Irvine Ranch Water District

Reclaimed Water Quality Report

A report on reclaimed water quality for calendar year 2000

Irvine Ranch Water District Reclaimed Water Use At A Glance

The primary uses for IRWD reclaimed water are:

- Landscape irrigation (parks, golf courses, school playfields, greenbelts, etc.)
- Agricultural irrigation
- Front and back yard landscape irrigation for some estate-sized properties
- Industrial/commercial uses, such as carpet dyeing. Cooling tower applications are expected in the near future.
- Toilet flushing in some dual-plumbed commercial buildings

Reclaimed Water Statistics for Calendar Year 2000

- 2,818 landscape meters
- 5,653 acres of landscape use
- 44 agricultural meters
- 1,087 acres of agricultural use
- 315 miles of reclaimed water pipelines, the most extensive distribution system in California and one of the largest in the U.S.
- Total reclaimed water use during 2000 was 19,284 acre-feet.
- Reclaimed water now makes up over 20 percent of overall water used within the IRWD service area.
- The Michelson Water Reclamation Plant capacity is 15 million gallons per day (mgd). The Los Alisos Water Reclamation Plant can produce 5.5 mgd.
- A total of 225 new reclaimed meters were added to the distribution system during 2000.

San Joaquin Reservoir Would Improve Seasonal Reclaimed Water Storage

Irvine Ranch Water District (IRWD) is moving ahead with plans to convert the now-empty San Joaquin Reservoir into a facility to provide increased seasonal storage of reclaimed water.

This plan would save energy, protect Upper Newport Bay, provide reclaimed water service to expanded areas, and restore a water view to surrounding homeowners.

The reservoir, located between Newport Beach and Newport Coast, is an open reservoir that was built in 1966 to provide drinking water to customers along a 35-mile area from Huntington Beach to Dana Point. Since more stringent water quality regulations now control the storage of treated drinking water in an open reservoir, San Joaquin has not been used for that purpose since 1994 when it was drained. Metropolitan Water District of Southern

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Merger with Los Alisos Water District Expands Reclaimed Water System

On Dec. 31, 2000 Irvine Ranch Water District merged with Los Alisos Water District and began serving additional customers in Lake Forest.

The Los Alisos Water Reclamation Plant, built in 1964, currently produces tertiary-treated reclaimed water to serve 194 landscape irrigation and agricultural customers. The Los Alisos facilities are a welcome addition to IRWD's extensive reclaimed water system. Data from that system will be included in next year's report.

To our new customers: Welcome!

Q Questions & A Answers

By reading this report, you can learn more about your local reclaimed water supply and the important steps we take to ensure its quality. Here are answers to some commonly asked questions about reclaimed water:

Is reclaimed water safe?

Yes. Reclaimed water supplied by Irvine Ranch Water District meets the stringent requirements set by the State Department of Health Services under Title 22 of the California Code of Regulations. The reclaimed water produced by IRWD is of such high quality that it has an unrestricted use permit, which means it can be used for everything but drinking. Thousands of tests are performed each year to ensure water quality. See the tables inside this report for a comprehensive summary of test results.

My dog recently drank reclaimed water from a sprinkler at the park. Is this harmful?

No. As indicated above, the reclaimed water produced by IRWD must meet very high standards. While it is not intended for drinking by people or pets, an animal which ingests reclaimed water will not be harmed. In addition to the unrestricted use permit from the State of California Dept. of Health Services (DOHS), IRWD's reclaimed water meets the DOHS recreation-1 standards. This means that the water is of such high quality it could be used to fill swimming pools. While our reclaimed water is not used for swimming, it is reassuring to know that it meets those high standards.

San Joaquin Reservoir

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California (MWD), the former operator of the reservoir, had proposed covering the reservoir with a floating plastic cover so that it could continue to be used for drinking water storage. However, MWD abandoned that plan due to extremely high costs. In addition, there were protests from surrounding property owners who did not want to lose a water view.

While IRWD had always been a part owner of the reservoir, it recently purchased the remaining capacity from the consortium of cities and water districts that had previously owned it jointly. Plans are now moving ahead to convert the reservoir to reclaimed water storage.

