

RECYCLED WATER A CALIFORNIA PERSPECTIVE

- Non-potable Reuse
- Indirect Potable Reuse



CALIFORNIA WATER CODE...

- ***"THE STATE SHALL UNDERTAKE ALL POSSIBLE STEPS TO ENCOURAGE DEVELOPMENT OF WATER RECYCLING FACILITIES... TO HELP MEET THE GROWING WATER REQUIREMENTS OF THE STATE"***

LEGISLATIVE DIRECTIVES

- ***CDPH ESTABLISH PUBLIC HEALTH CRITERIA***
- ***AGENCIES TAKE STEPS TO ENCOURAGE RECYCLING***
- ***SET RECYCLING GOALS***
- ***ADDRESS FUNDING MECHANISMS***
- ***EXPAND ALLOWABLE USES (e.g. dual plumbing, indirect potable reuse)***



CURRENT REGULATIONS.....

- **WATER RECYCLING CRITERIA
(UPDATED 2000)**

CURRENT REGULATIONS.....

- **UPDATES WERE FOR NON-POTABLE REUSES ONLY**
- **REFLECT NEWER TREATMENT TECHNOLOGIES AND INDUSTRY USES & NEEDS**

REGULATIONS ADDRESS...

- ***ALLOWABLE USES***
- ***LEVEL/TYPE of TREATMENT***
- ***TREATMENT PERFORMANCE CRITERIA***
- ***RELIABILITY FEATURES***
- ***USE AREA CONTROLS***
- ***DUAL PLUMBING***
- ***CROSS CONNECTION CONTROL***
- ***MONITORING***
- ***ENGINEERING REPORT***

IS IT A RECYCLED WATER PROJECT?

- **“RECYCLED WATER”--WATER WHICH, AS A RESULT OF TREATMENT OF *WASTE*, IS SUITABLE FOR A *DIRECT BENEFICIAL USE* OR A CONTROLLED USE THAT WOULD NOT OTHERWISE OCCUR....**

WASTE?

- **AS CURRENTLY STRUCTURED, TITLE 22 APPLIES ONLY TO MUNICIPAL WASTEWATER...**
- **BROADER DEFINITION IN WATER CODE**

DIRECT BENEFICIAL USE?

- **THE USE OF RECYCLED WATER WHICH HAS BEEN TRANSPORTED FROM THE POINT OF PRODUCTION TO THE POINT OF USE WITHOUT AN INTERVENING DISCHARGE TO WATERS OF THE STATE....**

REASON FOR REGULATIONS?

- *RESOURCE MGT*
- *DISPOSAL ALT.*
- *ECONOMICS*
- *ENVIRONMENTAL*
- *PUBLIC HEALTH*
- *OTHER*



REGULATIONS.....

- **WATER RECYCLING CRITERIA
(EFFECTIVE – DECEMBER 2, 2000)**
 - **ADDRESS:**
 - **NON-POTABLE REUSE**
 - **CONCERN: MICROBIOLOGICAL**
 - **INDIRECT POTABLE REUSE**
 - **CONCERN: MICROBIOLOGICAL & CHEMICAL**

REGULATIONS.....

■ NON-POTABLE REUSES

LEVELS OF TREATMENT...

- *SECONDARY (undisinfected)*
- *SECONDARY-23*
- *SECONDARY-2.2*
- *FILTERED/DISINFECTED-2.2...“tertiary”*
- *“Other Methods of Treatment”*

PERFORMANCE CRITERIA

- **SECONDARY TREATMENT**
 - Stabilized, Nonputrescible, Contains D.O

- **SECONDARY DISINFECTED**
 - Oxidized / disinfected 2.2 or 23 mpn - 7-day median

- **FILTERED WASTEWATER (tertiary – 2.2 mpn)**
 - Oxidized secondary
 - Influent turbidity / coagulation
 - Effluent turbidity (media vs. membrane)
 - Disinfection CT or equivalent
 - 2.2 mpn based on 7-day median

PERFORMANCE CRITERIA

- FILTERED WASTEWATER (tertiary)
 - MEDIA FILTRATION
 - 2 NTU AVG. (24 hours)
 - 5 NTU < 5 PERCENT OF TIME
 - 10 NTU MAX!
 - LOADING RATE LIMITATIONS
 - MEMBRANE FILTRATION
 - 0.2 NTU AVG. (24 hours)
 - 0.5 MAX
 - LOADING RATE SELF LIMITING

PERFORMANCE CRITERIA

- FILTERED/DISINFECTED WASTEWATER
(tertiary) OBJECTIVES
 - 1-LOG VIRUS REMOVAL - FILTRATION
 - POMONA VIRUS STUDY
 - 4-LOG VIRUS INACTIVATION - DISINFECTION
 - 450 CT W/90 MINUTE MODAL (CHLORINATION)...OR OTHER METHODS SHOWING EQUIVALENT 4-LOG

NOTE: 5- log Reduction Equates to 10^{-4} risk (1 / 10,000)

ACCEPTED FILTRATION TECHNOLOGIES

- CONVENTIONAL GRANULAR (17+)
 - DEEP BED GRAVITY, UPFLOW, PRESSURE, ABW
- MEMBRANE – FILTRATION / MBR (33)
 - HOLOW FIBER / FLAT SHEET
- CLOTH MEDIA (11)
- COMPRESSIBLE FIBER ("FUZZY") (1)
- THREAD WOUND (?)

