalitozoon cuniculu and Enterocytozoon bieneusi. The contaminant field was truncated at a certain length which it did not allow to store these two other names.	Yes	Yes (as Microsporidia)		

Appendix 2: Microbial Nominations

Supporting Information					CCL 3 Process Status			
Microbial Contaminant (organism or toxin)	**Nominator**	**Health Effect**	**Occurrence**	**Additional Information**	**Universe**	**PCCL**	**Draft CCL 3**	**Final CCL 3**
		nonimmunosuppressed and HIV seronegative patients and in fecal samples from travelers. E.intestinalis is the second most prevalent microsporidial species infecting HIV-positive patients. Has also been identified in HIV-negative travelers.						
Enteroviruses (includes poliovirus, echovirus, coxsackievirus)	ASDWA	None Provided.	None Provided.		Yes	Yes		Yes
GWR, LT2 Viruses in ground water	ASDWA	Viruses can cause a range of adverse health effects.Specific viruses that may be of concern are described in the preambles to EPA's Ground Water Rule (GWR) and Long Tej.iii 2 Enhanced Surface Water Treatment Rule. Viral inactivation is the basis for much of the Ground Water Rule. However, no nationwide data for viral occurrence in drinking water wells is available, so it is not possible to ascertain the breadth of the problem. Many specific case studies exist, and these are helpful in guiding research. However, no broad study linicing hyd.rogeologic sensitivity, well characteristics, and viral presence has been performed. Monitoring under the Ground Water Rule may provide some insight but few systems will do actual virus testing in response to this rule. More detailed virus studies are needed and only EPA, through the CCL process, has the resources to conduct such valuable research.	Viruses may be present in aquifers, as demonstrated by studies on hydrogeologically sensitive wells. Ore recent studies have shown the possibility of viral contamination in wells that are relatively well protected from surface water intrusion.		Group			

Appendix 2: Microbial Nominations

Supporting Information					CCL 3 Process Status			
Microbial Contaminant (organism or toxin)	**Nominator**	**Health Effect**	**Occurrence**	**Additional Information**	**Universe**	**PCCL**	**Draft CCL 3**	**Final CCL 3**
Helicobacter pylori	AWWA	Helicobacter pylori is the cause of 60-95% of all peptic ulcers. Other gastric disorders including chronic gastritis, mucosal-associated lymphoid tissue (MALT) lymphoma of the digestive tract, and adenocarcinoma of the stomach have been attributed to H. pylori infection (Blaser and Atherton, 2004). Helicobacter pylori is classified as a class I carcinogen by the International Association of Cancer Registries.	Hegarty et al. (1999) isolated actively respiring H. pylori from 40% of surface and 65% of shallow ground water samples tested. H. pylori has also been detected in lakes in the Canadian artic (McKeown et al. 1999), private wells and municipal tap water in Sweden (Hulten et al. 1998), in well water in Japan (Horiuchi et al. 2001), and private well water samples (Baker and Hegarty, 2001). Water source was identified as a risk factor of H. pylori infection among Peruvian children (Klein et al. 1991) irrespective of socioeconomic status. Standardized methods for detection of Helicobacter from water do not exist and negative occurrence data may be unreliable since low nutrient and hyperosmotic conditions can induce a rapid viable nonculturable state (Percival et al., 2004).	*EPA Notes: H. Pylori s included on the final CCL 3*	Yes	Yes	Yes	Yes
Hepatitis A virus	ASDWA	None Provided.	None Provided.		Yes	Yes	Yes	Yes
Hepatitis E virus	ASDWA	None Provided.	None Provided.		Yes	Yes		
Legionella	AWWA	Legionnaires' desease, which has a high fatality rate, produces pneumonia and also affects the nervous, gastrointestinal and urinary systems	Blackburn et al surveillance summary includes drinking water-associated outbreaks of Legionnaires disease (LD) six outbreaks of LD occurred during 2001-2002.In water and the environment Legionella require the presence of other bacteria or protozoa in order to grow. However, biofilm may be an area where Legionella may multiply.	*EPA Notes: L.pnuemophilla is included on the final CCL 3*	Yes	Yes	Yes	Yes

Appendix 2: Microbial Nominations

Supporting Information					CCL 3 Process Status			
Microbial Contaminant (organism or toxin)	**Nominator**	**Health Effect**	**Occurrence**	**Additional Information**	**Universe**	**PCCL**	**Draft CCL 3**	**Final CCL 3**
Methylobacteria	AWWA	Immunocompromised patients. Suggested to monitor for the Methylobacteria in distribution systems in hospital units for immunocompromised patients	Isolated from chlorinated and raw water supplies: potable water and distribution system	Considered an emerging pathogen in Japan	Yes			
Microcystin LR (Cyanobacterial toxin)	AWWA	'Cyanobacteria toxin that causes blood to spill into liver tissue. This bleeding can lead swiftly to death.	None Provided.		Yes	Yes	Yes	Yes
Mimivirus	Anon/ASM	At present, Mimivirus has been implicated in various cases of pneumonia. However, its recent discovery has not provided sufficient time to fully recognize or understand the scope of its health effects and risks. Its ecology is also uncertain, so it is not yet possible to ascertain whether it constitutes an emerging risk, or how it may respond to environmental change. The impact of the Mimivirus on pneumonia warrants further study of it as a CCL 3 organism.	Mimivirus is a recently discovered giant virus that infects amoeba. The virus was discovered in studies of cooling tower water in Bradford, England containing the free-living amoeba, Acanthamoeba polyphaga, which was implicated in a pneumonia outbreak in 1992. Studies of the water revealed a microbe growing in the amoebae that resembled small Gram-positive cocci. The agent has characteristic viral morphology, an icohsahedral capsid, and contains a double-stranded, circular DNA genome of about 800 kilobase pairs. The agent has a typical virus developmental cycle, including an eclipse phase, but it resembles a bacterium when Gram-stained. It has been named Mimivirus for Mimicking microbe, and is the largest known virus. The ecology of Mimivirus is poorly understood, but it is apparently associated with natural waters containing free-living amoeba, and in that respect it resembles Legionella bacteria in its behavior. Genetically similar giant viruses have now been discovered to be widespread in ocean waters as well as freshwater aquatic environments, where they play an important role in controlling		Yes			

Appendix 2: Microbial Nominations

Supporting Information					CCL 3 Process Status			
Microbial Contaminant (organism or toxin)	**Nominator**	**Health Effect**	**Occurrence**	**Additional Information**	**Universe**	**PCCL**	**Draft CCL 3**	**Final CCL 3**
			phyto- and bacterioplankton populations. Hence, these viruses are quite ubiquitous in aquatic habitats. Furthermore, Mimivirus has been implicated in cases of human illness, specifically pneumonia. When Mimivirus is used as an antigen in microimmunofluorescense assays, seroconversion has been documented in patients with both community- and hospital-acquired pneumonia. Additionally, Mimivirus DNA has been found in respiratory samples of patients with hospital-acquired pneumonia. These data suggest that Mimiviruses need to be considered as CCL candidates. They are waterborne microbes and they have been implicated in human illness associated with water exposure, in a manner and natural history similar to that of Legionella, an EPA-regulated pathogen in drinking water. Because little is known about Mimivirus and analytical methods are available to detect it, it deserves consideration and further study.				
Mycobacterium avium complex (MAC)	AWWA	Human infections due to MAC include three principal syndromes: cervical lymphadenitis in children, pulmonary infections in adults, and disseminated infection in AIDS patients. Mycobacterium avium ssp. paratuberculosis has also been implicated in human disease and is suspected of causing a human gastrointestinal ailment (Crohn's disease) [AWWA]	MAC have been isolated from all natural water systems, drinking water, distribution systems, and in biofilms (Grange et al., 1990 Pryor et al. 2004 Whan et al. 2005 Lehtola et al. 2006 Hilborn 2006). Occurrence has been shown to be independent of the presence of coliforms or fecal coliforms (Whan et al. 2005). [AWWA]	*EPA Notes: M. avium is included on the final CCL 3.* This organization also noted: 'MAC are highly resistant to disinfection (Taylor et al., 2000). The organisms are capable of persistence and replication within free-living protists (Mura et al. 2006) ###	Yes	Yes		Yes

Appendix 2: Microbial Nominations

Supporting Information					CCL 3 Process Status			
Microbial Contaminant (organism or toxin)	**Nominator**	**Health Effect**	**Occurrence**	**Additional Information**	**Universe**	**PCCL**	**Draft CCL 3**	**Final CCL 3**
				Mura, M., Bull, T., Evans, H. Sidi-Boumedine, K., McMinn, L., Rhodes, G., Pickup, R., and J. Hermon-Taylor. Replication and Long Term Persistence of bovine and human strains of Mycobacterium avium subsp. paratuberculosis within Acanthamoeba polyphaga. Appl. Env. Microbiol. 72:1:854-859. ### Taylor, R. Falkinham, J., Norton, C., and M. LeChevallier. 2000. Chlorine, chloramine, chlorine dioxide, and ozone susceptibility of Mycobacterium avium. Appl. Env. Microbiol. 66:4:1702-1705.				
Mycobacterium avium complex (MAC)	NRDC	Mycobacterium Avium Complex (MAC) causes lung infections in immunocompromised individuals. Mycobacteria are able to survive and grow in aquatic environments due to their protective outer coating, which also makes them resistant to chlorine treatment of water. Environmental sources are thought to be the main route of transmission of these pathogens. These bacteria are widely present in water sources and can also be found in biofilms that form on the inside of water pipes. About 20 to 30 percent of people with AIDS become infected with MAC. Although adults usually do not get MAC disease until their T-cell	Mycobacteria are able to survive and grow in aquatic environments due to their protective outer coating, which also makes them resistant to chlorine treatment of water. Environmental sources are thought to be the main route of transmission of these pathogens. These bacteria are widely present in water sources and can also be found in biofilms that form on the inside of water pipes. EPA researchers estimate that approximately 1500 individuals with advanced AIDS ingest tap water with detectable concentrations of MAC organisms each day. [NRDC] 'MAC have been isolated from all	*M. avium* is included on the final CCL 3.	Yes	Yes		Yes

Appendix 2: Microbial Nominations

Supporting Information					CCL 3 Process Status			
Microbial Contaminant (organism or toxin)	**Nominator**	**Health Effect**	**Occurrence**	**Additional Information**	**Universe**	**PCCL**	**Draft CCL 3**	**Final CCL 3**
		count drops below 50, children can get it earlier. People with disseminated MAC disease develop fever, night sweats, weight loss, abdominal pain, tiredness, and diarrhea. EPA researchers estimate that approximately 1500 individuals with advanced AIDS ingest tap water with detectable concentrations of MAC organisms each day. A related species typically considered MAC, Mycobacterium avium intracellulare, has been listed in Contaminant Candidate Lists (CCLs) 1 and 2. MAC should be included again in CCL3. The health effects and demonstrated occurrence in drinking water of MAC support the establishment of an MCL for this microbial contaminant.[NRDC]	natural water systems, drinking water, distribution systems, and in biofilms (Grange et al., 1990 Pryor et al. 2004 Whan et al. 2005 Lehtola et al. 2006 Hilborn 2006). Occurrence has been shown to be independent of the presence of coliforms or fecal coliforms (Whan et al. 2005). [AWWA]					
Naegleria fowleri	Anon/ASM	Humans and other mammals contact N .fowleri via swimming, bathing, or in the case of cattle and domesticated animals, drinking from or swimming in water sources where N. fowleri is present. The organism is inhaled and travels up the nasal passageway to t	Documented cases of PAM have been noted worldwide, including the United States, England, Czechoslovakia, and Mexico. The largest number of cases has been observed in the United States (Cabanes, 2001 Rivera, et al, 1993 Kadlec, Cerva, and Skvarova, 1978).	*EPA Notes: N. Fowleri is included on the final CCL 3.* This nominator also noted :'Humans and other mammals contact N .fowleri via swimming, bathing, or in the case of cattle and domesticated animals, drinking from or swimming in water sources where N. fowleri is present. The organism is inhaled and travels up the nasal passageway to the ethmoid sinuses. Penetration of the	Yes	Yes	Yes	Yes

Appendix 2: Microbial Nominations

Supporting Information					CCL 3 Process Status			
Microbial Contaminant (organism or toxin)	**Nominator**	**Health Effect**	**Occurrence**	**Additional Information**	**Universe**	**PCCL**	**Draft CCL 3**	**Final CCL 3**
				mucosa and invasion of olfactory nerves is followed by movement through the cribiform plate to brain tissue and cerebral spinal fluid. Once infected the brain tissue produces toxins that attempt to kill the parasite, but end up emulsifying tissue. The immune response leads to swelling and PAM (Marshall, et al, 1997). N. fowleri is the only member of the species known to be pathogenic to humans. Clinical signs of infection include headache, nausea, vomiting, high fever, lethargy, coma, seizures, and eventually death due to infection and swelling of brain tissue (Marshall, et al, 1997). The average time for onset of symptoms is 4 days. Mean time between onset of symptoms and death is 6.4 days (Parija and Jaykeerthee, 1999 Marshall, et al, 1997). The short onset period and symptoms mimic the flu, allergic reaction or hangover from alcohol. As a result, many cases have been misdiagnosed or not treated in time.				

Appendix 2: Microbial Nominations

Supporting Information					CCL 3 Process Status			
Microbial Contaminant (organism or toxin)	**Nominator**	**Health Effect**	**Occurrence**	**Additional Information**	**Universe**	**PCCL**	**Draft CCL 3**	**Final CCL 3**
Norovirus	AWWA	Infection lasts 12-60 hours and is characterized by sudden onset of nausea, vomiting, and watery diarrhea. Norovirus is highly infective and can be of increased risk for complications because of volume depletion and electrolyte disturbances			Yes	Yes (as Calicivirus)		
Norwalk and other Caliciviruses	ASDWA	None Provided.	None Provided.		Yes	Yes	Yes	Yes
Rotavirus	ASDWA	None Provided.	None Provided.		Yes	Yes		
Toxoplasma gondii	AWWA	Infectious in healthy adults are usually asymptomatic however, severe disease can occur in immunocompromised individuals and newborns.Wide spectrum of clinical disease occurs in congenitally infected children.Toxoplasmic encephalitis [TE] is a serious clinical complication in immunocompromised patients especially AIDS	In certain areas of Brazil, approximately 60% of 6-8 year old children have antibodies to T gondii linked to the ingestion of oocysts in a heavily contaminated environment with T. gondii ooocysts.An outbreak of tosoplasmosis in humans of a western Canadian city was linked epidemiologically to oocyst contamination of a municipal water supply. Between 2894 and 7718 persons were considered to have acquired T. gondii infections. 100 cases of acute toxoplasmosis were reported in patients 8-63 years of age. Although oocysts were not identified in the municipal reservoir, runoff from soil contaminated with feces of infected domestic cats or cougars was considered the likely source.31 infected young army recruits on a jungle exercise in Panama. Numerous reports exist of T. gondii infections in marine mammals including sea otters, dolphins, seals, whales.	Severity of health effects on children	Yes	Yes		