The reservoir's capacity is 3,050 acre-feet, or 994.3 million gallons. Under the IRWD plan, reclaimed water would be sent to the reservoir for storage during winter months when demand is lower. Reclaimed water would be removed from the reservoir from April through November, when demand is higher.

Increased reclaimed water use for landscape irrigation and other purposes saves both money and energy because it means that less drinking water needs to be pumped hundreds of miles from the Colorado River and Northern California.

		Michelson Plant (MWRP)			ET-1 Well	
Parameter	**Limit**	**Low**	**High**	**Average**	**Low**	**High**
Organic Chemicals (mg/L)						
Acetone	NS	ND	0.025	0.013		
Bromodichloromethane	NS	0.029	0.036	0.031	ND	0.0014
Bromoform	NS	ND	0.0012	0.0005	ND	0.0009
Carbon disulfide	NS	ND	0.0016	ND		
Carbon Tetrachloride	NS	ND	0.0007	ND	ND	ND
2-Chloroethyl Vinyl Ether	NS	ND	ND	ND	ND	0.0036
Chloroform	NS	0.036	0.047	0.040	ND	ND
Chloromethane	NS				ND	0.0009
cis-1,2-Dichloroethene	NS				0.0007	0.0022
Dibromochloromethane	NS	0.011	0.012	0.011	ND	0.0007
Methyl Chloride	NS	ND	0.0016	0.0009	ND	ND
Trichloroethene					0.0024	0.0161
Inorganic Chemicals (mg/L)						
Alkalinity as (CaCO3)	NS	101	150	127	203	203
Ammonia-N	NS	ND	2.0	ND		
Antimony	NS	0.0004	0.0031	0.0019		
Arsenic	0.05 (1)	ND	0.0029	0.0016		
Barium	1 (1)	0.024	0.057	0.040		
Bicarbonate	NS	101	150	127	203	203
Boron	1 (2)	0.28	0.59	0.5	0.21	0.21
Cadmium	0.01 (1)	ND	0.0002	ND		
Calcium	NS	37	68	49	122	122
Chloride	150 (2)	102	183	137	192	192
Chromium	0.05 (1)	0.0007	0.0041	0.0017		
Cobalt	0.2 (1)	0.0003	0.0007	0.0005		
Copper	0.02 (1)	0.0032	0.0083	0.0060		
Fluoride	1.0 (2)	0.28	0.55	0.45 (7)		
Iron	0.3 (1)	0.04	0.10	0.07		
Lead	0.05 (1)	0.0016	0.0050	0.0033		
Magnesium	NS	10.6	25.5	17.8	28.1	28.1
Manganese	0.05 (1)	0.0351	0.0705	0.0419		
Mercury	0.002 (1)	ND	0.0007	ND		
Nickel	NS	0.0054	0.0138	0.0086		
Nitrate (as N)	NS	2.9	5.5	4.5	7.9	7.9
Phosphate, Ortho (as P)	NS	0.2	2.9	1.2	ND	ND
Potassium	NS	14.3	37.3	20.0	3.5	3.5
Selenium	0.01 (1)	ND	0.0021	ND		
Silver	0.05 (1)	0.0003	0.0008	0.0004		
Sodium	125 (2)	116	142	129 (7)	135	135
Sulfate	240 (2)	110	248	163 (7)	229	229
Zinc	0.1 (1)	0.0388	0.0867	0.0666		
Additional Constituents Analyzed (Unit is mg/L except as specified)						
Biochemical Oxygen Demand	20 (1)	ND	11	ND		
Chemical Oxygen Demand	NS	12	41	23		
Chlorine residual	NS	3.2	17.1	10.0	ND (5)	0.2 (5)
Coliform Bacteria (MPN/100mL)	2.2 (3)	ND	23	ND	ND	ND
Color (CU)	NS	7	37	20	ND	9
Electrical Conductivity (umhos/cm)	NS	538	1265	892	1430	1580
Foaming Agents (MBAS)	NS	ND	0.35	0.18		
Hardness as CaCO3	380 (2)	144	268	199	420	420
pH (units)	6.5 - 8.5 (1)	6.5	6.8	6.6	6.7	7.7
Suspended Solids	20	ND	4.5	1.3		
Total Dissolved Solids	720 (2)	566	812	680	920	920
Turbidity (NTU)	2 (1) (4)	0.4	2.0	1.0	0.1	0.9 (6)