ACCEPTED DISINFECTION TECHNOLOGIES

- CHLORINATION
- NWRI COMPLIANT ULTRA-VIOLET (20)
- PASTEURIZATION (1)
- OZONE/PEROXIDE (1)

TREATMENT / USES

- **UNDISINFECTED SECONDARY-ORCHARDS*, VINYARDS*, NON-EDIBLE SEED CROPS (FLOWERS), NURSERY STOCK, SOD FARMS, FODDER/FIBER (non-milking)**
 - ***CONSULT WITH FOOD & DRUG**
- **SECONDARY 23 - CEMETERIES, FREEWAYS, RESTRICTED GOLF COURSE, PASTURE FOR MILKING ANIMALS, LIMITED INDUSTRIAL**

TREATMENT / USES

- *SECONDARY 2.2 – SURFACE IRRIGATION OF FOOD CROPS WITH NO DIRECT CONTACT*
 - Staked tomatoes
 - Grapes

TREATMENT / USES

- *TERIARY 2.2 - EDIBLE FOOD CROPS, PARKS/SCHOOLS/PLAYGROUNDS, RESIDENTIAL, UNRESTRICTED GOLF COURSE, RESTRICTED/UNRESTRICTED IMPOUNDMENTS , TOILET/URINAL FLUSHING, LAUNDRIES, SNOW MAKING, CAR WASHES,*
- *ADVANCED - PLANNED GROUNDWATER RECHARGE-INDIRECT POTABLE REUSE, HIGH TECH. INDUSTRIAL, ETC.....*

INDIRECT POTABLE REUSE

***GROUNDWATER RECHARGE REUSE
PROJECTS (GRRP's)**

***SURFACE SPREADING**

***DIRECT INJECTION**

***NO DIRECT POTABLE REUSE!**

INDIRECT POTABLE REUSE

***DRAFT POSTED AUGUST 5, 2008**

***RECEIVED COMMENTS AND
PREPARING RESPONSES**

***Current Version ~8 years in the
making**

PRESENT/FUTURE

■ *INDIRECT* POTABLE REUSE

– PLANNED INTENTIONAL RECHARGE (GRRP)

- Orange County - 72,000 AFY
- LA Basin - 100,000 AFY
- Inland Empire - 23,000 AFY
- Oxnard - 5,000 AFY (+++)