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
96184	1,2,3-Trichloropropane	[NJDEP]	None Provided.	NJ study: Detected in excess of health-based drinking water guidance value in 30 of 2,640 private wells and 11 of approximately 260 community water systems between 1999 and 2004 in NJ SOC Waiver Program sampling. [NJDEP]	Yes	Yes	Yes	Yes	Yes	Yes
123911	1,4-Dioxane	[NYDOH] [EPA Region 3]	Liver and kidney are target organs. Animal studies indicate liver and nasal cancer. IARC: Possibly carcinogenic. EPA: take immediate action of levels exceed 600 ug/L. New York State: MCL = 50 ug/L. California has action level of 3 ug/L. [NYDOH]	One CERCLA remediation site known-Bally site in PA, others may be associated with and TCE site. [EPA Region 3]	Yes	Yes	Yes	Yes	Yes	Yes
611596	1,7-Dimethylxanthine	No	None Provided.	None Provided.	Yes	Yes				
57910	17a-Estradiol	[Riverkeepers]	None Provided.	None Provided.		Yes		Yes		Yes
57636	17a-Ethynyl estradiol	(Fent et al., 2006)	No. Screening Category = Screening Category 1.	Removal efficiency in sewage plants: influent concentration: 0.003 µg/L, effluent concentration: 0.0004 µg/L, maximum removal: 85% (Fent et al., 2006)	Yes	Yes		Yes		Yes
50282	17b-Estradiol	[Riverkeepers]	None Provided.	None Provided.	Yes	Yes		Yes		Yes
68224	19-Norethisterone	[Riverkeepers]	None Provided.	None Provided.		Yes		Yes		Yes
90120	1-Methylnaphthalene	Serdar, D, et al. (1999); Diesel fuel widely used and released. [ASDWA]	None Provided.	5/12 detection frequency from lake water (range of concentrations 0.0016 - 0.012 ug/L). Six samples taken at two sampling events for a total of 12 samples. (Serdar et al 1999). Diesel fuel widely used and released. [ASDWA]	Yes	Yes				
91576	2-Methylnaphthalene	Serdar, D, et al. (1999)	None Provided.	5/12 detection frequency from lake water (range of concentrations 0.0016 - 0.012 ug/L). Six samples taken at two sampling events for a total of 12 samples. (Serdar et al 1999). Diesel fuel widely used and released. [ASDWA]	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	Common Name	References Cited	Supplemental HE DATA provided with Nomination	Supplemental OCC DATA provided with Nomination	Draft Universe Data	Final Universe Data	Draft PCCL	Final PCCL	DRAFT CCL 3	Final CCL 3
					117	131	37	53	17	28
77439760	3-Chloro-4-(dichloromethyl)-5-hydroxy-2-(5H)-furanone	Wright et al 2002; Krasner et al 2006	None Provided.	27.5 ng/L mean, 79.9 ng/L max (Wright et al, 2002)20 ng/L med, 310 ng/L max (Krasner et al, 2006)	Yes	Yes				
80057	4,4'-(1-Methylethylidene)bis phenol (Bisphenol A)	In-text reference cited by NRDC: "Cousins et al., 2002". Alonso-Magdalena, et al. 2006. Hunt, et al. 2003P Sugiura-Ogasawara et al. 2005 Occurrence Data Citations: Biles et al. 1997 Fromme et al 2002	LOEL 20 ug/kg; effect decrease in testicular weight and daily sperm production in adult rats fed BPA for 6 days and observed for 18 weeks.[Sakaue et al 2001]. LOAEL 100 ug/kg-day for 4 days in mice by oral administration; effect: insulin resistance/ intolerance (cited in Alonso-Magdalena et al., 2006, original source vom Saal and Hughes 2005). LOAEL Rapid nongenomic effect at a subcutaneousdose of 10 µg/kg/day, which produces 2.5-fold increase in plasma insulin and a 20% decrease in blood glucose levels, 30 min after its application; delivering BPA either via injection or through oral intake, induced insulin resistance at doses much lower than the LOAEL used up to now (50 mg/kg/day) (Alonso-Magdalena et al., 2006). BPA conc. of 0.02–0.04 mg/kg body weight/day elicited significant meiotic aneuploidy (Hunt et al., 2003). Elevated serum concentrations of BPA are associated with miscarraige (Sugiura-Ogasawara et al., 2005).	Release (U.S) = 1.4 million pounds (2004); 3,538 pounds released directly to water; 132,262 pounds released to the air. [NRDC] Conc. in surface water = 0.0005-0.41 ug/L; [NRDC] Median reported water concentration = 0.5 ug/l (below the detection limit of the studies) and a 90th percentile = 4.4 ug/l (Cousins et al., 2002). Half-life = 4.5 days in surface water; sol.300 g/m3; Log Kow=3.4; HLC (dimensionless) -9.01; HLC 4.03 E-6 Pa m3/mol; Koc 640-930. (Cousins et al., 2002). Production volume = 350 000 t/year (cited in Sugiura-Ogasawara et al., 2005, original sources Biles et al., 1997; Olea et al., 1996; Biles et al., 1999). Conc. in surface water = 0.0005-0.41 mg/L ; Conc. in sewage effluents = 0.018-0.702 mg/L; Conc. in sediments = 0.01-0.19mg/kg; Conc. in sewage sludge = 0.004-1.363 mg/kg dw. (Fromme et al., 2002).	Yes	Yes		Yes		
3380345	5-Chloro-2-(2,4-dichlorophenoxy)-phenol (Triclosan)	(Boyd et al., 2004); (Halden et al., 2005); (Lorraine et al., 2006); (Latch et al., 2004); (Rule et al., 2005)	(Triclosan) acts as by inhibiting bacterial fatty acid synthesis. Triclosan is not banned or restricted as with the other organochlorine compounds included in the test set, as the traditional toxicity test indicate a low toxic effect, with an acute oral LD50 of approx. 4000 mg/kg in rat and mouse, Jinno et al., 1997, (Jacobs et al., 2005).	Triclosan was detected in Louisiana sewage treatment plant effluent at 10-21 ng/l. Boyd (2004) reported triclosan concentrations of ND – 29 ng/l in two stormwater canals in New Orleans. ' Annual loadings of antimicrobials (triclocarbon, TCC and triclosan, TCS) to water resources is as follows: activated sludge treatment plants (39-67%) followed by trickling filters (31-45%), and combined and sanitary sewer	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	Common Name	References Cited	Supplemental HE DATA provided with Nomination	Supplemental OCC DATA provided with Nomination	Draft Universe Data	Final Universe Data	Draft PCCL	Final PCCL	DRAFT CCL 3	Final CCL 3
					117	131	37	53	17	28
				overflows(2-7% and 0.2%) respectivley. The water solubility of TCS is 1.97-4.6 mg/L at 25 degrees C. A strong positive linear correlation was observed between TCC and TCS occurrences across all aquatic environments and water types we examined in a concentration range spanning 5 orders of magnitude. Regression analysis of these data resulted in the empirical model: Log10 Crcc = 0.9491 Log10 Crcs (Halden, 2005). 'Triclosan was detected in most canal waters at concentrations up to 29 ng/L. The median triclosan concentration in Lake waters (4.6 ng/l) was lower compared to canal waters (15 and 15.2 ng/l) and contributed to the possible removal degradation process (Boyd, et al. 2004). 'Occurence of triclosan in raw drinking water was as follows: 4 out of 13 sample contained triclosan; mean detected = 0.515 µg/L, MDL = 0.096, range 0.326-0.818 µg/L. Occurence of triclosan in finished drinking water was as follows: 1 out of 15 samples, mean detected = 0.734µg/L, no range, no MDL. Occurence of triclosan in reclaimed wastewater was as follows: 3 out of 6 samples, mean detected = 1.43 µg/L, MDL 0.25 µg/L, range = 0.28-2.11 µg/L, total mean 0.71 µg/L, literature values = 0.04-0.21 µg/L. Average triclosan concentrations (µg/L) in raw drinking water (RDW), reclaimed water (RW) and wastewater influent (WWI) in the dry season and wet season: RDW dry = 0.73, RDW wet = ND, RW dry = 2.0, RW wet = 0.28, WWI dry = 0.45, WWI wet = 0.30 (Lorraine et al., 2006). In a recent reconnaissance for PPCPs, the USGS detected triclosan in 57% of the 139 streams tested. (Latch et al., 2004).						

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
				Surveys have measured triclosan in wastewater treatment plants (WWTP) influents at levels ranging from 0.0062 to 21.9 µg/L. Reported WWTP effluent concentrations range from 0.042 to 22.1 µg/L (Rule, et al., 2005).						
298464	5H-dibenz[b,f]azepine-5-carboxamide	Stackelberg et al. 2004; Benotti, et al. 2005; Potency: RTECS; Severity: PEDIAU Pediatrics. (American Academy of Pediatrics, P.O. Box 1034, Evanston, IL 60204) V.1-1948- Volume(issue)/ page/year 73,841,1984; Prevalence/ Magnitude: NREC.	None Provided.	Highest concentration in finished water: 0.258 ug/l (Stackelberg et al. 2004) Long Island Ground Water Shallow well-median concentration in NG/L = 57.9; Shallow well Freq. of Detect (n=20) = 50; Deep-well median conc. (ng/l) = 3.8; Deep well Freq of detect (n=52) = 55.8. Jamaica Bay Conclusions: Measured effluent conc ng/l 65.3; Dynamic Range 66.6; Microbrial Degradation (amount of spike removed in 4 weeks) <5% (Benotti, et al.2005)	Yes	Yes				
15972608	Alachlor	Barbash et al 2001	None Provided.	Detection in ground water at concentrations >1 ug/L. (Barbash et al 2001).	Reg	Reg				
142363539	Alachlor ethanesulfonic acid	USGS & NYS DEC 1998	None Provided.	Maximum concentrations in well water greater than 20 ug/L. (USGS & NYS DEC 1998)	Yes	Yes	Yes	Yes	Yes	Yes
171262172	Alachlor oxanilic acid	USGS & NYS DEC 1998	None Provided.	Maximum concentrations in well water greater than 20 ug/L. (USGS & NYS DEC 1998)	Yes	Yes	Yes	Yes	Yes	Yes
18559949	Albuterol	No	None Provided.	None Provided.	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
116063	Aldicarb	Fiore et al 1986 Hajoui et al 1992 Smulders 2003	Statistically significant negative correlation was noted between household well aldicarb levels (ppb) and T4:T8 ratio values (r = -0.34, P < 0.02). Statistically significant negative correlation was observed between average daily aldicarb ingestion (txg/day) and T4:T8 ratio values (r = -0.30, P < 0.05). When average aldicarb ingestion values (ixg/day) are grouped into three dose categories (no aldicarb, 0.3-10.0 and 10.1 to 48.3 txg/day), this dose-response trend is evident. Significant positive correlations were noted between average daily aldicarb ingestion (p~g/day) and both the Candida proliferation assays (r = +0.42, P < 0.01) and the Candida stimulation indices (r = +0.37, P < 0.01). No significant correlations were noted for the other antigen or mitogen assays. (Fiore 1986) IC50 > 1 mM. (Smulders 2003)	More than 1100 wells tested positive for aldicarb residues above 7 ppb in New York's Suffolk County. First detected in Wisconsin groundwater, more than 300 wells have tested positive for aldicarb residues at levels ranging from I to I00 ppb. (Fiore 1986) Detected in well water near potato fields in Ontario, Quebec and the Maritimes at low levels of up to 6 ppb, exceptionally reaching as high as 30 ppb. (Hajoui et al 1992)	Reg	Reg				
1646884	Aldicarb sulfone	USEPA 2000a; Mays et al. 1985; Schleien 1992; USEPA 1999; Parsa 1998; Focazio et al. 2001; USEPA 2000b; Szabo et al. 2005 (AWWA)	Cholinesterase inhibitor. RfD (EPA, mg/kg/d)=0.001. Observed toxic effect with both long-term and single-dose administration is acetylcholinesterase inhibition. Evidence suggests it is not genotoxic or carcinogenic. (AWWA)	Degrades mainly by biodegradations and hydolysis, persisting for weeks to months. It is one of the most acutely toxic pesticides in use. Frequently found as a contaminant in groundwater - aldicarb sulfoxide and aldicarb sulfone residuals are found in an approx. 1:1 ratio in groundwater (AWWA)	Reg	Reg				
1646873	Aldicarb sulfoxide		Cholinesterase inhibitor. RfD (EPA, mg/kg/d)=0.001. Observed toxic effect with both long-term and single-dose administration is acetylcholinesterase inhibition. Evidence suggests it is not genotoxic or carcinogenic. (AWWA)	Degrades mainly by biodegradations and hydrolysis, persisting for weeks to months. It is one of the most acutely toxic pesticides in use. Frequently found as a contaminant in groundwater - aldicarb sulfoxide and aldicarb sulfone residuals are found in an approx. 1:1 ratio in groundwater (AWWA)	Reg	Reg				
319846	Alpha-HCH	AWWA.	Can cause respiratory difficulty, skin irritation, skin senitization scabis and pediculosis. (AWWA)	Hydrolysis half life ranges between 92 to 71 hours in natural waters (but may be even slower). A Canadian study found levels in finished water. (AWWA)	Yes	Yes	Yes	Yes	Yes	Yes

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
7790989	Ammonium perchlorate	Blount et al., 2006Brechner et al., 2000Schwartz et al, 2001U.S. Government Accountability Office May 2005[NRDC]	DWEL of 24.5 ppb is inadequate (Blount et al., 2006; Brechner et al., 2000; Schwartz et al, 2001)	Detected in PWSs of 26 states and two territories under UCMR 1. Detections range from 4 - 420 ppb; mean = 10 ppb. 109 sites of known perchlorate releases in 29 states (U.S. Government Accountability Office May 2005, [NRDC])	Yes	Yes	Yes	Yes	Yes	Yes
64285069	Anatoxin-a	(Fischer et al., in press); (Batista et al., 2003); (Gilroy et al., 2000); (USEPA 2006) [AWWA]; [ASDWA]	NOAEL 0.5 mg/kg-day (no observed effect); RfD 5x10-4 mg/kg-day (sub-chronic) (USEPA 2006). WHO guidance value for drinking water 1.0 µg MC-LR/l [AWWA]	None Provided.	Yes	Yes	Yes	Yes	Yes	Yes
1912249	Atrazine	Barbash et al 2001 USGS & NYS DEC 1998	None Provided.	Detection in ground water at concentrations >1 ug/L. (Barbash et al 2001) Maximum concentrations in well water 1-10 ug/L. (USGS & NYS DEC 1998)	Reg	Reg				
86500	Azinphos-methyl	Souza et al 2004 Dabrowski et al 2005 Rothlein et al 2006	repro-placental enyzymatic activity.	Presence in 66% of the groundwater samples analysed (Souza et al 2005) Detected in carpet dust samples from 18 out of 26 farmworkers' homes (69%) at median concentration of 5.30 µg/g. LO D for AZM is reported as 0.1ug/g (Rothlein et al. 2006) Ambient concentrations: 0.1-1.7 ug/L (Dabrowski 2005) IRED EEC 16 ppb/ 0.27-7.2 ppb high ann mean. Use - apples4X peaches in IRED - COULD NOT FIND THIS IN ORIGINAL REFERENCES	Yes	Yes	Yes	Yes		
25057890	Bentazone		Long term studies have not indicated a carcinogenic potential. (AWWA)	Broad specturm herbicide used on a variety of crops - very mobile in soils and moderately persistent in the environment.(AWWA)	Yes	Yes	Yes	Yes		