NOTES:

(1) Michelson Water Reclamation Plant (MWRP) effluent limitation.
(2) Mixed irrigation limitation.
(3) Coliform limitation is a use-dependent, 7-day median of 2.2 or 23 MPN. No single sample may exceed 23 MPN.
(4) Turbidity limitation is 2 NTU, based on a daily average with no turbidity over 5 NTU for 5% of the time.
(5) Chlorine is not added to the ET-1 Well or Well 72.
(6) ILP, ET-1 and Well 72 have no turbidity limits.
(7) Limit is based on a flow-weighted average of all water sources.
Note: Monitoring requirements vary for the different sources of water. Therefore, all types of analyses are not performed on all water sources.

ABBREVIATIONS:

NS . . . . . No existing standards or limitations
ND . . . . . Not Detected
mg/L . . . . . Milligrams per Liter
MPN/100mL . Most Probable Number per 100 milliliters
CU . . . . . Color Unit
umhos/cm. . . Micromhos per Centimeter
MBAS . . . . . Methylene Blue Active Substances
NTU . . . . . Nephelometric Turbidity Units
MWRP . . . . . Michelson Water Reclamation Plant
ET-1 Well . . . TCE recovery well

Irvine Lake				Well 72		
Average	Low	High	Average	Low	High	Average
ND				ND	ND	ND
ND				ND	ND	ND
ND				ND	ND	ND
0.0008				ND	ND	ND
ND				ND	ND	ND
ND				ND	ND	ND
0.0015				ND	ND	ND
ND				ND	ND	ND
ND						
0.0132				ND	ND	ND
203				207	207	207
	0.0005	0.003	0.0018			
	ND	0.0028	0.0015			
	0.097	0.134	0.112			
203				207	207	207
0.21	0.14	0.68	0.33	0.17	0.17	0.17
	ND	ND	ND			
122				145	145	145
192	56	78	66	207	207	207
	0.0006	0.0026	0.0012			
	0.0002	0.0006	0.0003			
	0.0054	0.0239	0.0098			
	0.31	0.52	0.39			
	0.08	1.08	0.38			
	0.0004	0.0028	0.0009			
28.1				35.7	35.7	35.7
	0.0238	0.1790	0.0984			
	0.0005	0.0300	0.0100			
7.9				13.8	13.8	13.8
ND				ND	ND	ND
3.5				2.5	2.5	2.5
	ND	0.0018	ND			
	ND	0.0007	ND			
135	52	83	73	106	106	106
229	133	249	222	186	186	186
	0.0060	0.0640	0.0270			
ND (5)	ND	10	1.4	ND (5)	ND (5)	ND (5)
ND	ND	1600	110	ND	ND	ND
ND	11	172	73	ND	176	10
1490	845	981	924	1330	1514	1389
420	298	348	326	508	508	508
7.2	7.1	8.4	7.9	6.6	7.7	7.2
	0.8	32	9.7			
920	576	668	637	1050	1050	1050
0.3	0.5	26.5 (6)	10	0.1	35 (6)	1.7

How to read this data

IRWD collects and analyzes reclaimed water samples for Priority Pollutants, a national list of elements and compounds listed on these two pages, whose presence in wastewater has been established. Priority Pollutants have varying levels of environmental toxicity. IRWD is required to perform these analyses by regulation on a quarterly basis. **The vast majority of Priority Pollutants are not detected (ND) in IRWD's reclaimed water and are listed above right.** The few constituents that are detected are primarily associated with domestic use and disinfection practices. **Only the constitutents with detectable levels are listed in the table above.**

The substances below were monitored but not detected:

