



## PROJECT MEMORANDUM

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**From:** Brad Jeppson

**Date:** August 14, 2014 **Project No.:** 9363C.00

**Subject:** Phase III CEC Water Quality Evaluation and Other Water Quality Testing of Various Waters

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### INTRODUCTION

This Project Memorandum is prepared to summarize findings from the Phase III CEC Evaluation and Other Water Quality Testing of Various Waters. Carollo Engineers Inc (Carollo) previously assisted the City of Sedona (City) to complete multiple phases of testing for Constituents of Emerging Concern (CECs) at various locations at the Wastewater Reclamation Plant (WWRP). The City has requested additional sampling and water quality testing as summarized in Table 1.

<b>Sample ID</b>	<b>Location Description</b>	<b>Water Type</b>	<b>CEC Suite</b>	<b>Drinking Water Suite</b>
Oak Creek near Page Springs	At bridge where North Page Springs Road crosses Oak Creek	Surface Water	X	X
Oak Creek upstream of WWRP	South of Sedona, near the Doodlebug Road Creek access	Surface Water	X	X
Oak Creek Water Company potable system	Water spigot at the North View Pump Station	Drinking Water	X	
Arizona Water Company potable system	Tap at Sedona City Hall	Drinking Water	X	
WWRP effluent	Downstream of UV Disinfection	Treated Wastewater	X	X
WWRP Point of Compliance Well	POC-1	Groundwater	X	

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# METHODOLOGY

## Phase III CEC Evaluation

The CEC sampling campaign measured concentrations of 100 analytes. Table 2 lists the CECs that were analyzed as part of this study.

<b>CEC Compound</b>	<b>Typical Use</b>
1,7-Dimethylxanthine	Caffeine metabolite
2,4-D	Herbicide
4-nonylphenol	Member of alkylphenol family, detergent metabolite
4-tert-Octylphenol	Member of alkylphenol family, detergent metabolite
Acesulfame-K	Artificial sweetener
Acetaminophen	Nonsteroidal anti-inflammatory drug (NSAID)
Albuterol	Bronchial dilater (active ingredient in inhalers)
Amoxicillin	Antibiotic
Androstenedione	Natural hormone
Atenolol	Beta blocker (used to treat hypertension)
Atrazine	Herbicide
Azithromycin	Antibiotic
Bendroflumethiazide	Diuretic (used to treat hypertension)
Bezafibrate	Fibrate drug (used to treat high cholesterol)
Bisphenol A (BPA)	Breakdown product of polycarbonate, a plastic commonly used to store water and food
Bromacil	Herbicide
Butalbital	Barbiturate drug (pain medication)
Butylparaben	Member of paraben family, used in lotions and body creams
Caffeine	Stimulant found in many beverages
Carbadox	Antibacterial drug used in animal husbandry
Carbamazepine	Anti-seizure drug
Carisoprodol	Muscle relaxant drug
Chloramphenicol	Antibiotic
Chloridazon	Herbicide
Chlorotoluron	Herbicide
Cimetidine	Heartburn / Reflux drug
Clofibrilic Acid	Herbicide
Cotinine	Nicotine metabolite
Cyanazine	Herbicide

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<b>Table 2 CEC Compounds and their Typical Uses Phase III CEC Evaluation and Other Water Quality Testing of Various Waters City of Sedona</b>	
<b>CEC Compound</b>	<b>Typical Use</b>
DACT	Atrazine degradation product (see above)
DEA	Atrazine degradation product (see above)
DEET	Insect repellent
Dehydronifedipine	Metabolite of Nifedipine (see below)
DIA	Atrazine degradation product (see above)
Diazepam	Sedative, anti-epileptic, and muscle relaxant drug
(brand name Valium)	+
Diclofenac	Nonsteroidal anti-inflammatory drug (NSAID)
Dilantin	Anti-epileptic drug
	Antihistamine (brand name Benadryl)
Ditiazem	Calcium channel blocker (drug used to treat hypertension, angina, and some types of arrhythmia)
Diuron	Herbicide
Erythromycin	Antibiotic
Estradiol (E2)	Natural steroid hormone
Estrone (E1)	Natural steroid hormone
Ethinyl Estradiol - 17 $\alpha$	Synthetic steroid hormone (used in birth control pills)
Ethylparaben	Member of paraben family, used in lotions and body creams
Flumequine	Antibiotic
Fluoxetine	Antidepressant drug (brand name Prozac)
Gemfibrozil	Fibrate drug (used to lower blood lipid levels)
Ibuprofen	Nonsteroidal anti-inflammatory drug (NSAID)
Iohexal	X-ray contrast medium (helps make x-rays more visible)+
Iopromide	X-ray contrast medium (helps make x-rays more visible)
Isobutylparaben	Member of paraben family, used in lotions and body creams
Isoproturon	Herbicide
Ketoprofen	Nonsteroidal anti-inflammatory drug (NSAID)
Ketorolac	Nonsteroidal anti-inflammatory drug (NSAID)
Lidocaine	Local anesthetic and anti-arrhythmic drug
Lincomycin	Antibiotic
Linuron	Herbicide
Lopressor (metoprolol)	Anti-hypertension drug