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	Common Name	References Cited	Supplemental HE DATA provided with Nomination	Supplemental OCC DATA provided with Nomination	Draft Universe Data	Final Universe Data	Draft PCCL	Final PCCL	DRAFT CCL 3	Final CCL 3
					117	131	37	53	17	28
85687	Benzyl butyl phthalate (BBP)	IPCS INCHEM 1999Lorraine et al., 2006 Gray et al. 2000Gray et al. 2006Serda	Oral LD50 values for rats from 2 to 20 g/kg body weight, weight loss, apathy, leukocytosis, toxic splenitis and degenerative lesions of the central nervous system with congestive encephalopathy, myelin degeneration, and glial proliferation; detected in one sample in Canada at 2.8 µg/litre (IPCS INCHEM 1999)0.75 g severaly alters sexual differentiation in male rat; proposed preliminary PE-TEDs = 1; Reduced pup weight at birth; As infants, males displayed female-like areolas/nipples; 84% of males with malformations; every reproductive organ significantly affected in male offspring (Gray et al. 2000)LDRE/LDHC = 250/750; High-dose AGD effect, % (mg/kg/day) = 25 (750); Hypospadias at high doses (%) = 30; Cryptorchidism at high doses (%) = 50; Epididymal agenesis at high doses (%) = 65 (Gray et al. 2006).	1) Occurrence and concentrations of BBP in Raw Drinking Water: Occurrences = 2 of 13 samples; MDL = 0.033 µg/L; mean detected = 0.622 µg/L; range = 0.053-1.19 µg/L; total mean = 0.96 µg/L; literature values = 2.95 µg/L. 2) Occurrences and concentrations of BBP in Finished Drinking Water: Occurrence = 5 out of 15 samples; mean = 0.552 µg/L; range = 0.056-0.911; total mean = 0.1184 µg/L; literature values = 0.7. 4) Average BBP concentration in the dry season (August to November) and the wet season (January to June): Raw Drinking Water dry = 0.62 (0.05-1.19) µg/L; Raw Drinking Water Wet = ND; Reclaimed Water Dry = 0.65 µg/L; Reclaimed Water Wet = ND; Wastewater Influent Dry = 3.50 (2.93-4.07); Wastewater Influent Wet = ND (Lorraine et al., 2006).Water sample concentrations: 0.036 ug/L to 0.5 ug/L (Serdar et al. 1999)Concentrations in surface waters generally less than 1 µg/L. Manufacturing facilities released 176 tonnes to the environment in 1993, with about 99% released to the atmosphere; Half-life 1-7 days (IPCS INCHEM 1999) Mississippi River south of St. Louis: up to 2.4 ug/l. Environmental levels of BBP averaged less than 1 ug/l. Residues of BBP in Natural Waters: Waukehagn Harbor, IL, 11/8/77, 0.25 ug/l; Waukegean Creek, IL, 11/8/77, 0.23 ug/l; Up. Saginaw River, MI, 11/10/77, 0.43 ug/l; Low. Saginaw River, MI, 11/10/77, 0.43 ug/l; Illinois River, IL, 11/14/77, 0.47 ug/l; Meramec River, MO, 11/14/77, 0.38 ug/l; Missouri River, St. Louis, MO, 11/16/77, 0.2 ug/l; Missouri River, Weldon, MO, 11/16/77, 0.25 ug/l; Mississippi River N. St. Louis, MO, 11/30/77 0.30 ug/l; Misssissippi S St. Louis, MO, 11/30/77, 2.4 ug/l, San Francisco Bay, ND (Gledhill et al. 1980).	Yes	Yes	Yes	Yes		
98136993	Bromochloroacetaldehyde	[Krasner et al.06]	None Provided.	"sum of haloacetaldehydes," 4 ug/L med, 20 ug/L max, [Krasner et al.06]						
5589968	Bromochloroacetic acid	DBP ICR	None Provided.	72% det; 2.8 u(m?)g/L med; 41.9 ug/L max		Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	Common Name	References Cited	Supplemental HE DATA provided with Nomination	Supplemental OCC DATA provided with Nomination	Draft Universe Data	Final Universe Data	Draft PCCL	Final PCCL	DRAFT CCL 3	Final CCL 3
					117	131	37	53	17	28
83463621	Bromochloroaceto nitrile	Muellner et al, 2007; DBP ICR	in vitro data from Muellner et al, 2007	62% Det, 1.00 ug/L med, 13.4 ug/L max (DBP ICR)	Yes	Yes		Yes		
26482315	Bromochloronitro methane	Plewa2004A; DeAngelo? [EPA Research on HE]; [Krasner et al.06]	Plewa2004A has in vitro data	"sum of halonitromethanes" in effluent. med = 1 ug/L; max = 10 ug/L [Krasner et al.06]						
71133147	Bromodichloroacetic acid	DBP ICR	None Provided.	75% det; med 0; max 32 ug/L		Yes				
918014	Bromodichloronitro methane	Plewa2004A	Plewa2004A has in vitro data	None Provided.	Yes	Yes				
563702	Bromonitromethane	Plewa2004A; DeAngelo? [EPA Research on HE]	Plewa2004A has in vitro data	"sum of halonitromethanes" in effluent. med = 1 ug/L; max = 10 [Krasner et al.06]		Yes				
1689845	Bromoxynil	http://pmep.cce.cornell.edu/profiles/extoxnet/24d-captan/bromoxynil-ext.html	Dogs fed bromoxynil for 90 days at low doses showed unspecified adverse effects at and above 5 mg/kg. In the same type of test, the compound had no observable effect on rats at or below a 16.6 mg/kg/day dose (1). In another study at low doses (up to 50 mg/kg), rats developed no significant abnormalities. In other tests with rats administered low doses (up to 5 mg/kg) for up to two years, there were no significant changes in blood chemistry or in urine. In one documented case of chronic exposure of humans, workers showed symptoms of weight loss, fever, vomiting, headache and urinary problems. Chronic exposure for these four individuals had lasted for about one year. Suspected teratogen, produced birth defects in rats at low oral doses (above 35 mg/kg); compound toxic to mother and fetus at these low doses as well. Toxic effects included abnormal rib formation, and reduced fetal weight. Newborn rabbits had birth defects when bromoxynil was administered to pregnant	0.046 ppb - 95%ile (AWWA)	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
			mothers at doses above 30 mg/kg. In the rabbit, birth defects included changes in bone formation in the skull and hydrocephaly. The available evidence indicates that bromoxynil may pose a teratogenic risk to humans. (http://pmep.cce.cornell.edu/profiles/extoxnet/24d-captan/bromoxynil-ext.html) RfD (EPA, mg/kg/d)=0.02. Developmental or reproductive toxin, moderate acute (PAN)							
63252	Carbaryl	USEPA. Interim Reregistration Eligibility Decision for Carbaryl. Case No. 0080. Revised Oct 22, 2004WHO, USGS (AWWA)	Primary mode of toxic action is through cholinesterase inhibition (ChEI) after single or multiple exposures; Cancer: Q1* for carbaryl is 8.75 x 10-4 (mg/kg/day)-1; Acute Dietary general population (including infants and children) NOAEL = 1, UF = 100; Chronic Dietary (all populations) LOAEL = 3.1, UF = 300. (USEPA. Interim Reregistration Eligibility Decision for Carbaryl. Case No. 0080. Revised Oct 22, 2004)'WHO 10-6 cancer risk 40 µg/L. Thus, 10-4 cancer risk is 4,000 ug/L. (AWWA)	Based on available usage information for the years 1992 through 2001, an annual estimate of total carbaryl domestic usage in agriculture averaged approximately 1.9 million pounds of active ingredient for over 1.3 million acres treated. In 1998, Bayer had estimated approximately 3.9 million pounds total active ingredient sold. The most recent data available to EPA reflects a decline in agricultural usage; carbaryl usage for 2001 was between 1 to 1.5 million pounds active ingredient; Out of 5220 surface water samples analyzed, about 21% (1082) had detections greater than the minimum detection limit (0.063 ppb). The maximum observed concentration for carbaryl in surface water from the non-targeted USGS NAWQA study is 5.5 ppb. Concentrations were low (roughly 0.002 to 0.031 ppb) in raw water and generally lower in treated drinking water; however, the highest concentration detected were in finished drinking water (0.181 ppb); Carbaryl was reported in the raw water of all four community water systems (CWSs) selected to represent impacts from home and garden uses. Concentrations measured in raw water at these sites were low (roughly 0.002 to 0.044 ppb), and detection frequencies ranged from approximately 1 to 20%; In groundwater, US EPA's Pesticides in Groundwater Database reports carbaryl	Yes	Yes	Yes	Yes		

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	Common Name	References Cited	Supplemental HE DATA provided with Nomination	Supplemental OCC DATA provided with Nomination	Draft Universe Data	Final Universe Data	Draft PCCL	Final PCCL	DRAFT CCL 3	Final CCL 3
					117	131	37	53	17	28
				detections in only 0.4% of wells sampled in several states (i.e., California, Missouri, New York, and Rhode Island) as a result of normal agricultural use. Although the maximum concentration detected was 610 ppb in a well in New York, the typical measured concentrations were orders of magnitude lower. The EPA STORET database contains 9389 records showing analysis for carbaryl. Of these, only four reported concentrations above the detection limits, all from one well in Oklahoma in 1988, with concentrations between 0.8 and 1 ppb. In the USGS NAWQA program, 1.1% of groundwater samples recorded results above the detection limit (0.003 ppb), with a maximum concentration of 0.021 ppb. (USEPA. Interim Reregistration Eligibility Decision for Carbaryl. Case No. 0080. Revised Oct 22, 2004)						
6804075	Carbodox	(Mackie et al, 2006);	Carcinogen.[Health Canada]	None Provided.	Yes	Yes				
16887006	Chloride	NYCDEP 2004, (Kaushal et al., 2005);(Hesig et al., 2000)	Increases in salinity up to 1000 mg/L can have leathal or sub-lethal effects on aquatic plants and invertebrates and chronic concentrations of chloride as low as 250 mg/L have been recognized as harmful to freshwater life and not potable for humans (Kaushal et al., 2005).	Surface water: 7.3 - 83.03 mg/L (NYCDEP 2004) In the White Mountains (NH), chloride concentrations in some rural streams now exceed 100 mg/L on a seasonal basis, which is similar to the salt of the Hudson River Estuary. In the Baltimore area, streams with high levels of choloride were associated with impervious surfaces and in many suburban and urban streams now already exceed the maximum limit of 250 mg/L (Kaushal et al., 2005). The concentrations of chloride in baseflow streams sampled in this study ranged from 1.8-280 mg/L (Hesig et al., 2000).	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	Common Name	References Cited	Supplemental HE DATA provided with Nomination	Supplemental OCC DATA provided with Nomination	Draft Universe Data	Final Universe Data	Draft PCCL	Final PCCL	DRAFT CCL 3	Final CCL 3
					117	131	37	53	17	28
1794849	Chloronitromethane	Plewa2004A; DeAngelo ??[EPA Research on HE]; [Krasner et al.06]	Plewa2004A has in vitro data	"sum of halonitromethanes" in effluent. med = 1 ug/L; max = 10 ug/L [Krasner et al.06]						
1897456	Chlorothalonil	AWWA.	None Provided.	half-lives ranging between 0.2 - 9 days (AWWA) chronic EEC 1.3 to 23 ppb; mobile, not persistent.	Yes	Yes	Yes	Yes		
2921882	Chlorpyrifos	Makris 1998 EPA 2000; WHO (AWWA)	Prenatal: Maternal NOEL 0.1 & LOEL 3 (plasma and RBC ChEI); Fetal NOEL greater than equal to 15 (No developmental toxicity observed (fetal ChEI not assessed). Multi-generation repduction: Parental NOEL 0.1 & LOEL 1.0 (plasma and RBC ChEI; histopathology of adrenal in&s; at 5.0 mg/kg/day: brain ChEI), Offspring NOEL 1.0 & LOEL 5.0 (pup weight and survival decreased; ChEI not assessed in pups). No subchronic neurotoxicity. 28-day human oral c: Acute NOEL 01., UF 10, & RfD 0.01, Chronic NOEL 0.03, UF 10, & RfD 0.003. (Makris 1998) Dev neurotoxin. Classified as "moderately hazardous" and has a recommended drinking water guideline of 30 ppb. (AWWA)	USGS 6% prev/PRZM/EXAMS est.6.7 ppb.	Yes	Yes				
57625	Chlortetracycline	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
57885	Cholesterol	[Riverkeepers]	None Provided.	None Provided.	Yes	Yes				
85721331	Cipro-floxacin	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
53418	cis-Androsterone	[Riverkeepers]	None Provided.	None Provided.		Yes				
76573	Codeine	No	None Provided.	None Provided.	Yes	Yes				
360689	Coprostanol	[Riverkeepers]	None Provided.	None Provided.	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
486566	Cotinine	No	None Provided.	None Provided.						
143545908	Cylindrospermopsin	(Fischer et al., in press); (Batista et al., 2003); (Gilroy et al., 2000) (USEPA 2006); [AWWA]; [ASDWA]	LOAEL 60ug/kg-day; NOAEL 30 ug/kg-day; RfD 3x10-5 mg/kg-day (sub-chronic increased kidney weight) (USEPA 2006). WHO guidance value for drinking water 1.0 µg MC-LR/l [AWWA]	None Provided.	Yes	Yes	Yes	Yes	Yes	Yes
67035227	Dehydronifedipine	No	None Provided.	None Provided.	Yes	Yes				
1007289	Deisopropylatrazine	USGS & NYS DEC 1998	None Provided.	Maximum concentrations in well water 1-10 ug/L. (USGS & NYS DEC 1998)	Yes	Yes	Yes	Yes		
6190654	Desethylatrazine		None Provided.	None Provided.	Yes	Yes	Yes	Yes		

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	Common Name	References Cited	Supplemental HE DATA provided with Nomination	Supplemental OCC DATA provided with Nomination	Draft Universe Data	Final Universe Data	Draft PCCL	Final PCCL	DRAFT CCL 3	Final CCL 3
					117	131	37	53	17	28
84742	Di(n-butyl) phthalate	Serdar et al. 1999 Lehmann et al. 2004 Lorraine et al. 2006 Swan et al. 2005	endocrine disruptor [NRDC] prenatal maternal urinary levels (Swan et al. 2005) For rats: LDRE = 50; LDHC = 500. Oral DBP treatments fail to accelerate vaginal opening or induce constant oestrus in the intact female rat. For Rabbits: In rabbits exposed to 400 mg DBP kg/day in utero, (GD 15-29), male offspring exhibited reduced numbers of ejaculated sperm (down 43%), testis weights (at 12 weeks, down 23%) and accesroy sex gland weights (at 12 and 25 weeks down 36% and 25% respectivley). DBP caused an increase from 16% to 30%, p , 0.01 of abnormal sperm were present in 1/17 DBP-treated male rabbits (Gray et al., 2005). Fetal testicular testostorone was significantly reduced at DBP doses> 50 mg/kg/day. Our results establish 50 mg DBP/kg/day as the LOEL and 10 mg DBP/kg/day as the NOAEL for reductions in genes and proteins associated with testosterone production together with reductions in intra-testicular testosterone (Lehmann et al., 2004).	1) Occurrence and concentrations of dibutyl phthalate in Raw Drinking Water: Occurrences = 4 of 13 samples; MDL = 1.35 µg/L; mean detected = 5.00 µg/L; range = 1.44-8.34 µg/L; total mean = 1.54 µg/L; literature values = 0.0.12-8.8 µg/L. 2) Occurrences and concentrations of dibutyl phthalate in Finished Drinking Water: Occurrence = 1 out of 15 samples; mean = 2.73 µg/L; range = N/A; total mean = 0.18 µg/L. 3) dibutyl phthalate in Reclaimed Wastewater: Occurrences = 1 of 6 samples; MDL = 2.70 µg/L; mean detected = 3.71 µg/L; range = N/A; total mean = 0.352 µg/L; literature values = N/A. 4) Average dibutyl phthalate concentration in the dry season (August to November) and the wet season (January to June): Raw Drinking Water dry = 5.00 (1.44-8.3) µg/L; Raw Drinking Water Wet = ND; Reclaimed Water Dry = 3.71 µg/L; Reclaimed Water Wet = ND; Wastewater Influent Dry = 7.54; Wastewater Influent Wet = 214.6 (Lorraine et al., 2006). Water sample concentrations: 0.16 ug/L to 0.2 ug/L (Serdar et al. 1999) Produced at over one million pounds per year [NRDC] DBP in raw and finished drinking water samples [NRDC] DBP was found in only minor concentrations. Surface water concentrations were from 0.12 to 8.80 ug/l-1 (median = 0.50 ug/l -1) for DBP. Out of 39 sewage works outlet samples, DBP could be measured in 34. A large range, from 0.2 to 10.4 ug/l-1 was seen for outlet levels (Fromme et al., 2000). Mean recoveries (%) from water: 104; RSD = 0.3. Minimum Detectable Quantities (MDQ)and limits of detection of the analytical method (LDM): MDQ = 0.003 ng; LDM for water = 0.006 ug/L (Vitali et al., 1997).	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
3397624	Diaminochlorotriazine		None Provided.	None Provided.	Yes	Yes				
333415	Diazinon	Serdar et al. 1999 Frans 2004	None Provided.	Concentrations of diazinon above recommended maximum concentrations; ambient water samples range from 0.023 - 0.42 ug/L (Serdar et al. 1999) Ambient water concentration range: 0.008-0.586 ug/L (Frans 2004)	Yes	Yes	Yes	Yes		
3039132	Dibromoacetaldehyde	[Krasner et al.06]	None Provided.	"sum of haloacetaldehydes," 4 ug/L med, 20 ug/L max, [Krasner et al.06]						
5278955	Dibromochloroacetic acid	DBP ICR	None Provided.	31% Det; 0.00 med; 22 ug/L max		Yes				
1184890	Dibromochloronitro methane	Plewa2004A; DeAngelo ??[EPA Research on HE] [Krasner et al.06]	Plewa2004A has in vitro data	"sum of halonitromethanes" in effluent. med = 1 ug/L; max = 10 ug/L [Krasner et al.06]						
598914	Dibromonitromethane	Plewa2004A	Plewa2004A has in vitro data	None Provided.	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
1918009	Dicamba	Rowland 1998; USEPA 1998; Cox 1994, Muller and Buser 1997; USGS 1998; Grover et al. 1997; SERA 1994b; Miller et al. 1995; Ritter et al. 1996; Majewski and Capel 1995.	EC50 values for sensitive species between 0.1 and 0.2 ppm (ecological value); acute oral LD50 of 2740 mg/kg in rats. (AWWA)	Dicamba was detected in 0.32% of stream samples and 0.12% of samples from major aquifers (USGS 1998) highest level detected was 0.00016 mg/L. In an agricultural area where herbicides are used extensively, dicamba was found in 17%- 55% of water samples from farm ponds and dugout waters (Grover et al. 1997). USGS (1998) found dicamba in 0.11%-0.15% of the groundwaters surveyed. The maximum level detected was 0.0025 mg/L no apparent correlation between the prevalence of dicamba in groundwater from agricultural areas (0.11%) compared with non-agricultural urban areas (0.35%). Several additional studies summarized in SERA (1994b) and studies published in the more recent liberature (Miller et al. 1995, Ritter et al. 1996) report higher frequencies of occurrence of dicamba in groundwater from agricultural areas. (AWWA)	Yes	Yes				
79027	Dichloroacetaldehyde	Krasner et al 2006	None Provided.	1 ug/L med, 14 ug/L max (Krasner et al 2006)	Yes	Yes		Yes		
7119893	Dichloronitromethane	Plewa2004A; DeAngelo ??[EPA Research on HE]; [Krasner et al.06]	Plewa2004A has in vitro data	"sum of halonitromethanes" in effluent. med = 1 ug/L; max = 10 ug/L [Krasner et al.06]						