ORGANIC CHEMICALS

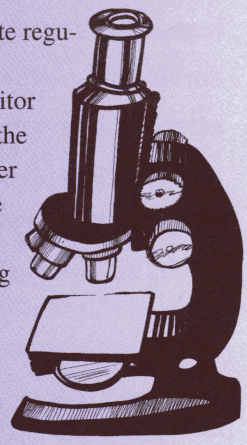
Acenaphthene
Acenaphthylene
Aldrin
Alpha BHC
Alpha Endosulfan
Anthracene
Benzene
Benzidine
Benzo (A) Anthracene
Benzo (A) Pyrene
Benzo (B) Fluoranthene
Benzo (K) Fluoranthene
1,12-Benzoperylene
Beta BHC
Beta Endosulfan
Bis (2-Chloroethoxy) Methane
Bis (2-Chlorisopropyl) Ether
Bis (2-Chlorethyl) Ether
Bis (2-Ethylhexyl) Phthalate
Bromobenzene
Bromochloromethane
Bromomethane
4-Bromophenyl Phenyl Ether
Butyl Benzene Phthalate
N-Butylbenzene
Chlordane
Chlorobenzene
Chloroethane
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl Phenyl Ether
2-Chlorotoluene
4-Chlorotoluene
Chrysene
cis-1,3-Dichloropropene
4,4'-DDD
4,4'-DDE
4,4'-DDT
Delta BHC
1,2,5,6-Dibenzoanthracene
1,2-Dibromoethane
1,2-Dibromo-3-Chloropropane
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
3,3'-Dichlorobenzidine
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethylene
2,4-Dichlorophenol
1,2-Dichloropropane
1,3-Dichloropropane
2,2-Dichloropropane
1,1-Dichloropropene
Dieldrin
Diethyl Phthalate
2,4-Dimethylphenol
Dimethyl Phthalate
Di-N-Butyl Phthalate
2,4-Dinitrophenol
4,6-Dinitro-O-Cresol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-N-Octyl Phthalate
1,2-Diphenylhydrazine
Endosulfan Sulfate
Endrin
Endrin Aldehyde
Ethylbenzene
Fluoranthene
Fluorene
Gamma BHC
Heptachlor
Heptachlor Epoxide
Hexachlorobenzene
Hexachlorobutadiene
Hexachloroethane
Hexachlorocyclopentadiene
Indeno(1,2,3-CD)Pyrene
Isophorone
Isopropylbenzene
4-Isopropyltoluene
Methyl Bromide
Methyl Ethyl Keytone
Methyl Isobutyl Keytone
Methylene Chloride
Naphthalene
Nitrobenzene
N-Nitrosodi-N-Propylamine
N-Nitrosodimethylamine
N-Nitrosodiphenylamine
2-Nitrophenol
4-Nitrophenol
PCB 1016
PCB 1221
PCB 1232
PCB 1242
PCB 1248
PCB 1254
PCB 1260
P-Chloro-M-Cresol
Phenanthrene
Phenol
Pentachlorophenol
Propylbenzene
Pyrene
Styrene
tert-Butylbenzene
1,1,2,2-Tetrachloroethane
Tetrachloroethylene
Toluene
1,2-trans Dichloroethylene
trans-1,3,-Dichloropropene
1,2,3-Trichlorobenzene
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene
Trichlorofluoromethane
2,4,6-Trichlorophenol
1,2,3-Trichloropropane
Trichlorotrifluoroethane
1,3,5-Trimethylbenzene
Toxaphene
Vinyl Chloride
Xylenes, Total

Inorganic Chemicals

Beryllium
Carbonate
Cyanide
Thallium

Reclaimed Water Quality Monitoring Program at IRWD

The Water Quality Department of Irvine Ranch Water District (IRWD) samples the reclaimed water system every week.



While state regulations require IRWD to monitor the quality of the reclaimed water as it leaves the reclamation plant, sampling within the distribution system is not required by any regulatory agency. However, IRWD performs this service for the benefit of our customers and for maintaining internal standards.

A total of 18 distribution sites, three supplemental irrigation wells and four reclaimed water storage reservoirs are tested on a weekly basis. An automated composite sampler also collects the final product from the Michelson Water Reclamation Plant (MWRP) continuously throughout a 24-hour period for daily analysis.