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<b>Table 2 CEC Compounds and their Typical Uses Phase III CEC Evaluation and Other Water Quality Testing of Various Waters City of Sedona</b>	
<b>CEC Compound</b>	<b>Typical Use</b>
Meclofenamic Acid	Nonsteroidal anti-inflammatory drug (NSAID)
Meprobamate	Anxiolytic drug (tranquilizer)
Metazachlor	Herbicide
Methylparaben	Member of paraben family, used in lotions and body creams
Metolachlor	Herbicide
Naproxen	Nonsteroidal anti-inflammatory drug (NSAID)
Nifedipine	Drug used to treat high blood pressure and angina
N-Nitrosodibutylamine (NDBA)	Member of the nitrosamine family, formed as disinfection byproducts primarily in chloramination.
N-Nitrosodiethylamine (NDEA)	Member of the nitrosamine family, formed as disinfection byproducts primarily in chloramination.
N-Nitrosodimethyl-amine (NDMA)	Member of the nitrosamine family, formed as disinfection byproducts primarily in chloramination.
N-Nitrosodi-n-propyl-amine (NDPA)	Member of the nitrosamine family, formed as disinfection byproducts primarily in chloramination.
N-Nitrosomethyl-ethyl-amine (NMEA)	Member of the nitrosamine family, formed as disinfection byproducts primarily in chloramination.
N-Nitrosomorpholine (NMOR)	Member of the nitrosamine family, formed as disinfection byproducts primarily in chloramination.
N-Nitrosopiperidine (NPIP)	Member of the nitrosamine family, formed as disinfection byproducts primarily in chloramination.
N-Nitrosopyrrolidine (NPYR)	Member of the nitrosamine family, formed as disinfection byproducts primarily in chloramination.
Norethisterone	Synthetic hormone (used in birth control pills)
Oxolinic acid	Antibiotic
Pentoxifylline	Drug that improves blood flow
Phenazone	Analgesic and antipyretic drug (used to treat pain and reduce fever)
Primidone	Anticonvulsant drug
Progesterone	Natural steroid hormone
Propazine	Herbicide
Propylparaben	Member of paraben family, used in lotions and body creams
Quinoline	Used for many purposes, also an herbicide metabolite
Simazine	Herbicide
Sucralose	Artificial sweetener
Sulfachloropyridazine	Antibiotic

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<b>Table 2 CEC Compounds and their Typical Uses</b> <b>Phase III CEC Evaluation and Other Water Quality Testing of Various Waters</b> <b>City of Sedona</b>	
CEC Compound	Typical Use
Sulfadiazine	Antibiotic
Sulfadimethoxine	Antibiotic
Sulfamerazine	Antibiotic
Sulfamethazine	Antibiotic
Sulfamethizole	Antibiotic
Sulfamethoxazole	Antibiotic
Sulfathiazole	Antibiotic
Tris(2-chloroethyl) phosphate (TCEP)	Flame retardant chemical
Tris(2-chloropropyl) phosphate TCPP	Flame retardant chemical
Tris(1,3-dichloro-2-propyl) phosphate (TDCPP)	Flame retardant chemical
Testosterone	Natural steroid hormone
Theobromine	Chemical component of chocolate
Theophylline	Methylxanthine drug (used to treat respiratory diseases)
Triclocarban	Antimicrobial agent (used in hand soaps)
Triclosan	Antimicrobial agent (used in hand soaps)
Trimethoprim	Antibiotic
Warfarin	Anticoagulant (prevents blood clots), aka Coumadin

All samples were collected as grab samples and were sent to, and analyzed by, Eurofins-Eaton Laboratory, located in Monrovia, California (Eaton Lab).

The method for CEC quantification is based on isotope dilution and solid phase extraction (SPE) followed by liquid chromatography and mass spectrometry in tandem (LC MS/MS). Nine of the 100 compounds (the nitrosamine group) were analyzed using the EPA Method 521 for the Detection of Nitrosamines in Drinking Water based on gas chromatography and chemical ionization tandem mass spectrometry (GC MS/MS).

The lab also analyzed Quality Assurance/Quality Control (QA/QC) samples (a field blank and an equipment blank sample). No anomalies were identified in the QA/QC results.