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
62737	Dichlorvos (DDVP)	Leiss&Savitz 1995Brown et al. 1990NTP 1995	Known carcinogen in animals; associated with leukemia in adult men; several cases of childhood leukemia following exposure to dichlorvos. (Leiss & Savitz 1995)Odds Rations (ORs) for leukemia for subjects who ever personally mixed, handled, or applied dichlorvos (for subjects who first mixed, handled, or applied these insecticide at least 20 years before interview): Without latency considerations, significantly elevated risks were seen (OR 2.0), Significantly elevated risks by histological type (without latency considerations) were seen for CLL among persons who ever handled the dichlorvos (OR 2.2, 95% CI 1.0-4.6; 11 cases) and for CML among farmers who ever handled dichlorvos (OR 3.3, 95% CI 1.0-10.6; 4 cases); risks were greatest for subjects who handled the insecticide for >10 days/year; ORs for the most frequent users were significantly elevated for dichlorvos (OR 3.8). (Brown et al. 1990)Using more current EPA data than the 2000 USEPA. HED preliminary risk assessment for Dichlorvos.NTP clear evidence	USDA's Pesticide Data Program water monitoring data were available and all samples had non-detectable residues (LODs ranged from 6 to 22.5 ppt) and were not considered sufficiently representative; Dichlorvos appears to degrade through aerobic soil metabolism and abiotic hydrolysis, but is secondary to volatilization. Hydrolysis is pH dependant where the half lives were 11 days at pH 5, 5 days at pH 7 and 21 hours at pH 9. (USEPA Interim Reregistration Eligibility Decision for Dichlorvos DDVP 2006)	Yes	Yes	Yes	Yes		

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
115322	Dicofol	Hoekstra 2006Thibaut et al 2004OPP 1998	The o,p'- and p,p'-substituted isomers of dicofol were found to induce b-galactosidase production and/or transactivation using the yeast-based steroid hormone receptor gene transcription assay; EC50 for activity of p,p'- and (±)-o,p'-dicofol was 4.2x10-6 and 1.6x10-6 M, respectively, which were significantly greater than the EC50 for (+)-17b-estradiol (3.7x10-10 M). Enantiomer-specific activity of o,p'-dicofol with the hER (assumed from b-galactosidase activity) was observed. The b-galactosidase induction by (-)-o,p'-dicofol (EC50: 5.1x10-7 M) was greater than the racemic mixture. (Hoekstra 2006)Dicofol at a concentration of 100 uM significantly inhibited the synthesis of T by 16%; The strongest inhibitor was dicofol, at a concentration of 100 uM led to 90% inhibition; Concerning the synthesis of 5 -DHT, dicofol was the strongest inhibitor (74%). Significantly inhibited T glucuronidation (81% inhibition; IC50 293±11 uM) with no significant effect on E2-UGT (Thibaut et al 2004)	Since the first-order degradation half-lives for dicofol in water is <1–85 days (pH 5–9), it is unlikely that environmental concentrations will meet or exceed the threshold values calculated in this study. (Hoekstra 2006)SciGrow90d avg peak = 0.69; Mean SW = 0.5 ppb	Yes	Yes	Yes	Yes		

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
84662	Diethyl phthalate (DEP)	Serdar et al. 1999 Vitali et.al, 1997Lorraine et al. 2006Swan et al.	prenatal maternal urinary levels (Swan et al. 2005)	Water sample concentrations: 0.015 ug/L to 0.34 ug/L (Serdar et al. 1999). 1) Occurrence and concentrations of DEP in Raw Drinking Water: Occurrences = 2 of 13 samples; MDL = 0.49 µg/L; mean detected = 1.20 µg/L; range = 0.899-1.49 µg/L; total mean = 0.096 µg/L; literature values = 0.16-0.3 µg/L. 2) Occurrences and concentrations of DEPin Finished Drinking Water: Occurrence = 1 out of 15 samples; mean = 2.47 µg/L; range = N/A; total mean = 0.16 µg/L. 3) DEP in Reclaimed Wastewater: Occurrences = 1 of 6 samples; MDL = 0.97 µg/L; mean detected = 2.10 µg/L; range = N/A; total mean = 0.394µg/L; literature values = N/A. 4) Average DEP concentration in the dry season (August to November) and the wet season (January to June): Raw Drinking Water dry = 1.49 µg/L; Raw Drinking Water Wet = 0.90; Reclaimed Water Dry = 2.10 µg/L; Reclaimed Water Wet = ND; Wastewater Influent Dry = 14.8 (6.31-23.7); Wastewater Influent Wet = 7.5 (5.3-9.7) (Lorraine et al., 2006). Mean recoveries (%) from water: 78; RSD = 0.8. Minimum Detectable Quantities (MDQ)and limits of detection of the analytical method (LDM): MDQ = 0.004 ng; LDM for water = 0.008 ug/L (Vitali et al., 1997).	Yes	Yes				
1672464	Digoxigenin	No	None Provided.	None Provided.	Yes	Yes				
20830755	Digoxin	No	None Provided.	None Provided.	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	Common Name	References Cited	Supplemental HE DATA provided with Nomination	Supplemental OCC DATA provided with Nomination	Draft Universe Data	Final Universe Data	Draft PCCL	Final PCCL	DRAFT CCL 3	Final CCL 3
					117	131	37	53	17	28
28553120	Diisononyl phthalate (DINP)	Gray et al. 2000 Swan et al. 2005 [NRDC]	Reduced pregnancy weight gain to gesgational day 21 by 14 grams; 22% of infant males displayed female-like areolas/nipples; 7.7% of males with malformations; maternal treatment (0.75 g/kg/day from GD 14 to day 3 of lactation) significantly increased the incidence of male offpsring with reproductive malformations on an individual (Gray et al. 2000) DINP produced in volumes of over 1 million pounds per year [NRDC] endocrine disruptor [NRDC] prenatal maternal urinary levels (Swan et al. 2005)	The Institute for Health and Consumer Protection (IHCP) of the European Chemicals Bureau has estimated a half life in surface water for DINP of 50 days. According to the IHCP, 82 percent of any DINP discharged by sewage treatment plants will be adsorbed on to sludge, 10 percent will be degraded and 1 percent will be stripped to air. The remaining 7 percent will be released in the effluent. [NRDC]	Yes	Yes				
108203	Diisopropyl ether	[NYDOH] ; NEIWPCC, 2001)	Animal studies have indicated that ethers have toxic effects such as “increased adrenal gland, liver, kidney weights and neurological effects" NEIWPCC, 2001.	Water solubility(Cs(o)) (mg/l) = 9000@ 20 degrees C, 2039; Log Kow = 1.52; Henrys Law Kh (atm-m3)/(gmole) = {9.97E-3, 4.77E-3, 5.87E-3}; Henry's Law Dimensionless(h/rt) = {4.045E-1, 1.95E-1, 2.399E-1}; Log Koc {1.82, 1.46} NEIWPCC, 2001.	Yes	Yes				
42399417	Diltiazem	No	None Provided.	None Provided.	Yes	Yes				
564250	Doxy-cycline	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
76420729	Enalaprilat	No	None Provided.	None Provided.	Yes	Yes				
115297	Endosulfan	Wilson & LeBlanc 1998 Sinha et al 1997 Sinha et al 1991 Lakshmana & Raju 1994 USEPA 2002. Reregistration Eligibility Decision for Endosulfan	Chronic Dietary: NOAEL = 0.6, UF = 100, FQPA SF = 10, LOAEL = 2.9 mg/kg/day based on reduced body weight gain, enlarged kidneys, increased incidences of marked progressive glomerulonephrosis; & blood vessel aneurysms in male rats; Chronic RfD = 0.006 mg/kg/day cPAD = 0.0006 mg/kg/day. Endosulfan is highly toxic following acute oral exposure and moderately toxic following acute inhalation exposure. In rats, oral median	The STORET data are not reliable enough to enable an accurate quantitative assessment of the endosulfan distribution throughout the U.S., but it does give some insight into where endosulfan is being found. The mean concentration found in this data is 0.17 ppb, with a standard deviation of 0.98 ppb. The 90th percentile value (one in ten year value) was 0.31 ppb and the median value was 0.03 ppb. The Pesticides in Ground Water Database	Yes	Yes	Yes	Yes		

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	Common Name	References Cited	Supplemental HE DATA provided with Nomination	Supplemental OCC DATA provided with Nomination	Draft Universe Data	Final Universe Data	Draft PCCL	Final PCCL	DRAFT CCL 3	Final CCL 3
					117	131	37	53	17	28
			lethal doses (LD50 values) are 82 mg/kg (males) and 30 mg/kg (females). Median lethal concentrations (LC50 values) in rats following acute inhalation exposure range from 0.16 to 0.5 mg/L. Endosulfan is considerably less lethal, however, following acute dermal exposure (LD50 is 2.0 g/kg). (USEPA 2002. Reregistration Eligibility Decision for Endosulfan) All female mice exposed to endosulfan survived and appeared normal. Exposure of mice to 7.5 mg/kg/day of endosulfan resulted in an 3.6-fold increase in the rate of urinary elimination of [14C]androgen. Overall, 7.5 mg/kg/day of endosulfan resulted in a 1.6-fold increase in testosterone hydroxylation; however, 16b hydroxylation was increased ;3.3-fold, with lesser effects in 6a and 16a hydroxylation. (Wilson & LeBlanc 1998) A dose dependent reduction in the number of sperm count was recorded in all the group. The percent decrease observed were 39, 62 and 75 % for 2.5, 5.0 and 10.0 mg/kg endosulfan respectively as compared to the control group. A significant elevation in the activities of the enzymes LDH, GGT and G6PDH was recorded in all the treated group in a dose dependent manner (P<0.001). The degree of elevation being maximum in the highest dose group i.e. 10 mg/kg body weight (95.73% for LDH, 50.19% for GGT and 45.43 % for G6PDH) as compared to the control. However, SDH registered a decrease in its activities in a dose (p(O.001) dependent manner, the highest group showing maximum effect (58.94 %) as compared to the controls. (Sinha et al 1997)	(PGWDB) reports detections of endosulfan, ranging from trace to #20 ppb, in 1.3% of 2410 discrete samples (32 wells). Detections were reported in California, Maine, and Virginia. All sampling was conducted on or before the year 1989. The abbreviated nature of the PGWDB does not capture important factors such as depth of the water table, soil permeability, proximity of crops to wells, usage (application) of the chemical in the years prior to sampling, suitability of the analytical methodology used and/or limits of detection. Endosulfan sulfate was detected in 0.3% of the samples (6 out of 1,969), with detections ranging from < 0.005 to 1.4 ppb. The detections were reported in Indiana and New York. Sampling occurred at or prior to 1990. (USEPA 2002. Reregistration Eligibility Decision for Endosulfan) RED EEC = 0.53 -1.5 ppb						

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
93106606	Enrofloxacin	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
517099	Equilenin	[Riverkeepers]	None Provided.	None Provided.		Yes		Yes		Yes
474862	Equilin	[Riverkeepers]	None Provided.	None Provided.		Yes		Yes		Yes
114078	Erythoromycin-H20	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes		Yes		Yes
50271	Estriol	[Riverkeepers]	None Provided.	None Provided.		Yes		Yes		Yes
53167	Estrone	(Boyd et al., 2004)	None Provided.	Estrone was detected, but determined non-quantifiable in 6 of 7 samples from Lake Pontchartrain. Surrogate standards in ultra-pure water yielded recoveries of 57-67% for estrone-d4.		Yes		Yes		Yes
637923	Ethyl-tert-butyl ether	[NYDOH]; NEIWPCC, 2001)	Animal studies have indicated that ethers have toxic effects such as “increased adrenal gland, liver, kidney weights and neurological effects" (NEIWPCC, 2001)	water solubility (Cs(o)) =~26,000 mg/L'; Log Kow = 1.74; H=2.66E-3 (atm-m3)/(g-mole); H/RT=1.087E-1; Log Koc={2.2, 0.95} ; (NEIWPCC). Min. Conc. detected in GW from leaking USTs = 0.35 ug/L; Max. Conc. detected in GW from leaking USTs = 7,500 ug/L; Median Conc. detected in GW from leaking USTs = 4 ug/L; Mean Conc. detected in GW from leaking USTs = 260 ug/L (Shih et al., 2004).	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
2164172	Fluometuron	http://www.epa.gov/iris/subst/0241.htm http://extoxnet.orst.edu/pips/fluometu.htm EPA, PAN, USGS (AWWA)	NOAEL: 250 ppm diet (12.5 mg/kg/day). RfD 1.3E-2 mg/kg/day. 90-Day Feeding - rat: NOEL=7.5 mg/kg/day; LEL=75 mg/kg/day (decrease in body weight and enlarged spleens); no core grade. 90-Day Feeding - dog: NOEL=10 mg/kg/day; LEL=100 mg/kg/day (inflammatory reaction in kidney and liver); no core grade. Teratology - rabbit: Maternal and Fetotoxic NOEL not established; LEL=50 mg/kg/day; minimum for teratogenicity otherwise supplementary. 103-Week Feeding - mouse: NOEL=500 ppm (75 mg/kg/day); LEL=1000 ppm (150 mg/kg/day) (marginal increase in liver tumors); no core grade. (http://www.epa.gov/iris/subst/0241.htm) RfD (EPA, mg/kd/d) = 0.013. Possible carcinogen. (AWWA)	Highly persistent in water, half-life of fluometuron in water 110 to 144 weeks; stable at pH values ranging from 1 to 13, at 20 C. However, exposure of 10 ppm aqueous solutions of fluometuron to natural sunlight resulted in 88% decomposition in 3 days, with a half-life of 1.2 days. (http://extoxnet.orst.edu/pips/fluometu.htm) 0.046 ppb 95%ile (AWWA)	Yes	Yes	Yes	Yes		
54910893	Fluoxintine	No	None Provided.	None Provided.	Yes	Yes				
25812300	Gemfibrozil	No	None Provided.	None Provided.	Yes	Yes				
2163680	Hydroxyatrazine	USGS & NYS DEC 1998	None Provided.	Maximum concentrations in well water 0.1 to 1 ug/L. (USGS & NYS DEC 1998)	Yes	Yes				
154212	Lincomycin	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	Common Name	References Cited	Supplemental HE DATA provided with Nomination	Supplemental OCC DATA provided with Nomination	Draft Universe Data	Final Universe Data	Draft PCCL	Final PCCL	DRAFT CCL 3	Final CCL 3
					117	131	37	53	17	28
330552	Linuron	http://extoxnet.orst.edu/pips/linuron.htmUSGS 1992 Pesticide Use MapsCook et al 1993Gray 99	Chronic toxicity: Skin sensitization was seen in guinea pigs repeatedly exposed. Alterations in red blood cells were seen in rats given 2.75 mg/kg/day over 2 years. Anemia was seen in dogs at doses above 6.25 mg/kg/day. Reproductive effects: In a three-generation study, no reproductive effects were observed at doses of 12.5 mg/kg/day. These data suggest that reproductive effects are unlikely in humans at expected exposure levels. Teratogenic effects: Pregnant rabbits fed high doses of linuron during the sensitive period of pregnancy had normal offspring at doses of up to 25 mg/kg/day, even though maternal weight gain was reduced. In rats, doses of 6.25 mg/kg/day did not produce teratogenic effects. These data suggest that linuron is not likely to cause birth defects. Linuron is either nonmutagenic or slightly mutagenic. Carcinogenic effects: Several animal studies of mice, rats, and dogs have shown that it produces nonmalignant liver and testicular tumors. In these studies, doses of 72.5 mg/kg/day in rats caused testicular adenomas and 180 mg/kg/day in mice caused hepatocellular adenoma. These data are not sufficient to determine linuron's carcinogenicity to humans. Organ toxicity: Rats and dogs fed linuron for 2 years had detectable residues of linuron in their blood, fat, kidney, and spleen, but these did not seem to be associated with adverse effects. Fate in humans and animals: In rats, linuron breaks down completely after passing through the liver. It is thus unlikely to bioaccumulate in mammalian systems. (http://extoxnet.orst.edu/pips/linuron.htm) Testosterone IC50(nM) 64,000 +/- 11,000. (Cook et al 1993)	1992 estimated annual agricultural use: 1,920,784 total pounds applied in US. (USGS 1992 Pesticide Use Map)State Monitoring data. SW Est. 18 ppb.	Yes	Yes	Yes	Yes		