In the field, water is analyzed for pH and total chlorine residual. Samples brought back to the lab are analyzed for total coliform bacteria, electrical conductivity (salts and minerals), turbidity (clarity), color and suspended solids. This data is forwarded to the reclamation plant and systems operations personnel to make the necessary process and/or system adjustments.

By keeping an active watchful eye on the distribution system IRWD strives to ensure a high quality product is delivered to our reclaimed water customers.

Reclaimed Water News Briefs

IRWD Involved in National Studies on Reclaimed Water

Irvine Ranch Water District is participating in two national studies aimed at improving the quality of reclaimed water. Both studies are being conducted under the auspices of the American Water Works Association Research Foundation (AWWARF).

Salinity Study: IRWD is one of 14 water agencies in several Western states studying the sources of increased salinity in water. A multi-agency workgroup, along with the Water Quality Association, proposed a salinity characterization study to AWWARF. This research seeks to characterize and propose management practices for all sources of increased salinity in the sewer collection and reclaimed water systems.

Microbial Study: Along with nine other water utilities nationwide, IRWD will be the lead agency on a study of the potential for reclaimed water quality to degrade within a storage and distribution system. By using case studies, this program will develop operational guidelines to improve the overall quality of reclaimed water. IRWD already conducts extensive monitoring to ensure that our reclaimed water maintains its quality within our distribution system (see monitoring article on page 3), but our agency is always looking for ways to improve.

IRWD Continuously Improves Reclaimed Water Quality

Irvine Ranch Water District has undertaken several projects to continuously improve the quality of its reclaimed water. Among the steps taken:

- The biological nutrient removal system within the Michelson Water Reclamation Plant was converted to nitrification/denitrification. This process converts ammonia to nitrate. Nitrates are used as a source of oxygen, releasing harmless nitrogen gas into the atmosphere.The result is a better quality reclaimed water with lower turbidity levels. As a result, IRWD is already meeting more stringent quality standards that are only now being discussed by regulators for the future. It will also mean that IRWD's reclaimed water can be used for future applications such as industrial cooling towers.
- A destratification system was installed at Sand Canyon Reservoir where reclaimed water is stored. The system uses an air compressor and diffusers to circulate the top and lower "layers" of water in the lake and to increase dissolved oxygen levels. The result, again, is better quality for end users.

Water Resources Master Plan

If you're curious about future supplies of both drinking water and reclaimed water for the area served by Irvine Ranch Water District, many answers can be found in the latest edition of IRWD's Water Resources Master Plan.

The purpose of the plan is to provide a framework for future IRWD water resources planning. It estimates future land use requirements and water demands and recommends a preferred resources strategy and implementation plan.

The plan was recently recognized by the Southern California chapter of the American Public Works Association as one of its "projects of the year" for 2000. This is due to its innovative use of geographic information systems (GIS) technology to create a plan that is more reader-friendly and easier to update.

The plan can be accessed in PDF format through IRWD's Web site at www.irwd.com. Use the direct link from the home page or click on Water Service/Engineering & Planning/Master Plan.

High Rise Building Converted to Reclaimed Water

The latest addition to the IRWD reclaimed water system occurred in June 2001 when the dual-plumbed eight-story 1900 Main Street building began using reclaimed water for toilet flushing. The Irvine office tower, which houses 80 tennants, was constructed in 1999 and had been using domestic water for that purpose until the time of the conversion. The building becomes the fifth high-rise in the IRWD service area to use reclaimed water for all toilets and urinals while all sinks and other fixtures use drinking water as before.

The mission of Irvine Ranch Water District, a public agency, is to provide reliable, high quality water and sewer service in an efficient, cost effective manner and environmentally sensitive way that provides a high level of customer satisfaction.

For additional information: Contact Community Relations at (949) 453-5500.

For questions about water quality data, contact Laboratory Manager Dennis Wilson at (949) 453-5835.

A Word About Recycling
Irvine Ranch Water District recycles more than just water. We print our publications on recycled papers that are also *recyclable.* We hope you'll save this report for future reference, but if you discard it, please recycle!

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