### Drinking Water Quality Testing

Drinking water parameters were analyzed from the Oak Creek and WWRP effluent samples. Results were compared to maximum contaminant levels (MCL) regulated by the EPA. It should be noted that this testing was not performed for the purpose of obtaining approvals for these sources as drinking water; testing was performed to more fully characterize the water quality of these sources.

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Table 3 lists the drinking water quality parameters that were tested, along with the MCL, if applicable. Some parameters tested do not have MCLs, but are routinely measured as part of drinking water-related testing. Standard EPA-approved drinking water methods were employed. Analytical testing was performed by Legend Analytical, which is a certified drinking water laboratory in the state of Arizona.

<b>Table 3 Drinking Water Quality Testing Suite Phase III CEC Evaluation and Other Water Quality Testing of Various Waters City of Sedona</b>		
<b>Analyte</b>	<b>MCL</b>	<b>Units</b>
Asbestos	7	MFL
Nitrate as N	10	mg/L
Barium	2	mg/L
Beryllium	0.004	mg/L
Calcium	-	mg/L
Chromium	0.1	mg/L
Copper	TT5; Action Level 1.3	mg/L
Magnesium	-	mg/L
Nickel	-	mg/L
Sodium	-	mg/L
Antimony	0.006	mg/L
Arsenic	0.01	mg/L
Cadmium	0.005	mg/L
Lead	TT5; Action Level 0.015	mg/L
Selenium	0.05	mg/L
Thallium	0.002	mg/L
Sulfate	-	mg/L
Dichloromethane	0.005	mg/L
trans-1,2-Dichloroethene	0.1	mg/L
cis-1,2-Dichloroethylene	0.07	mg/L
Chloroform	-	mg/L
1,1,1-Trichloroethane	0.2	mg/L
Carbon tetrachloride	0.005	mg/L
1,2-Dichloroethane	0.005	mg/L
Benzene	0.005	mg/L
Trichloroethene	0.005	mg/L
1,2-Dichloropropane	0.005	mg/L
Bromodichloromethane	-	mg/L
Toluene	1	mg/L

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<b>Table 3      Drinking Water Quality Testing Suite Phase III CEC Evaluation and Other Water Quality Testing of Various Waters City of Sedona</b>		
<b>Analyte</b>	<b>MCL</b>	<b>Units</b>
Vinyl chloride	0.002	mg/L
1,1,2-Trichloroethane	0.005	mg/L
Tetrachloroethene	0.005	mg/L
Dibromochloromethane	-	mg/L
Chlorobenzene	0.1	mg/L
Ethylbenzene	0.7	mg/L
m,p-Xylene	10	mg/L
o-Xylene	10	mg/L
Styrene	0.1	mg/L
Bromoform	-	mg/L
Total THMs	0.08	mg/L
1,2-Dichlorobenzene-d4	0.075	mg/L
1,2-Dichloroethane-d4	0.005	mg/L
4-Bromofluorobenzene	-	mg/L
Pentafluorobenzene	-	mg/L
1,4-Dichlorobenzene	-	mg/L
1,2-Dichlorobenzene	-	mg/L
1,2,4-Trichlorobenzene	0.07	mg/L
Xylenes (total)	10	mg/L
1,1-Dichloroethene	0.007	mg/L
Aldicarb sulfoxide	-	mg/L
Aldicarb sulfone	-	mg/L
Oxamyl	0.2	mg/L
Methomyl	-	mg/L
3-Hydroxycarbofuran	-	mg/L
Aldicarb	-	mg/L
Carbofuran	0.04	mg/L
Carbaryl	-	mg/L
4-Bromo-3,5-dimethylphenyl-N-methylcarbamate	-	mg/L
Glyphosate	0.7	mg/L
Temperature	-	°C
Total Alkalinity as CaCO <sub>3</sub>	-	mg/L
Total Dissolved Solids	-	mg/L

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<b>Table 3      Drinking Water Quality Testing Suite Phase III CEC Evaluation and Other Water Quality Testing of Various Waters City of Sedona</b>		
<b>Analyte</b>	<b>MCL</b>	<b>Units</b>
Cyanide, Total	0.2	mg/L
Fluoride	4	mg/L
Nitrite as N	1	mg/L
Nitrate + Nitrite as N	11	mg/L
pH	-	pH Units
Calcium Hardness as CaCO <sub>3</sub>	-	mg/L
Magnesium Hardness as CaCO <sub>3</sub>	-	mg/L
Total Hardness as CaCO <sub>3</sub>	-	mg/L
Mercury	0.0002	mg/L
Langlier Index	-	N/A
Total Coliforms	5.0%	P/A
E. coli	MCL <sup>4</sup>	P/A
Toxaphene	0.003	mg/L
Chlordane	0.002	mg/L
Decachlorobiphenyl	-	mg/L
Aroclor 1016	-	mg/L
Aroclor 1221	-	mg/L
Aroclor 1232	-	mg/L
Aroclor 1242	-	mg/L
Aroclor 1248	-	mg/L
Aroclor 1254	-	mg/L
Aroclor 1260	-	mg/L
13C-2,3,7,8-TCDD	-	mg/L
Dioxin	0.00000003	mg/L
Combined Radium	5	pCi/L
Gross Alpha Activity	15	pCi/L
Radium 226 Activity	-	pCi/L
Radium 228 Activity	-	pCi/L
1,2-Dibromo-3-chloropropane (DBCP)	0.0002	mg/L
1,2-Dibromoethane (EDB)	-	mg/L
2,4,5-TP (Silvex)	0.05	mg/L
2,4-D	0.07	mg/L
Dalapon	0.2	mg/L