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
121755	Malathion	WHO, AWWA	WHO: the presence of malathion in drinking water under usual conditions is unlikely to represent a hazard to human health. (AWWA)	log n-octanol-water partition coefficient 2.36 - 2.89, solubility in water 145 mg/L at 25 oC (AWWA)	Yes	Yes	Yes	Yes		
7439965	Manganese	Wasserman et al. 2006 Tasker et al. 2003	Investigation of intellectual function in 142 10-year-old children in Bangladesh, who had been consuming well water with an average concentration of 793 ppb found that water manganese was associated with reduced scores on standardized intelligence testing; adverse neurologic effects (Wasserman et al. 2006)	Roughly 6% of domestic wells have manganese concentrations that exceed 300 ppb; (Wasserman et al. 2006). Mother blood: 6.3 - 151.2 ug/l; cord/newborn blood: 14.9 - 92.9 ug/l; mother hair: 0.10 - 3.24 ug/l; cord/newborn hair: 0.05 - 13.33 ug/l; mother placental: 0.01 - 0.49 ug/l (Tasker et al. 2003)	Yes	Yes				
93652	Mecoprop	Serdar et al 1999 Frans 2004	None Provided.	Ambient water concentrations up to 0.19 ug/L (Serdar et al 1999) Ambient water concentrations up to 0.69 ug/L (Frans 2004)	Yes	Yes				
72333	Mestranol	(Fent et al., 2006)	None Provided.	"A survey in the U.S.A showed that...maximum and median…levels of mestranol were 407 and 74 ng/L, respectively". Detected in 10 of 16 stream samples. (Fent et al,06 citing Kolpin 2002).	Yes	Yes		Yes		Yes
657249	Metformin	No	None Provided.	None Provided.	Yes	Yes				
298000	Methyl parathion	EPA, PAN, USGS (AWWA)	Interferes with the normal way that the nerves and brain function. RfD (EPA, mg/kd/d)=0.00025. Chlolinesterase inhibitor (AWWA)	0.006 ppb 95%ile and 0.061 max (AWWA)	Yes	Yes				
51218452	Metolachlor	USGS & NYS DEC 1998	None Provided.	Maximum concentrations in well water greater than 20 ug/L. (USGS & NYS DEC 1998)	Yes	Yes	Yes	Yes	Yes	Yes
171118095	Metolachlor ethanesulfonic acid	USGS & NYS DEC 1998	None Provided.	Maximum concentrations in well water greater than 20 ug/L. (USGS & NYS DEC 1998)	Yes	Yes	Yes	Yes	Yes	Yes
152019733	Metolachlor oxanilic acid	USGS & NYS DEC 1998	None Provided.	Maximum concentrations in well water greater than 20 ug/L. (USGS & NYS DEC 1998)	Yes	Yes	Yes	Yes	Yes	Yes

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
101043372	Microcystin LR	(USEPA 2006) [AWWA]; [ASDWA]	Cyanobacteria toxin that causes blood to spill into liver tissue. This bleeding can lead swiftly to death."[AWWA] NOAEL 3 ug/kg-day (no observed effect); RfD 3x10-6 mg/kg-day (chronic) (USEPA 2006)	None Provided.	Yes	Yes	Yes	Yes	Yes	Yes
17157481	monobromoacetaldehyde	Krasner et al 2006 (?-not on analyte list)	None Provided.	"sum of haloacetaldehydes," 4 ug/L med, 20 ug/L max. Incl. Monobromo? [Krasner et al.06]		Yes				
107200	monochloroacetaldehyde		None Provided.	"sum of haloacetaldehydes," 4 ug/L med, 20 ug/L max, [Krasner et al.06]	Yes	Yes		Yes		
91203	Naphthalene	(Serdar et al, 1999); [ASDWA]	None Provided.	7/12 detection frequency from lake water (range of concentrations 0.016 - 0.083 ug/L) Six samples taken at two sampling events for a total of 12 samples. (Serdar et al, 1999); Diesel fuel widely used and released. [ASDWA]	Yes	Yes	Yes	Yes		
14797558	Nitrate	[TXCEQ, ASDWA]	None Provided.	Texas study indicated half of water systems using chloramines had detectable nitrite, and as many as 10% detected nitrite in excess of the MCL in at least one sample. [TXCEQ, ASDWA]	Reg	Reg				
14797650	Nitrite	[TXCEQ, ASDWA]	None Provided.	Texas study indicated half of water systems using chloramines had detectable nitrite, and as many as 10% detected nitrite in excess of the MCL in at least one sample. [TXCEQ, ASDWA]	Reg	Reg				
55185	N-Nitrosodiethylamine (NDEA)	AMWA; (no useful data in AWWARF Reports 2867 or 2900; other AWWARF reports not yet released)	Probable human carcinogen [AMWA]	None Provided.	Yes	Yes	Yes	Yes	Yes	Yes

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
62759	N-Nitrosodimethylamine (NDMA)	AMWA nomination, ASDWA nomination, AWWARF Report 2867, AWWARF Report 2900 (other AWWARF reports not yet released)	Probable human carcinogen [AMWA]. DHHS has determined NDMA "may reasonably anticipated to be a human carcinogen." [ASDWA] Cancer lowest TD50 = 0.096 mg/kg/day in rat with target organs liver, kidney, lungs, testes and vasculature; also found TD50 of 0.189 mg/kg/day in mouse with target organs liver and nervous system (study by Gold, 2005). Predicted LOAEL = 2.7 mg/kg/day according to TOPKAT model (AWWA Report 2867)	Found in groundwater associated with rocket fuel [ASDWA] Levels of NDMA found in drinking water are generally below 10 ng/L. Valentine et al 2005 found a median NDMA concentration of 0.0005 ug/L and a max (or 90th %ile?) concentration 0.0011 ug/L in chlorinated water (AWWARF Report 2867). NDMA can be formed by reaction of chloramines with NOM under normal conditions used by chloraminating facilities (AWWARF report 2900).	Yes	Yes	Yes	Yes	Yes	Yes
621647	N-Nitrosodi-n-propylamine (NDPA)	AWWARF Report 2867 (no useful data in AWWARF Report 2900; other AWWARF reports not yet released)	Cancer TD50 in rat = 0.186 mg/kg/day (AWWARF 2867)	None Provided.	Yes	Yes	Yes	Yes	Yes	Yes
25154523	Nonylphenol (NP)	Occurrence Data Citations: Ying, et al. 2002; Gatidou, et al. 2007	Estrogenic effects are present at tissue concentrations of 0.1 µM for octylphenol and 1 µM for nonylphenol [NRDC]	Production Volume = 450,000,000 pounds of Alkylphenols and polyethoxylates (APEs) produced annually (U.S.) [NRDC]Production volume = 500,000 tons produced annually worldwide (cited in Ying et al., 2002, original source Renner, 1997; Sole et al., 2000)Concentration in Sewage Treatment Plants = 0.18– 15.9 ug/L (cited in Ying et al., 2002, original source Naylor et al., 1992). Half-life in river water = 35–58 days (cited in Ying et al., 2002, original source Ekelund et al., 1993).LOD in wastewater + sewage sludge = 0.03 ug/L; LOQ in wastewater + sewage sludge = 0.11 ug/L (Gatidou et al., 2007) NP concentration records for surface waters, (ug/l): 1) Sample number = 14; range= <LOD-1.19; median= 1.52, 2) Sample Number = 5; range = 12-95; median = 48, 3) Sample number = 22; range = 0.077-0.416; median = 0.2, 4) Sample Number = 30 (rivers); range = <0.11-0.64; median = 0.12 (Ying et al. 2002).	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	Common Name	References Cited	Supplemental HE DATA provided with Nomination	Supplemental OCC DATA provided with Nomination	Draft Universe Data	Final Universe Data	Draft PCCL	Final PCCL	DRAFT CCL 3	Final CCL 3
					117	131	37	53	17	28
9016459	Nonylphenol ethoxylate (NPE)	Occurrence Data Citations: Ying,et al. {NRDC}	Estrogenic effects are present at tissue concentrations of 0.1 µM for octylphenol and 1 µM for nonylphenol [NRDC]	Production Volume = 450,000,000 pounds of Alkylphenols and polyethoxylates (APEs) produced annually (U.S.) [NRDC] 'Nonylphenol mono ethoxylate concentrations (ug/l for the following records: 1) Sample number = 22; range = 0.056-0.326; median =0.145 2) Sample Number = 30 (rivers) (ug/l) range = <0.06-0.60; median = 0.09 (Ying et al., 2002). Nonphenyl diethylate concentrations for: 1) Sample number = 22; range = 0.038-0.398; median = 0.176. 2) Sample number = 30 (rivers) , range = <0.07-1.2; median = 0.1 (Ying et al. 2002). Nonylphenol Triethyloxylate concentrations for: 1) Sample number = 22; range = 0.026-0.398; median = 0.153. 2) 30 samples (rivers) (ug/l), range = <1.6-14.9; median = 2, 3) Sample number = 14;, range = <LOD-17.8; median = 6.97, (Ying et.al, 2002).	Yes	Yes				
70458967	Norfloxacin	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
27193288	Octylphenol (OP)	[NRDC], Ying et al 2002; Gatidou et al 2006.; NEIWPCC, 2004	Animal studies have indicated that ethers have toxic effects such as “increased adrenal gland, liver, kidney weights and neurological effect" NEIWPCC, 2001.	Water solubility (at 20ºC) = 12.6 mg/l; log Kow = 4.12; Halflife=8.1-51 days (Ying et al. 2002). Occurance of OP has been widely reported around the world (world data is available). Concentration in surface waters of the USA: In 14 rivers, OP showed a range <LOD - 0.81 (mean of 0.017); In 22 rivers, OP showed a range 0.00156 - 0.007 (mean 0.002) (Ying et al. 2002). Detection in 3 WWTP samples [Gatidou et al]	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
9036195	Octylphenol ethoxylate (OPE)	[NRDC], Ying et al 2002; Gatidou et al 2006.	None Provided.	Octylphenol monoethoxylate (OPE1): Water solubility (at 20ºC) = 8.0 mg/l; log Kow = 4.10 (Ying et al. 2002). Octylphenol diethoxylate (OPE2): Water solubility (at 20ºC) = 13.2 mg/l; log Kow = 4.00 (Ying et al. 2002). Octylphenol triethoxylate (OPE3): Water solubility (at 20ºC) = 18.4mg/l; log Kow = 3.90 (Ying et al. 2002). Octylphenol tetraethoxylate (OPE4): Water solubility (at 20ºC) = 24.5 mg/l; log Kow = 3.90 (Ying et al. 2002). Detection in 3 WWTP samples [Gatidou et al]	Mix	Mix				
79572	Oxytetracycline	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
	Paroxetine metabolite	No	None Provided.	None Provided.						
14797730	Perchlorate	Glinoer, D. 2001. Rovet, JF. 2002. Haddow, JE, 1999. Allan WC, 2000. Clewell RA, 2003 Kirk AB, 2005 ;Blount BC, 2006 Blount BC, 2006 ;Brechner RJ, 2000 USEPA. Unregulated Contaminant Monitoring Rule (Jan 2005). USEPA (2004).	Epi Study in Az determined 6 ppb in drinking water associated with decreased newborn TSH levels. [Brechner et al 2000]	None Provided.	Yes	Yes	Yes	Yes	Yes	Yes

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
		Known perchlorate releases in the US.								
375224	Perfluorobutanoic acid	NJDEP 2006 Statewide survey. Minn; NJ; Ohio; WV	Suspected toxicity, Risk assessment in progress refer to OPPT's PFOA web site [nominator. SB note - only says 'nominator' in spreadsheet. Assuming this to be EPA R3]. EPA and NJDEP assessing health effects. [NJDEP]	PFOA and PFBA replaced PFOS in many application, but all three are highly persistant in the environment and appear to accumulate in the blood proteins of humans with a half life of about 4 years. [nominator, assumed EPA R3]	Yes	Yes				
335671	Perfluorooctanoic acid	NJDEP 2006 Statewide survey. Minn; NJ; Ohio; WV	Suspected toxicity, Risk assessment in progress refer to OPPT's PFOA web site [nominator. SB note - only says 'nominator' in spreadsheet. Assuming this to be EPA R3]. EPA and NJDEP assessing health effects. [NJDEP]	PFOA and PFBA replaced PFOS in many application, but all three are highly persistent in the environment and appear to accumulate in the blood proteins of humans with a half life of about 4 years. [nominator, assumed EPA R3]. 2006 Occurrence data from NJ indicate PFOA was quantitated at 65% of water systems sampled (78% of systems if non-quantifiable detects are considered). Concentrations ranged from 0.003 ppb to 0.039 ppb. [NJDEP]	Yes	Yes	Yes	Yes	Yes	Yes
1763231	Perfluorooctanoic sulfonate	NJDEP 2006 Statewide survey. Minn; NJ; Ohio; WV	Suspected toxicity, Risk assessment in progress refer to OPPT's PFOA web site [nominator - assumed to be EPA R3]. EPA and NJDEP assessing health effects. [NJDEP]	PFOS was phased out by 3M, in 2002 due to toxicity. PFOA and PFBA replaced PFOS in many application, but all three are highly persistent in the environment and appear to accumulate in the blood proteins of humans with a half life of about 4 years. [nominator, assumed EPA R3]. 2006 Occurrence data from NJ indicate PFOS was quantitated at 30% of water systems sampled (57% of systems if non-quantifiable detects are considered). Concentrations ranged from 0.0023 ppb to 0.019 ppb. [NJDEP]	Yes	Yes		Yes		Yes
61949777	Permethrin, trans	IARC	IARC classified as group 3	Water solubility 0.2 mg/L; log octanol water partition coefficient 6.5; Soil half-life approx. 28 days. Occurrence 0.006 ppb 95%ile (USGS). Concentrations as high as 0.8 mg/L have been detected in surface water. (AWWA)	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	Common Name	References Cited	Supplemental HE DATA provided with Nomination	Supplemental OCC DATA provided with Nomination	Draft Universe Data	Final Universe Data	Draft PCCL	Final PCCL	DRAFT CCL 3	Final CCL 3
					117	131	37	53	17	28
732116	Phosmet	Taylor 1999 EPA IRED 2001 Raffaelle 1999	Subchronic oral neurotoxicity study: The LOAEL is 22 ppm (equivalent to 1.5/1.6 mg/kg/day [Male/Female], the LDT), based on dose-related decreases in plasma, RBC, whole blood, and brain cholinesterase activity levels. The NOAEL was not established. In a rat developmental toxicity study , treatment-related clinical signs were observed at the 15 mg/kg/day dose level, which consisted of tremors/shaking and subdued behavior. In the mouse carcinogenicity study, convulsions were observed in males at 25 ppm. In a 2-generation reproduction study in rats, tremors were observed at the high-dose level [23.4 mg/kg/day]. In the developmental toxicity study in rabbits, unsteady gait and shaking were observed at 15 mg/kg/day. Maternal Toxicity in Rats: NOAEL 10 mg/kg/day & LOAEL 15 mg/kg/day (decreased body weight gain and food consumption and clinical signs; No developmental toxicity in rats. Maternal Toxicity in Rabbits: NOAEL 5 mg/kg/day & LOAEL 15 mg/kg/day (clinical signs and decreased body weight). Developmental Toxicity in Rabbits: NOAEL 5 mg/kg/day & LOAEL 15 mg/kg/day (increased incidence of skeletal variations in fetuses). Parental systemic toxicity in rats: NOAEL equal to and less than 1.5 mg/kg/day & LOAEL 6.1 (RBC ChEI). Offspring toxicity in rats: NOAEL 1.5 mg/kg/day & LOAEL 6.1 mg/kg/day (decreased # of live pups, pup weights, fertility and lactation index). Delayed Neurotoxicity: unsteadiness, subdued behavior, recumbency, salivation; no ataxia; no decreases in brain or spinal cord NTE; brain ChE decreased 63%; no neuropathology. Acute Neurotoxicity NOAEL 4.5 mg/kg LOAEL 22.5 mg/kg, based on cholinesterase inhibition [plasma, RBC,	EEC 0.4 - 140 ppb	Yes	Yes	Yes	Yes		

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
			brain] and decreased motor activity in both sexes. (Taylor 1999) IRED NOAEL unc.							
57830	Progesterone	[Riverkeepers]	None Provided.	None Provided.		Yes				
1610180	Prometon	Frans 2004USGS & NYS DEC 1998	None Provided.	Ambient water concentrations up to 0.19 ug/L (Frans 2004)Maximum concentrations in well water 0.1 to 1 ug/L. (USGS & NYS DEC 1998)	Yes	Yes	Yes	Yes		
114261	Propoxur		None Provided.	None Provided.	Yes	Yes				
129000	Pyrene	Serdar, D, et al. (1999); [ASDWA]	None Provided.	6/12 detection frequency from lake water (range of concentrations 0.0016 - 0.012 ug/L). Six samples taken at two sampling events for a total of 12 samples. (Serdar et al 1999). Diesel fuel widely used and released. [ASDWA]	Yes	Yes				
13233324	Radium 224	Mays et al. 1995 USEPA 2000 Schleien 1992	Lifetime cancer risk from ingestion less than that from ingestion of an equal amount of Ra-226 or Ra-228, but greater than that suggested in the Mays et al study. Concern that previously undetected presence of Ra-224 may pose an additional, quantifiable radium health risk that currently is not accounted for by the 5-pCi/L MCL for combined radium in drinking water. (USEPA 2000) Because of its short half life, much of the ingested Ra-224 decays on bone surfaces, where it may have enhanced effectiveness (Schleien 1992)	Extensive monitoring in the NJ over past several years established presence of unsupported Ra-224 as the significant source of the elevated alpha-particle radioactivity (Parsa 1998) Survey by USEPA and USGS demonstrated that Ra-224 may be present in significant quantities in groundwater (Focazio et al. 2001) Study by USGS, NJDEP, and NJDHSS confirms that Ra-224 contributes considerable gross alpha-particle activity to drinking water produced from New Jersey Coastal Plain aquifer system (Szabo et al. 2005) Half life of 3.66 days (Mays et al. 1995)	Reg	Reg				
66357355	Ranitidine	No	None Provided.	None Provided.	Yes	Yes				
80214831	Roxithromycin	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
98105998	Sarafloxacin	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
7440235	Sodium	NYCDEP 2004	None Provided.	Surface water: 5.06 - 44.6 mg/L (NYCDEP 2004)	Yes	Yes	Yes	Yes		
7647145	Sodium chloride	(Hesig et al., 2000)	None Provided.	Road salt application rate, in tons per mile of roadway per year: Town, county, state roads (2 land) = 3y; Taconic Parkway (4 lane) = 75; Interstate 84 (4 lane) = 298 (Hesig et al., 2000).	Yes	Yes				
122112	Sulfadimethoxine	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
127797	Sulfamerazine	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
57681	Sulfamethazine	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
144821	Sulfamethizole	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
723466	Sulfamethoxazole	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
72140	Sulfathiozole	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
75854	tert-Amyl alcohol	No.	None Provided.	None Provided.	Yes	Yes				
919948	tert-Amyl ethyl ether	[NYDOH] (Shih, et al., 2004; NEIWPCC, 2001)	Animal studies have indicated that ethers have toxic effects such as “increased adrenal gland, liver, kidney effects and neurological effect" NEIWPCC, 2001.	Med = 20 ug/L; Percent Detects 18.3% in CA leaking UST sites. [Shih et al 2004.]						

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	Common Name	References Cited	Supplemental HE DATA provided with Nomination	Supplemental OCC DATA provided with Nomination	Draft Universe Data	Final Universe Data	Draft PCCL	Final PCCL	DRAFT CCL 3	Final CCL 3
					117	131	37	53	17	28
994058	tert-Amyl methyl ether	New England Water Pollution Control Commission, 2001. Shih et al., 2004	Animal studies have indicated that ethers have toxic effects such as “increased adrenal gland, liver, and kidney weights and neurological effects” (NEIWPCC, 2001)	Min. Conc. detected in GW from leaking USTs = 0.38 ug/L; Max. Conc. detected in GW from leaking USTs = 12,000 ug/L; Mean Conc. detected in GW from leaking USTs = 240 ug/L; Med. Conc. detected in GW from leaking USTs = 20 ug/L (Shih et al., 2004) Water solubility (Cs(o)) (mg/l) = ~20,000; Log Kow = N/A; Henrys Law Kh (atm-m3)/(gmole) = 1.27E-3; Henry's Law Dimensionless(h/rt) = 5.191E-2; Log Koc = {2.2, 1.27} (NEIWPCC, 2001).	Yes	Yes				
75650	tert-Butyl alcohol	NTP Shih et al., 2004New England Water Pollution Control Commission, 2001.	Kidney tumors in male rats (NTP)Thyroid tumors in male and female mice (NTP)Health-based groundwater criterion of 100 ug/L based on nephropathy in female rats (NTP)LOAEL from kidney study = 175 mg/kg-d (NTP)Group C possible human carcinogen (NTP)Applied UF of 10,000 from LOAEL and 10 for poss. carc., assuming RSC of 20% [NJDEP]Animal studies have indicated that ethers have toxic effects such as “increased adrenal gland, liver,and kidney weights and neurological effects”.Tertiary-butyl alcohol (TBA), an alcohol, is not considered to be a viable alternative to MtBE giventhat animal studies have produced evidence that it may be a carcinogen (NEIWPCC, 2001)	Detected in 36 out of 3,048 private wells. Min: 10 ppb; max: 251 ppb; mean: 67 ppb. [NJDEP]Min. Conc. detected in GW from leaking USTs = 6 ug/L; Max. Conc. detected in GW from leaking USTs = 4.4E-06 ug/L; Mean Conc. detected in GW from leaking USTs = 30,120 ug/L; Med. Conc. detected in GW from leaking USTs = 1,880 ug/L (Shih et al., 2004)Water solubility (Cs(o)) (mg/l) = infinatley soluble; Log Kow = 0.35; Henrys Law Kh (atm-m3)/(gmole) = {1.175E-5, 1.19E-5, 1.04E-5, 1.47E-5}; Henry's Law Dimensionless(h/rt) = {4.803E-4, 4.864E-4, 4.251E-4, 5.927E-4, 4.8E-4}; Log Koc = {1.21, 0.20} (NEIWPCC, 2001).	Yes	Yes	Yes	Yes		
58220	Testosterone	[Riverkeepers]	None Provided.	None Provided.		Yes				
60548	Tetracycline	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
75967	Tribromoacetic acid	Roberts et al 2002 (discusses classes only); DBP ICR	None Provided.	3% Det, 0.00 mg/Lmed, 19.00 mg/L max (DBP ICR)	Yes	Yes		Yes		
464108	Tribromonitromethane (bromopicrin)	Plewa2004A, Krasner et al, 2006	Plewa2004A has in vitro data	ND med, 5 ug/L max (Krasner et al, 2006)	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	Common Name	References Cited	Supplemental HE DATA provided with Nomination	Supplemental OCC DATA provided with Nomination	Draft Universe Data	Final Universe Data	Draft PCCL	Final PCCL	DRAFT CCL 3	Final CCL 3
					117	131	37	53	17	28
52686	Trichlorfon	EPA IRED, 1997	None Provided.	None Provided.	Yes	Yes				
75876	Trichloroacetaldehyde		None Provided.	"sum of haloacetaldehydes," 4 ug/L med, 20 ug/L, max. Incl. Trichloro? [Krasner et al.06]	Yes	Yes				
76062	Trichloronitromethane (chloropicrin)	Plewa2004A; DeAngelo-USEPA (could not identify report); DBP ICR; Krasner et al, 2006	Plewa2004A has in vitro data	26% Det, 0.50 ug/L med, 13.6 ug/L max (DBP ICR); 0.2 ug/L med, 2.0 ug/L max (Krasner et al, 2006)	Yes	Yes	Yes	Yes		
101202	Triclocarban	(Pruden et al, 2006; Halden et al., 2005)	None Provided.	Annual loadings of antimicrobials (triclocarban, TCC and triclosan, TCS) to water resources is as follows: activated sludge treatment plants (39-67%) followed by trickling filters (31-45%), and combined and sanitary sewer overflows(2-7% and 0.2%) respectivley. The magnitude and frequency of TCC contamination (regional) 6750 ng/L, 68%; (predicted nationwide for 1999-2000), 1150 ng/L 60%. 84% of all animicrobial bar soaps sold in the United States contain triclocarban. Approx. 500,000-1,000,000lb (227, 00-454,00 kg) of triclocarban are used in the US every year. The water solubility of triclocarban is is 0.65-1.55 mg/L at 25 degrees C. We estimated nationwide rates of triclocarban in personal care products disposed into wastewater at >330,000 kg/yr. Detectable concentrations of triclocarban were predicted for 49 US streams in 21 states. A strong positive linear correlation was observed between triclocarban and triclosan occurrences across all aquatic environments and water types we examined in a concentration range spanning 5 orders of magnitude. Regression analysis of these data resulted in the empirical model: Log10 Crcc = 0.9491 Log10 Crcs. In this study, estimated concentrations ranged	Yes	Yes				

Appendix 3: Chemical Nominations

Supporting Information					CCL 3 Process Status					
CASRN	**Common Name**	**References Cited**	**Supplemental HE DATA provided with Nomination**	**Supplemental OCC DATA provided with Nomination**	**Draft Universe Data**	**Final Universe Data**	**Draft PCCL**	**Final PCCL**	**DRAFT CCL 3**	**Final CCL 3**
					117	**131**	**37**	**53**	**17**	**28**
				from 9 to 1550 ng/L, with a mean and median of 213 and 109 ng/L, respectivley. In this study, TCC has an overall frequency of detection of 60% (55 of 91 streams total) Triclocarbon is expected to rank in the top 20 in maximum concentration among 96 pharmaceuticals, hormones and organic wastewater contaminants considered. (Halden, 2005).						
55335063	Triclopyr		None Provided.	None Provided.	Yes	Yes				
738705	Trimethoprim	[NYDOH]	25th ranked prescription medicine in the US, (NYDOH).	NYDOH surveyed the New York city watershed; in each of four WWTP effluent sampled and at high frequency. Detected as high as 8,090-37,000 ng/L. USGS detected in groundwater at concentrations ranging from 0.1-100 ng/L in Long Island. Median NREC concentration 103 ng/L. Relatively stable and moderately mobile (NYDOH).	Yes	Yes				
1401690	Tylosin	(Mackie et al, 2006); [Riverkeepers]; [NYDOH]	None Provided.	None Provided.	Yes	Yes				
21411530	Virginiamycin	(Mackie et al, 2006);	None Provided.	None Provided.						
81812	Warfarin	No	None Provided.	None Provided.	Yes	Yes				

Appendix 4: References

Agency for Toxic Substances and Disease Registry (ATSDR), ToxFAQs™ 4-di-n-butyl phthalate, http://www.atsdr.cdc.gov/tfacts135.html
Agency for Toxic Substances and Disease Registry (ATSDR), Toxicological Profiles, diethyl phthalate (DEP) PV/95/264214/AS. Updated Jun 1995. Accessed 12/11/06. http://www.atsdr.cdc.gov/toxprofiles/tp73.html.
Agency for Toxic Substances and Disease Registry, Toxicological Profile for Manganese. (2000) http://www.atsdr.cdc.gov/toxprofiles/tp151.pdf
Allan WC, Haddow JE, Palomaki GE, Williams JR, Mitchell ML, Hermos RJ, Faix JD, Klein RZ. (2000) Maternal thyroid deficiency and pregnancy complications: implications for population screening. J Med Screen. 7(3): 127-30.
Alonso-Magdalena, P, Morimoto, S, Ripoll, C, Fuentes, E, Nadal, A. (2006) The estrogenic effect of bisphenol A disrupts pancreatic beta-cell function in vivo and induces insulin resistance. Environ Health Pespect. 114(1): 106-12.
Arizona Department of Environmental Quality (ADEQ), Perchlorate in Arizona: occurrence study of 2004 (revised), http://www.azdeq.gov/function/about/perch.html
Association of American Pesticide Control Officials Inc. 1969 as cited in ACGIH 1986/ Ex 1-3, p. 230.
AwwaRF. 2867. Use of Toxicological and Chemical Models to Prioritize DBP Research.
AwwaRF. 2900. Organic Nitrogen in Drinking Water and Reclaimed Wastewater.
AwwaRF. 2979. Strategies for Minimizing Nitrosamine Formation During Disinfection of Drinking Water.
AwwaRF. 3014. Occurrence and Formation of Nitrogenous Disinfection By-Products.
AwwaRF. 3135. Analysis, Toxicity, Occurrence, Fate and Removal of Nitrosamines in the Water Cycle.
Barbash, JE, Resek, EA. (1996) Pesticides in Ground Water: Distribution, Trends and Governing Factors. Chelsea, MI: Ann Arbor Press, 588 p. at p.98-9. and at p.167. (NAWQA).
Barbash, JE; Thelon, GP; Kolpin, DW; Gilliom, RJ. (2001) Major herbicides in groundwater: Results from the National Water Quality Assessment. Journal of Environmental Quality, 30 (3: 831-845).
Batista et al. (2003) Microcystin-LR causes the collapse of actin filaments in primary human hepatocytes. Aquatic Toxicology. 8 October 2003. 65(1): 85-91.
Becker, RL, Herzfeld, D, Ostlie, KR, and Stamm-Catovich, EJ. (1989) Pesticides: Surface runoff, leaching, and exposure concerns. Univ. of Minnesota, Minnesota Extension Service Publication AG-BU-3911, 32 p.
Benotti and Brownwell (2005) Occurrence and fate of high volume pharmaceuticals in wastewater impacted environments. http://www.epa.gov/ncer/publications/meetings/h-23-2005/abstract/benotti.html
Blount BC, Pirkle JL, Osterloh JD, Valentin-Blasini L, Caldwell KL. (2006) Urinary perchlorate and thyroid hormone levels in adolescent and adult men and women living in the US. Environ Health Perspec. Dec. 114(12): 1865-71.
Blount BC, Valentin-Blasini L, Osterloh JD, Maulden JP, Pirkle JL. Perchlorate exposure of the US population, 2001-2002. J Expo Sci Environ Epidemiol. 2006 Oct 18. (Epub ahead of print)
Boyd, GR, Reemtsma H, Grimm, DA, Mitra, S. (2004) Pharmaceuticals and Personal Care Products (PPCPs) and Endocrine Disrupting Chemicals (EDCs) in Stormwater Canals and Bayou St. John in New Orleans, LA, USA. Sci Total Environ. Oct 15. 333 (1-3): 137-48.
Brechner RJ, Parkhurst GD, Humble WO, Brown MB, Herman WH. (2000) Ammonium perchlorate contamination of Colorado River drinking water is associated with abnormal thyroid function in newborns in Arizona. J Occup Environ Med. Aug. 42(8): 777-82.
Brenda Tarplee. USEPA, Health Effects Division. Carbaryl - 2nd Reassessment Report of the FQPA Safety Factor Committee. Memorandum April 30, 2001, Tox Review No. 014553.
Brenda Tarplee. USEPA, Health Effects Division. Carbaryl Reassessment Report of the FQPA Safety Factor Committee. Memorandum Dec 13, 1999, Tox Review No. 013891.
Brown, LM, Blair, A, Gibson, R, et al. (1990.) Pesticide exposures and other agricultural risk factors for leukemia among men in Iowa and Minnsota. Cancer Res 50(20):6585-91.