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<b>Table 3      Drinking Water Quality Testing Suite Phase III CEC Evaluation and Other Water Quality Testing of Various Waters City of Sedona</b>		
<b>Analyte</b>	<b>MCL</b>	<b>Units</b>
Dicamba	-	mg/L
Dinoseb	0.007	mg/L
Pentachlorophenol	0.001	mg/L
Picloram	0.5	mg/L
SS-2,4-Dichlorophenylacetic acid	-	mg/L
Alachlor	0.002	mg/L
Aldrin	-	mg/L
Atrazine	0.003	mg/L
Benzo(a)pyrene	0.0002	mg/L
Butachlor	-	mg/L
Di(2-ethylhexyl)adipate	0.4	mg/L
Di(2-ethylhexyl)phthalate	0.006	mg/L
Dieldrin	-	mg/L
Endrin	0.002	mg/L
gamma-BHC (Lindane)	0.0002	mg/L
Heptachlor	0.0004	mg/L
Heptachlor epoxide	0.0002	mg/L
Hexachlorobenzene	0.001	mg/L
Hexachlorocyclopentadiene	0.05	mg/L
Methoxychlor	0.04	mg/L
Metolachlor	-	mg/L
Metribuzin	-	mg/L
Propachlor	-	mg/L
Simazine	0.004	mg/L
SS-2,4,5,6-Tetrachloro-m-xylene	-	mg/L
SS-4,4'-Dichlorobiphenyl	-	mg/L
SS-Triphenylphosphate	-	mg/L
Endothall	0.1	mg/L
SS-2,4-Dichlorophenylacetic acid	-	mg/L
Diquat	0.02	mg/L

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# FINDINGS

## Phase III CEC Evaluation

Table 4 summarizes the number of CECs detected in each sample. No CECs were detected in the two drinking water samples (Arizona Water Co. and Oak Creek Water Co.), or in Oak Creek near Page Springs. DEET (active ingredient in insect repellent) was detected in the Oak Creek Sample upstream of the WWRP, which is likely a reflection of human activity in the Creek. A number of CEC's were detected in the treated effluent that are typical in municipal wastewater, and are reflective of human use/consumption of personal care products, pharmaceuticals, food additives, etc. Detailed lab reports are included in Appendix A.

<b>Sample Location</b>	<b>Number of CEC's Detected</b>	<b>Comments</b>
Arizona Water Company	0	NA
Oak Creek Water Company	0	NA
WWRP POC-1 (Groundwater from POC well)	2	Acesulfame-K (artificial sweetener), BPA (plastic degradation byproduct)
Oak Creek Surface Water (upstream of WWRP) Phase III	1	DEET (active ingredient in insect repellent)
Oak Creek Page Springs Surface Water (downstream of WWRP) Phase III	0	NA
WWRP treated effluent	23	See Appendix A for complete list

Results were compared to human health threshold levels that have been recommended by the National Water Research Institute (NWRI) in the context of potable reuse applications. NWRI thresholds are NOT regulations, but are based on extensive research for those CECs believed to represent the highest human health impacts. Table 5 lists the NWRI thresholds compared to the results of this study. None of the detected CECs exceed the thresholds, and in most cases, results are orders of magnitude lower.