Appendix 4: References

Burkart, MR, Kolpin, DW. (1993) Hydrologic and land-use factors associated with herbicides and nitrate in near surface aquifers. J Environ Qual. 22 (4): 646-56. (NAWQA).

California Department of Health Services (DHS). California drinking water data (database on CD) April 2005.

Cappon, GD. Phosmet: acute neurotoxicity study. (GD Cappon, lead investigator: Gowan Company Yuma, AZ, sponsor). MRID No 44673301. WIL Research Labs, Ashland, OH, Oct 8 1998.
(Title might be "An acute neurotoxicity study of phosmet in rats.")

Centers for Disease Control and Prevention (CDC). (2005) 3rd National Report on Human Exposure to Environmental Chemicals, Atlanta, GA. Available: www.cdc.gov/exposurereport

Clewell RA, Merrill EA, Yu KO, Mahle DA, Sterner TR, Mattie DR, Robinson PJ, Fisher JW, Gearhart JM. (2003) Predicting fetal perchlorate dose and inhibition of iodide kinetics during gestation: a physiologically-based pharmacokinetic analysis of perchlorate and iodide kinetics in the rat. Toxicol Sci 2003 June. 73(2): 235-55. Epub 2003 April 15.

Cook, JC, Nullin, LS, Frame, SR, Biegel, LB. (1993) Investigation of a mechanism for Leidig cell tumorigenesis by linuron in rats. Toxicol Appl Pharmacol. 119: 195-204.

Cousins, IT, Staples, CA, Klecka, GM, Mackay1, D. Multimedia assessment of the environmental fate of bisphenol A. (2002) Human and Ecological Risk Assessment 8(5): 1107-1135.

Dabrowski, JM, Bennett, ER, Bollen, A, Schultz, R. Mitigation of Azinphos methyl in a vegetated stream: Comparison of runoff- and spray-drift. Chemosphere. 2006. Jan: 62 (2): 204-12. Epub 2005 July 5.

DeAngelo (USEPA)

Durando, M, Cass, L, Piva, J, Sonnenschein, C, Soto, AM, Luque, EH, Munoz-de-Toro, M. Prenatal Bisphenol A exposure induces preneoplastic legions in the mammary gland in Wistar rats. Environ Health Perspect. 2006. Aug 29. (Epub ahead of print).

ECPI. Phthalates in the Aquatic Environment. Brussels, European Council for Plasticizers and Intermediates. 1996.

ENVIRODAT Surveys and Information Systems Branch, Environment Canada, 1993.

Etoxnet. Pesticide Information Profile. Bromoxynil. May 1994. http://pmep.cce.cornell.edu/profiles/extoxnet/24d-captan/bromoxynil-ext.html

Etoxnet. Pesticide Information Profile. Fluometuron. June 1996. http://extoxnet.orst.edu/pips/fluometu.htm

European Commission Joint Research Centre, Institute for Health and Consumer Protection, 1,2-benzenedicarboxylic acid, di-C8-10-branched alkyl esters, C9-rich and di-"isonono"phthalate (DIMP), CAS No. 68515-48-0 and 28553-12-0, EINECS Nos. 271-090-9 and 249-079-5, Summary Risk Assessment Report, 2003. http://ecb.jrc.it/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/SUMMARY/dinpsum046.pdf

Extension Toxicology Network (EXTOXNET), Pesticide Information Profiles. June, 1996. http://extoxnet.orst.edu/pips/linuron.htm

Fent, et al. Erratum notice. (2006) "Erratum to 'Ecotoxicology of human pharmaceuticals (200) 122-159." published in a subsequent issue of Aquatic Toxicology, 78(2): 207.

Fent, K et al. (2006) Ecotoxicology of human pharmaceuticals. Aquatic Toxicology, 78(2): 122-159 At 143

Fiore, MC, Anderson HA, Hong R, Golubjatnikov R, Seiser JE, Nordstrom D, Hanrehan L, Belluck D. (1996) Chronic exposure to aldicarb contaminanted groundwater and human immune function. Environ Res. Dec: 41(2): 633-45.

Fischer et al.

Focazio et al. (2001) Occurrence of Selected Radionuclides in Ground Water Used for Drinking Water in the United States: A Targeted Reconnaissance Survey, 1998. USGS. Water-Resources Investigations Report 00-4273.

Frans, LM. (2004) Pesticides detected in urban streams in King County, WA, 1998-2003. USGS Scientific Investigations Report 2004-5194.

Fromme, H, Kuchler, T, Auto, T, Pilz, K, Muller, J, Wenzel, A. (2002) Occurrence of phthalates and bisphenol A and F in the environment. Water Res 36(6): 1429-38.

Appendix 4: References

Gatidou G, Thomaidis NS, Stasinakis AS, Lekkas TD. Simultaneous determination of the endocrine disrupting compounds nonylphenol, nonylphenol ethoxylates, triclosan, and bisphenol A in wastewater and sewage sludge by gas chromatography-mass spectrometry. J Chromatog A. 2006 Oct 27 (Epub ahead of print)

German Human Biomonitoring Commission. (2006) Umweltbundesamtes. Available: http://www.umweltbundesamt.de/uba-info-daten-e/monitor/pub.htm

Gilroy et al. (2000) Assessing Potential Health Risks from Microcystin Toxins in Blue–Green Algae Dietary Supplements. Environmental Health Perspectives. May. 108(5): 435-39.

Gledhill, WE, Kaley, RG, Adams, WJ, Hicks, O, Michael, PR, Saeger, VW. (1980) An environmental safety assessment of butyl benzyl phthalate. Environ. Sci. Tech. 14(3): 301-305.

Glinoer, D. (2001) Potential consequences of maternal hypothyroidism on the offspring: Evidence and implications. Horm Res. 55: 109-114.

Goss, DW. (1992) Screening procedure for soil and pesticides relative to potential water quality impacts. J Weed Technol. 6: 701-8.

Gray, LE Jr., Ostby, J, Furr, J, Price, M, Veeramachaneni, DN, Parks, L. (2000) Perinatal exposure to the phthalates DEHP, BBP, and DINP but not DEP, DMP, or DOTP, alters sexual differentiation of the male rat. Toxicol. Sci. 58 (2): 350-65.

Gray, LE Jr., Wilson, VS, Stoker, T, Lambright, C, Furr, J, Noriega, N, Howdyshell, K, Ankley, GT, Guillette, L. (2006) Adverse effects of environmental anti-androgens and androgens on reproductive development in mammals. Int J Andro. 29 (1): 96-108

Gray, LE Jr., Wolf, C, Lambright, C., Mann, P, Price, M, Cooper, RL, Ostby, J. (1999) Administration of potentially anti-androgenic pesticides (procymidone, linuron, iprodione, clozolinate, p, p'-DDE, and ketoconazole) and toxic substances (dibutyl- and diethylhexyl phthalate, PCB169, and ethane dimethane sulfonate) during sexual differentiation produces diverse profiles of reproductive malformations in the male rat. J Toxicol Ind Health. Jan-Mar 15(1-2): 94-118.

Grendon, J, Frost F, Baum L. (1994) Chronic health effects among sheep and humans surviving an aldicarb poisoning incident. Vet hum toxicol. June: 36 (3): 218-23

Greyshock, AE, Vikesland, PJ. (2006) Triclosan reactivity in chloraminated waters. J Environ Sci Tech. Apr 15. 40 (8): 2615-22.

Haddow, JE, Palomaki, GE, Alan, WC, Williams, JR, Knight, GJ, Gagnon, J, O'Heir, CE, Mitchell, ML, Hermos, RJ, Waisbren, SE, Faix, JD, Klein, RZ. (1999) Maternal Thyroid deficiency during pregnancy and subsequent neuropsychological development of the child. N Engl J Med. Aug 19; 341(8): 549-55.

Comments in: N Engl J Med 1999 Aug 19:341(8): 601-2.
N Engl J Med 1999 Dec 23; 341(26): 2015-6; discussion 2017.
N Engl J Med 1999 Dec 23; 341(26): 2015; discussion 2017.
N Engl J Med 1999 Dec 23; 341(26): 2016-7.
N Engl J Med 1999 Dec 23; 341(26): 2016; discussion 2017.

Hajoui, O, Flipo D, Mansour S, Founier M, Krzystyniak K. (1992) Immonotoxicity of subchronic versus chronic exposure to aldicarb in mice. Int J Immunopharmacol. Oct: 14(7) 1203-211.

Halden R, D Paull. (2005) Cooccurrence of triclocarban and triclosan in US water resources. Environ Sci Technol 2005. 39(6): 1420-1426.

Hari AC et al. (2005) Effects of pH and Cationic and Nonionic Surfactants on the Adsorption of Pharmaceuticals to a Natural Aquifer Material. Environ. Sci. Technol. 39, 2592-2598. http://pubs.acs.org/subscribe/journals/esthag-w/2005/apr/science/kp_chlorine.html

Hasegawa et al. Erratum in: Int J Cancer 1993 Sep 30: 55(3): 528.

Hasegawa R, Cabral R, Hoshia T, Hakoi K, Ogiso T, Boonyaphiphat P, Shirai T, Ito N. (1993) Carcinogenic potential of some pesticides in a medium-term multi-organ bioassay in rats. Int J Cancer. May 28. 54(3): 489-93.

HealthCanada. (2001) Health hazard alert: consumers advised to stop eating pork until carbadox taken off the market. Available at: http://www.healthcoalition.ca/carbadox.html

Appendix 4: References

Hesig, PM. (2000) Effects of residential and agricultural land uses on the chemical quality of base flow of small streams in the Croton Watershed, southeastern NY. US Geological Survey Water Resources Investigations Report 99-4173, 8.

Ho, SM, Tang, WY, Belmonte de Frausto, J, and Prins, GS. (2006.) Developmental exposure to estradiol and bisphenol A increases susceptibility to prostate carcinogenesis and epigenetically regulates phosphodiesterase type 4 variant 4. Cancer Res. 66(11): 5624-32.

Hoekstra, PF, Burnison, BK, Garrison, AW, Neheli, T, Muir, DC. Estrogenic activity of dicofol with the human estrogen receptor: Isomer- and enantiomer-specific implications. Chemosphere. 2006 Jun 64(1): 174-27. Epub 2005 Dec 7.

Hunt, PA, Koehler, KE, Susiarjo, M, Hodges, CA, Ilagan, A, Voigt, RC, Thomas, S, Thomas, BF, Hassold, TJ. (2003) Bisphenol A exposure causes meiotic aneuploidy in the female mouse. Curr Biol. 13 (7): 546-53.

IPCS INCHEM, Concise International Chemical Assessment Document 17, Butyl benzyl phthalate, 1999, http://www.inchem.org/documents/cicads/cicads/cicad17.htm

IRIS. Fluometuron. Jan 2007. http://www.epa.gov/iris/subst/0241.htm

Ishihara, A, Sawatsubashi, S, Yamauchi, K. (2003) Endocrine disrupting chemicals: interference of thyroid hormone binding to transthyretins and to thyroid hormone receptors. Mol Cell Endocrinol. Jan 31. 199(1-2): 105-17.

Jackson, WA et al. (2004) Distribution and potential sources of perchlorate in the high plains region of Texas: final report Texas Tech University, Water Resources Center, prepared for Texas Commission on Environmental Quality. http://www.waterresources.ttu.edu/research.htm

Jacobs, MN, Nolan, GT, Hood, SR. (2005) Lignins, bactericides and organochlorine compounds activate the human pregnane X receptor (PXR). Toxicol. Appl. Pharmacol. Dec 1. 209(2):123-33.

Jadaramkunti, UC, Kaliwal, BB. (2001) Possible mechanisms for the anti-implementation action of dicofol in albino rats. J Basic Clin Physiol Pharmacol. 12(3): 217-26.

Kaushal, S et al. (2005) Increased salinization of fresh water in the northeastern US, proceedings of the National Academy of Sciences, 102: 38, 13517-13520, available at: http://www.pnas.org/cgi/content/full/102/38/13517

Kirk AB, Martinelango PK, Tian K, Dutta A, Smith EE, Dasgupta PK. (2005) Perchlorate and iodide in dairy and breast milk. Environ Sci Technol. Apr 1. 39(7): 2011-7.

Kolpin et al. (2002) Pharmaceuticals, hormones, and other wastewater contaminants in US streams, 1999-2000-A national reconnaissance, Env Sci & Tech, 36, 1202-1211.

Kolpin, D et al. (2002) Water quality data for pharmaceuticals, hormones, and other organic wastewater contaminants in US streams, 1999-2000, USGS open file report 02-94, available at: http://toxics.usgs.gov/pubs/QFR-02-94/

Krasner S. W.; Weinberg, H. S.; Richardson, S. D.; Pastor, S. J.; Chinn, R.; Sclimenti, M. J.; Onstad, G. D.; Thruston, A. D., Jr. (2006). Occurrence of a New Generation of Disinfection By-Products. Environmental Science and Technology. 40, 7175-7185.

Lakshmana, MK, Raju, TR. (1994.) Endosulfan induces small but significant changes in the levels of noradrenaline dopamine and serotonin in the developing rat brain and deficits in the operant learning performance. Toxicol. 91(2): 139-150.

Larson, Steven J., Capel, Paul D., and Majewski, M.S. (1997) Pesticides in surface waters: Distribution, trends and governing factors. Chelsea, MI: Ann Arbor Press. 373 p. 19.

Latch, DE, Packer, JL, Stender, BL, Van Overbeke, J, Arnold, WA, and McNeill, K. (2005) Aqeous photochemistry of triclosan: Formation of 2, 4-dichlorophenol, 2,8-dichlorodibenzo-p-dioxin, and oligomerization products. Enviro Toxicol. Chem. 24 (3): 517-25.

Lehmann, et al. (2004) Dose-dependent alterations in gene expression and testosterone synthesis in the fetal testes of male rats exposed to di-(n-butyl)-phthalate. Toxicol Sci 81: 60-68.

Leiss, JK, Savitz, DA. (1995.) Home Pesticide use and childhood cancer: A case-controlled study. Am J Public Health. 85: 249-52.

Loewy, RM, Carvajal, LG, Novelli, M, de D'Angelo, AM. (2005) Effect of pesticide use in fruit production orchards on shallow groundwater. J Environ Sci Health

Appendix 4: References

B. May: 38 (2): 317-25.

Loewy, RM, Carvajal, LG, Novelli, M, Pechen de D'Angelo, AM. (2006) Azinphos methyl residues in shallow groundwater from the fruit production region of Northern Patagonia, Argentina. J Environ Sci Health B. 41 (6): 869-81.