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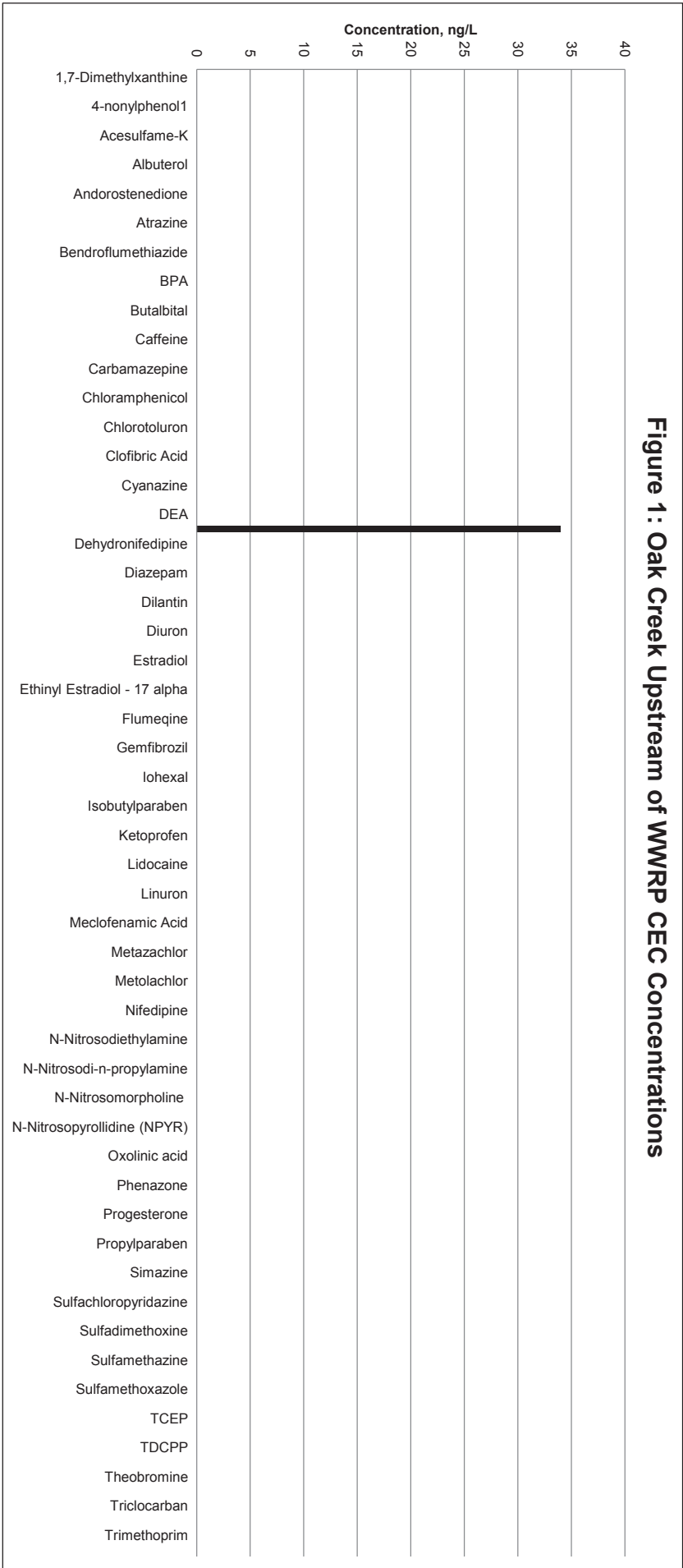
<b>Table 5 NWRI Thresholds compared to Phase III CEC Analysis Results Phase III CEC Evaluation and Other Water Quality Testing of Various Waters City of Sedona</b>				
<b>Analyte</b>	<b>Results in ng/L<sup>(1)</sup></b>			
	<b>NWRI Threshold Concentration<sup>(2)</sup></b>	<b>Oak Creek Upstream</b>	<b>Effluent</b>	<b>WWRP POC</b>
Atenolol	4,000	ND	83	ND
Carbamazepine	10,000	ND	110	ND
Cotinine	1,000	ND	38	ND
DEET	200,000	34	78	ND
Meprobamate	200,000	ND	180	ND
N-Nitrosodi-n-propylamine	(NDMA 10)	ND	3.2	ND
Primidone	10,000	ND	51	ND
Sucralose	150,000,000	ND	28,000	ND
TCEP	5,000	ND	120	ND

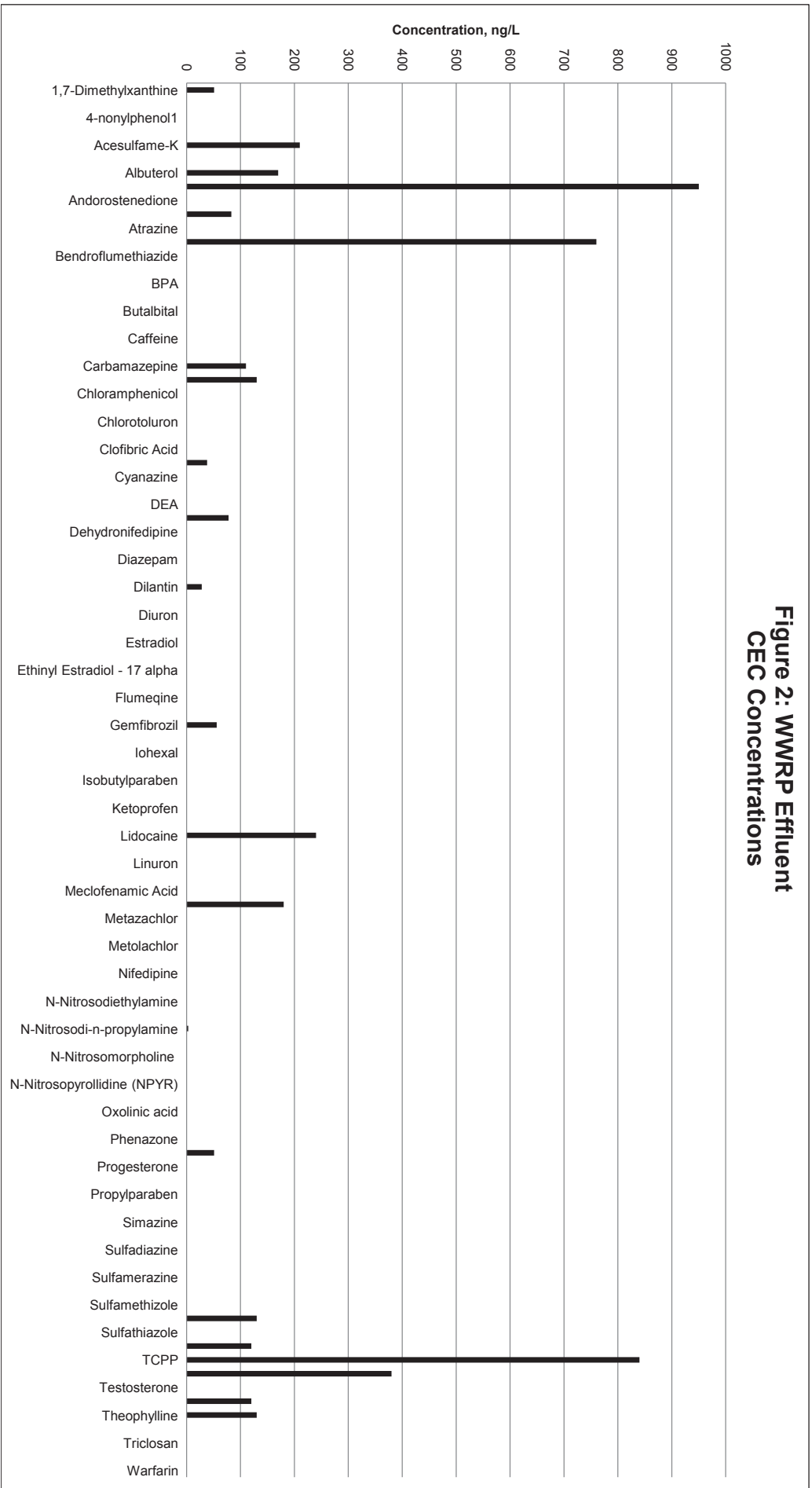
**Notes:**

(1) Results are shown as provided by the analytical laboratory. Detections are shown in bold font. ND indicates the analyte was not detected above the respective method reporting limit (MRL). MRLs for each analyte are shown in the full laboratory reports provided in Appendix A.

(2) Threshold concentrations adopted from NWRI (2013), According to NWRI (2013) the criteria were selected for pharmaceuticals as the drinking water equivalent concentration for the lowest therapeutic dose/1,000 was used in recognition of the teratogenic potential of these drugs (primidone). However, the numbers for carbamazepine and phenytoin are based on reported carcinogenicity. In the case of the anticonvulsant drugs, the criteria were set to the lowest daily maintenance dose in adults/10,000. Sucralose was based upon ADI established by the U.S. FDA of 5 milligrams per kilogram (mg/kg) per day × 60 kg/2 L. The criteria for TCEP and DEET were set based on the respective Minnesota Dept. of Health (2011) guidance values.

Figures 1 through 3 show CEC concentrations detected in each sample. (Note that sucralose (an artificial sweetener) is not included in these results. See Phase II, TM 2, Carollo Engineers, 2014 for rationale for omitting sucralose data).