Long, T. (1989) Groundwater contamination in the vicinity of agrichemical mixing and loading facilities, in Illinois Agricultural Pesticides Conference: Proceedings. Univ. of Illinois, College of Agricultural Consumer and Environmental Services, Urbana-Champaign, IL. p.139-149: Barbas and Resek at p. 327.

Loraine, GA, Pettigrove, ME. (2006) Seasonal variations in concentrations of pharmaceuticals and personal care products in drinking water and reclaimed wastewater in Southern California. Environ Sci Technol. 40(3): 687-95.

Luks-Betlej, K, Popp, P, Janoszka, B, Paschke, H. (2001) Solid-phase microextraction of phthalics from water. J Chromatogr A. 938, 93-101.

Mackie, RI et al. (2006) Tetracycline residues and tetracycline resistance genes in groundwater impated by swine production facilities. Animal Biotechnology, 17(2): 157-176. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=17127527&query_hl=3&itool=pubmed_docsum

Makris, S, Raffaele, K, Sette, W, Seed, J. A retrospective analysis of 12 developmental neurotoxicity studies submitted to the USEPA Office of Prevention, Pesticides and Toxic Substances (OPPTS). Draft Nov 12, 1998.

Massachusetts Department of Environmental Protection. Perchlorate monitoring results (data provided by drinking water program), March 2005.

Mays et al. (1985) USGS. Naturally Occurring Radionuclides in the Ground Water of Southeastern Pennsylvania.

Muellner et al. (2007) Haloacetonitriles vs. Regulated Haloacetic Acids: Are Nitrogen-Containing DBPs More Toxic? Environ. Sci. Technol. 41(2): 645-651

Murray, TJ, Maffini, MV, Ucci, AA, Sonnenschein, C, Soto, AM. Induction of mammary gland ductal hyperplasia and carcinoma in situ following fetal bisphenol A exposure. J Reprod Toxicol. 2006. Oct 24. (Epub ahead of print).

National Toxicology Program. NTP Toxicology and Carcinogenesis Studies of Dichlorvos (CAS No. 62-73-7) in F-344/N Rats and B6C3F1 Mice (Gavage studies). National Toxcilogy Program Technical Report Series 1989. 342: 1-208.

New England Interstate Water Pollution Control Commission. (2001) Health, environmental, and economic impacts of adding ethanol to gasoline in the Northeast states. Water Resources and Associated Health Impacts, 3. Lowell, MA.

New York City Department of Environmental Protection. (2004) Watershed water quality annual report, 41, available at http://www.nyc.gov/html/dep/watershed/pdf/dwqcar04.pdf

NIWR. Occurrence of Phthalates and Organotins in sediments and Water in Norway. Oslo, Norwegian Institute for Water Research (Report No. 0-96006). 1996.

NJDEP 2006 Statewide survey. Minn; NJ; Ohio; WV

NYSDOH (2006). A survey of the New York City watershed for the presence of pharmaceuticals 103pp. (NH: can't find)

OSHA Comments from the Jan 19, 1989 Final Rule on Air Contaminants Project Extracted from 54 FR 2332 et seq.

PAN Pesticides Database. (2006) Fluometuron. http://www.pesticideinfo.org/Detail_Chemical.jsp?Rec_Id=PC35072

Parsa 1998

PDR. PDR for Nonprescription Drugs, Dietary Supplements, and Herbs (2007 2nd ed, published by Thomson Health Care)

PDR. Physicians Desk Reference. 2007 61st edition. Published by Thomson Health Care.

Plewa MJ, Wagner ED, Jazwierska P, Richardson SD, Chen PH, McKague AB. (2004.) Halonitromethane drinking water disinfection byproducts: chemical characterization and mammalian cell cytotoxicity and genotoxicity. Environ Sci Technol. Jan 1;38(1):62-8. (Plewa et al A)

Plewa MJ, Wagner ED, Richardson S, Thruston A, Woo Y, McKague AB. (2004.) Chemical and Biological Characterization of Newly Discovered Iodoacid Drinking Water Disinfection Byproducts. Env. Sci & Tech 38(19): 4713-22. (Plewa et al B)

Pruden et al. (2006) Antibiotic resistance Gene as Emerging Contaminants: Studies in Northern Colorado. Env Sci Tech 40, no 23. 7445-7450.

Raffaele K, 1999 Phosmet: acute neurotoxicity study. USEPA. DER of study MRID 44673301. Obtained by FOIA # RIN 0593-02, to Jennifer Sass, Jan 16

Appendix 4: References

2002. Discussion and conclusions page 13-14.

Roberts et al. (2002) Comparing Total HAA Total THM Concentrations Using ICR Data. American Water Works Journal, Jan 2002, 94, 1.

Rohlman, DS, Arcury, TA, Quandt, SA, Lasarev, M, Rothlein, J, Travers, R, Tamulinas, A, Scherer, J, Early, J, Marin, A, Phillips, J, McCauley, L. Neurobehavioral performance in preschool children from agricultural and non-agricultural communities in OR and NC. Neurotoxicology. 2005. Aug.: 26 (4): 589-98.

Rothlein, J., Rohlman, D., Lasarev M., Phillips, J., Muniz, J., McCauley L. Organophosphate pesticide exposure and neurobehavioral performance in agricultural and non-agricultural Hispanic workers. Environ Health Perspect. 2006. May: 114 (5): 691-6.

Rovet, JF. (2002) Congenital hypothyroidism: An analysis of persisting deficits and associated factors. Neuropsychol Dev Cogn C Child Neuropsychol. Sep. 8(3): 150-62. Review.

Rule et al. (2005/6) Formation of chloroform and chlorinated organics by free-chlorine mediated oxidation of triclosan. Env Sci Tech 39, no 9. 3176-3185.

Sakaue, M, S, Ohsaka, R, Ishimura, S, Kurusawa, M, Kurohmaru, Y, Hayashi, Y, Aoki, J, Yanemoto, C, Tohyama. (2001) Bisphenol A affects spermatogenesis in the adult rat even at a low dose. J Occup Health. 43: 185-190.

SCDOH (Suffolk County Deparment of Health). (2002) Water quality monitoring program to detect pesticides in groundwaters of Nassau and Suffolk Counties New York. Monitoring conducted April 2000-March 2001. Hauppauge, NY. Division of Environmental Quality, Bureau of Groundwater Resources.

No document, but likely website:
http://www.nassaucountyny.gov/agencies/Health/EnvHealth/Water%20Quality/

Schleien. (1992) Handbook of Health Physics and Radiological Health

Schwartz et al. (2001) Gestational exposure to perchlorate is associated with measures of decreased thyroid function in a population of California neonates [thesis]. Berkeley, CA: University of California. (Masters Thesis)

Sedlak DL et al. (2005). Occurrence survey of pharmaceutically active compouds. AWWARF Denver, CO.

Serdar, D, et al. (1999) Lake Whatcom Watershed Cooperative Drinking Water Protection Project. Washington State Department of Ecology. Bellingham, WA.

Shih, T.; Rong, Y; Harmon, T; Suffet, M. (2004). Evaluation of the Impact of Fuel Hydrocarbons and Oxygenates on Ground Water Resources. Env Sci & Tech. 38, 42-48.

Sinha, N, Lal, B, Singh, TP. (1991) Pesticides induced changes in circulating thyroid hormones in the freshwater catfish Clarias betrachus. Comparative Biochem Physio. 100 C. 107-110.

Sinha, N, Narayan, R, Saxena, DK. (1997) Effect of endosulfan on the testis on the growing rats. Bulletin Environ Contamination Toxicol. 58: 79-86.

Sinha, N, Narayan, R, Shanker, R, Saxena, DK. (1995) Endosulfan-induced biochemical changes in the testis of rats. Veterinary and Human Toxicol. 37: 547-549.

Smulders CJ, Bueters TJ, Van Kleef RG, Vijverberg HP. (2003) Selective effects of carbamate pesticides on rat neuronal nicotinic acetylcholine receptors and rat brain acetylcholinesterase. Toxicol Appl Pharmacol. Dec 1: 193(2): 139-46

Smulders CJ, Van Kleef RG, de Groot A, Gotti C, Vijverberg HP. (2004) A noncompetitve, sequential mechanism for inhibition of rat alpha4beta2 neuronal niconitic acetylcholine receptors by carbamate pesticides. Toxicol Sci. Nov: 82(1): 219-27. Epub 2004 Aug 25.

Souza MS, Magnarelli dePotas G, Pechen de D'Angelo AM. (2004) Organophosphorus and organochlorine pesticides affect human placental phosphoinositides metabolism and PI-4 kinase activity. J Biochem Mol Toxicol. 18(1): 30-6.

Souza MS, Magnarelli dePotas G, Rovedatti MG, Cruz SS, de D'Angelo AM. (2005) Prenatal exposure to pesticides: analysis of human placental acetylcholinesterase, glutathione S-transferase and catalase as biomarkers of effect. Biomarkers. Sept-Oct: 10(5): 376-89.

Stackelberg et al. (2004) Persistence of pharmaceutical compounds and other organic wastewater contaminants in a conventionl drinking water treatment plant. Science of the Total Environment, 329, 99-113.

Appendix 4: References

State of California: Department of Industrial Relations/ Ex 1-8.

Sugiura-Ogasawara, M, Ozaki, Y, Santa, S, Makino, T, Suzumori, K. (2005) Exposure to bisphenol A is associated with recurrent miscarriage. Hum Reprod. 20(8): 2325-9.

Swan, SH, et al. (2005) Decrease in ano-genital distance among male infants with prenatal phthalate exposure. Environ Health Perspect. 113: 1056-1061.

Swartz C. USEPA, Phosmet HED review of the Gowan Company probabilistic (Monte Carlo) acute dietary exposure risk assessment. July 30 1999.

Szabo et al. (2005) Occurrence of Radium-224, Radium-226, and Radium-228 in Water of the Unconfined Kirkwood-Cohansey Aquifer System, Southern New Jersey. Prepared in cooperation with the New Jersey Department of Environmental Protection. Scientific Investigations Report 2004-5224.

Takser L, D Mergler, G Hellier, J Sahuquillo, G Huel. (2003) Manganese, monoamine metabolite levels at birth, and child psychomotor development. Neurotoxicol. 24(4-5). pp. 667-74.

Taylor LL. (1999) Phosmet: revised report of the hazard identification assessment review committee on phosmet. HED Doc # 013604. Aug 4 1999.

Thibaut, R, Porte, C. Effects of endocrine disruptors on sex steroid synthesis and metabolism pathways in fish. J Steroid Biochem Mol Bio. 2004. Dec. 92(5): 485-94. Epub 2004 Dec 21.

US Geological Survey. 1992 Pesticide Use Maps. http://ca.water.usgs.gov/pnsp/pesticide_use_maps/show_map.php?year=92&map=m1993

US Government Accountability Office (GAO). Perchlorate: a system to track sampling and cleanup results is needed, 2005, GAO-05-4622, http://www.gao.gov

USEPA (1997). Reregistration Eligibility Decision for Trichlorfon List A Case 0104.

USEPA, 49 FR 28320, 1984, 53 FR 24630, 1988.

USEPA, 65 FR. 2000. Final Radionuclides in Water Rule. (USEPA 2000a)

USEPA. (1995) Reregistration Eligibility Decision for Linuron.

USEPA. (1998) Reregistration Eligibility Decision, Dicofol.

USEPA. (1999) Cancer Risk Coefficients for Environmental Exposure to Radionuclides. Federal Guidance Report No. 13. September. EPA 402-R-99-001.

USEPA. (2000) Dichlorvos (DDVP) - Report of the Cancer Assessment Review Committee 2000.

USEPA. (2000) Human Health Risk Assessment: Chlorpyrifos. 2000.

USEPA. (2000) HED preliminary risk assessment for Dichlorvos. Oct 11, 2000.

USEPA. (2001) Interim Reregistration Eligibility Decision for Azinphos-methyl, Case No. 0235. Oct 30, 2001.

USEPA. (2001) Interim reregistration eligibility decision for phosmet, case no. 0242, Oct 30, 2001.

USEPA. (2002) Interim Reregistration Eligibility Decision for Chlorpyrifos.

USEPA. (2002) Overview of linuron risk assessment. http://www.epa.gov/oppsrrd1/reregistration/linuron/linuron_overview_5-31-02.pdf

USEPA. (2002) Reregistration Eligibility Decision for Endosulfan.

USEPA. (2004) Interim Reregistration Eligibility Decision for Carbaryl. Case No. 0080. Revised Oct 22, 2004.

USEPA. (2004) Known perchlorate releases in the US. Dec 10, 2004. http://www.epa.gov/fedfac/pdf/detection_with_dates_12_10_04.pdf

USEPA. (2005) Unregulated Contaminant Monitoring Rule (Jan 2005). Data released, http://www.epa.gov/safewater/ucmr/index.html

USEPA. (2006) Interim Reregistration Eligibility Decision for Dichlorvos DDVP.

USEPA. (2006) Toxicological review of cyanobacterial toxins: microcystins LR, RR, YR and LA (external review draft USEPA Washington DC, EPA/600/R-06-139)

USEPA. (2006) Aldicarb, HED revised preliminary human health risk assessment for the reregistration eligibility decision document (RED), May 12, 2006.

USEPA. (2006) Toxicological review of cyanobacterial toxins: cylindrospermopsin (external review draft USEPA Washington DC, EPA/600/R-06-138)

USEPA. (2006) Toxicological reviews of cyanobacterial toxins: anatoxin-A (external review draft). USEPA Washington, DC, EPA/600/R-06-137.

USEPA. Toxics Release Inventory. http://www.epa.gov/triexplorer

Appendix 4: References

USGS and NYS DEC. (US Geological Survey and NYS Department of Environmental Conservation.) (1998) Pesticides and their metabolites in wells of Suffolk County, NY 1998. Try, NY and Albany, NY: USGS and NYS DEC.

USGS. (2006) Emerging contaminants in the environment, toxic substances hydrology program, available at: http://toxics.usgs.gov/regional/emc/index.html

Veldhoen, N, Skirrow, RC, Osachoff, H, Wigmore, H, Clapson, DJ, Gunderson, MP, Van Aggelen, G, and Helbing, CC. (2006) The bactericidal agent triclosan modulates thyroid hormone-associated gene expression and disrupts post-embryonic anuran development. Aquatic Toxicol. 80 (3): 217-27.

Vitali, M, Guidotti, M, Macilenti, G, Cremisini, C. (1997) Phthalate esters in freshwaters as markers of contamination sources - a study in Italy. Environment International 23 (3): 337-347.

Vlckova V, Miadokova E, Podstavkova S, Vleck D. (1993) Mutagenic activity of phosmet, the active component of the organophosphorus insecticide Decemtione EK 20 in salmonella and saccharomyces assays. Mutat Res. Jul. 302(3): 153-6.

Wasserman, GA, Liu, X, Parvex, F, Ahsan, H, Levy, D, Factor-Litvak, P, Kline, J, van Geen, A, Slavkovich, V, LoIacono, NJ, Chang, EZ, Zheng, Y, Graziano, JH. (2006) Water Manganese exposure and childrens' intellectual function in Araihazar, Bangladesh. Environ Health Perspect. Jan. 114(1): 124-29.

Willey, JB, Krone, PH. (2001.) Effects of endosulfan and nonylphenol on the primordial germ cell population in pre-larval zebrafish embryos. Aquat Toxicol. 54(1-2): 113-123.

Wilson, V, LeBlanc,GA. (1998) Endosulfan elevates testosterone biotransformation and clearance in CD-1 mice. Toxicol Appl Pharmacol. 148: 158-168.

Wright et al. (2002) 3-Chloro-4-(dichloromethyl)-5-hydroxy-2(5H)-furanone (MX) and Mutagenic Activity in Massachusetts Drinking Water. Environmental Health Perspectives. 110(2): February 2002. 157-164.

Ying GG, Williams B, Kookana R. (2002) Environmental fate of alkylphenols and alkylphenoal ethoxylates-a review. Environ Int. July: 28(3): 215-226.