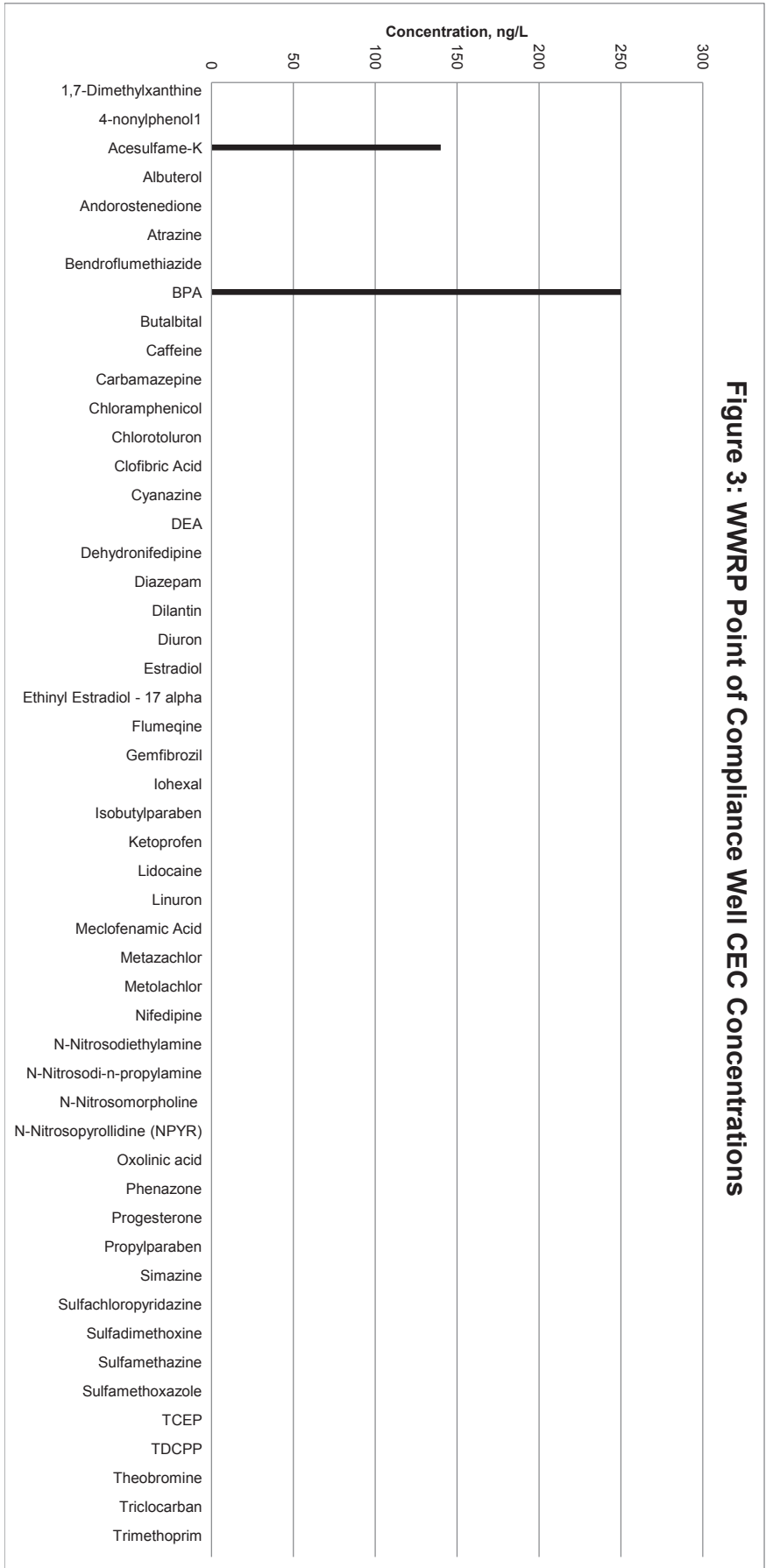


Figure 3: WWRP Point of Compliance Well CEC Concentrations

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### Drinking Water Quality Testing

Table 6 lists detected analytes, the MCL (if applicable) and the measured concentrations for each sample. The majority of analytes were not detected (see Appendix B for complete results).

Analyte	WWRP Effluent	Oak Creek Downstream	Oak Creek Upstream	Units	MCL
Nitrate as N	5.85	<0.20	<0.20	mg/L	10
Barium	0.15	0.16	0.23	mg/L	2
Calcium	58	47	34	mg/L	-
Copper	0.02	<0.01	<0.01	mg/L	TT5; Action Level 1.3
Magnesium	27	21	17	mg/L	-
Sodium	114	11	5	mg/L	-
Arsenic	0.0057	0.0128	0.0059	mg/L	0.01
Sulfate	18.1	<5.0	<5.0	mg/L	-
1,2-Dichlorobenzene-d4	0.0040	0.0040	0.0040	mg/L	0.075
1,2-Dichloroethane-d4	0.0037	0.0038	0.0037	mg/L	0.005
4-Bromofluorobenzene	0.0034	0.0035	0.0035	mg/L	-
Pentafluorobenzene	0.0039	0.0039	0.0039	mg/L	-
4-Bromo-3,5-dimethylphenyl-N-methylcarbamate	0.00223	0.00213	0.00217	mg/L	-
Temperature	17.6	16.0	15.5	°C	-
Total Alkalinity as CaCO <sub>3</sub>	264	213	169	mg/L	-
Total Dissolved Solids	537	215	180	mg/L	-
Fluoride	0.40	0.10	<0.10	mg/L	4
Nitrate + Nitrite as N	5.85	<0.20	<0.20	mg/L	11
pH	7.5	8.2	8.7	pH Units	-
Calcium Hardness as CaCO <sub>3</sub>	144	117	85	mg/L	-
Magnesium Hardness as CaCO <sub>3</sub>	109	86	70	mg/L	-

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<b>Table 6 Detected Drinking Water Analytes Phase III CEC Evaluation and Other Water Quality Testing of Various Waters City of Sedona</b>					
<b>Analyte</b>	<b>WWRP Effluent</b>	<b>Oak Creek Downstream</b>	<b>Oak Creek Upstream</b>	<b>Units</b>	<b>MCL</b>
Total Hardness as CaCO <sub>3</sub>	254	204	155	mg/L	-
Langlier Index	0.0220	0.568	0.827	N/A	-
Total Coliforms	Present	Present	Present	P/A	See note 1
E. coli	Absent	Present	Present	P/A	See note 1
Decachlorobiphenyl	0.0000210	0.0000310	0.0000300	mg/L	-
13C-2,3,7,8-TCDD	0.0000013	0.0000015	0.0000015	mg/L	-
Gross Alpha Activity	1.9 ± 0.9	1.4 ± 0.5	1.9 ± 0.7	pCi/L	15
SS-2,4-Dichlorophenylacetic acid	0.028	0.026	0.025	mg/L	-
SS-2,4,5,6-Tetrachloro-m-xylene	0.0045	0.0048	0.0045	mg/L	-
SS-4,4'-Dichlorobiphenyl	0.0048	0.0049	0.0049	mg/L	-
SS-Triphenylphosphate	0.0048	0.0050	0.0048	mg/L	-
SS-2,4-Dichlorophenylacetic acid	0.43	0.47	0.40	mg/L	-
<b>Note:</b>					
1. No more than 5.0% samples total coliform-positive (TC-positive) in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliforms or E. coli if two consecutive TC-positive samples, and one is also positive for E.coli fecal coliforms, system has an acute MCL violation.					



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Table 7 summarizes analytes that were detected at levels above the MCL. The presence of total coliform and *E. coli* are typical for untreated surface waters.

<b>Sample Location</b>	<b>Analytes Detected Above Drinking Water MCL</b>	<b>Comments</b>
WWRP Effluent	None	Total Coliform was present. Additional testing required to determine if MCL would be exceeded.
Oak Creek near Page Springs	Arsenic (0.0128 mg/L)	Total Coliform and <i>E. Coli</i> were present. Additional testing required to determine if MCL would be exceeded.
Oak Creek Upstream of WWRP	None	Total Coliform and <i>E. Coli</i> were present. Additional testing required to determine if MCL would be exceeded.

## CONCLUSIONS

### Phase III CEC Evaluation

The Phase III CEC Evaluation results can be summarized by the following conclusions.

- CECs were not detected in the potable water samples or in Oak Creek near Page Springs.
- DEET (insect repellent) was detected at very low levels in the sample at Oak Creek upstream of the WWRP. This is likely a result of human activity in the creek near the sample location.
- Several CECs were detected in the wastewater effluent sample, though generally at concentrations in the lower or medium ng/L range. All CECs detected in the wastewater effluent were two or three orders of magnitude lower in concentrations compared to the threshold concentrations proposed by NRW (2013). It is emphasized that the NRW panel's recommendations are based on a direct potable reuse scenario, which means that they assume no further treatment of the reclaimed water occurs before it is used for potable purposes. Therefore, the recommendations provided by the NRW panel should be seen as a very conservative benchmark for groundwater recharge as additional attenuation occurs in the aquifer.

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- The compound with the highest concentration in the wastewater effluent sample was the artificial sweetener Sucralose (28,000 ng/L). A safe consumption level as recommended by the NWRI study cited previously is 150,000,000 ng/L. While sucralose does not pose a health impact at the levels detected in this study, NWRI suggests that sucralose could be used as a tracer for detecting wastewater impacts on surface or groundwaters; sucralose has not been detected in the point of compliance well or in downstream surface waters.
- Two CEC compounds were detected in the WWRP Point of Compliance Well (POC-1): Acesulfame-K (artificial sweetener) and BPA (plastic degradation byproduct). The low levels of the artificial sweetener do not represent a human health concern and the BPA is likely from the rubber hose used at the well to sample. The POC well does not appear to be impacted from CECs in the reclaimed water.

## Drinking Water Quality Testing

The drinking water quality testing results can be summarized by the following conclusions.

- The majority of contaminants measured in the drinking water suite were not detected in any of the samples.
- Arsenic in the Oak Creek Sample near Page Springs was the only drinking water quality parameter tested that was present at a higher concentration than the respective MCL.