PRESENT / FUTURE

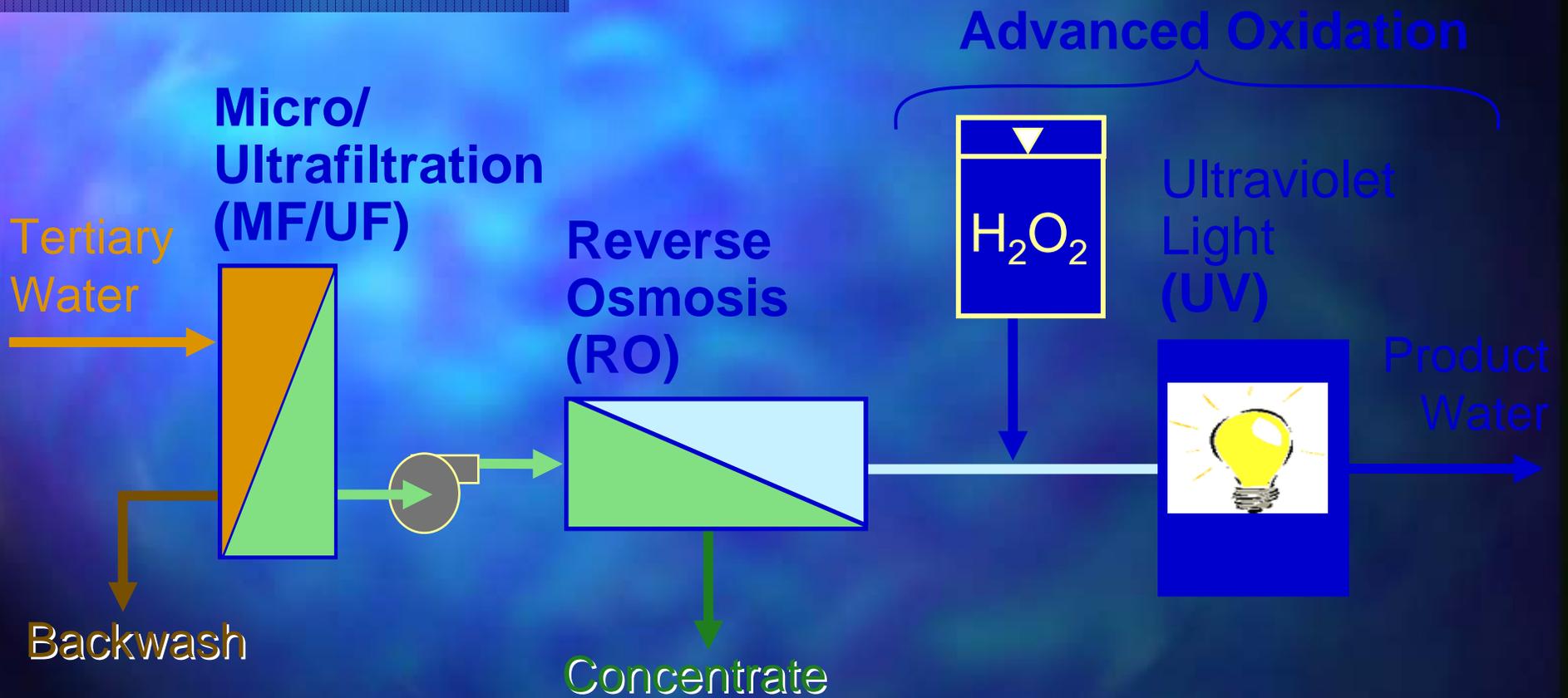
■ *INDIRECT* POTABLE REUSE

– PLANNED SURFACE WATER
AUGMENTATION

■ SAN DIEGO (26,000 AFY)

■ LAKE ARROWHEAD (1,300 AFY)

Advanced Water Treatment Process



DRAFT CRITERIA ADDRESS:

- WASTEWATER SOURCE CONTROL PROGRAMS**
- TREATMENT PROCESSES**
- WATER QUALITY (Microbial / Chemical)**
- DILUTION (% RWC)**
- RECHARGE METHODS**
- TIME IN UNDERGROUND**
- DISTANCE TO EXTRACTION (?)**
- MONITORING WELLS**
- ENGINEERING REPORT**
- PUBLIC HEARINGS**

Requirements

Source Control Program

- Industrial Pretreatment / Monitoring
- Inventory Updates
- Contaminant Fate Assessment
- Outreach

Treatment

- Primary / Secondary (oxidized)
- Filtration
- Disinfection / Oxidation
- Organic Chemical Removal
- Advanced filtration / Oxidation
- SAT

Water Quality

- PRIMARY / SECONDARY MCL'S
- PUBLIC HEALTH GOALS
- NITROGEN SPECIES
- NONREGULATED CONTAMINANTS (TOC)
- PHAC's, EDC's, OTHERS LIKELY

- PATHOGENIC MICROORGANISMS
 - Bacteriological
 - Virus
 - Protozoan

THE HERE AND NOW!!!

- SIGNIFICANT INCREASE IN REUSE OVER PAST 30 YEARS
- RECYCLED WATER NOW VIEWED AS VALUABLE RESOURCE
- INCREASED TYPES OF USES
- ADVANCED TREATMENT SCHEMES

THE HERE AND NOW!!!

- IMPROVED ANALYTICAL TECHNIQUES
- BETTER UNDERSTANDING OF TOXICOLOGICAL EFFECTS
 - (Water reuse, wef, awwarf, etc.)
- DROUGHT RESISTANT RESOURCE

THE FUTURE???

- WWTP UPGRADES TO COMPLY WITH STRICTER DISCHARGE REQUIREMENTS = ADDED OPPORTUNITIES
- NEW SOURCES/TYPES OF RECYCLED WATER
 - STORM/INDUSTRIAL PROCESS/URBAN 'SLOBBER'

STUMBLING BLOCKS?

- Per AB 331 Legislative Task Force:
 - REGULATIONS
 - MUST BE WORKABLE
 - INVOLVE STAKEHOLDERS
 - UNIFORM INTERPRETATION STATEWIDE (OMBUDSMAN)
 - PUBLIC EDUCATION/CONFIDENCE
 - LACK IN STATE/FEDERAL FUNDING

STUMBLING BLOCKS?

- Per AB 331 Legislative Task Force:
 - INCIDENTAL RUNOFF
 - RESEARCH FUNDING
 - PERMITTING PROCEDURES
 - SOURCE CONTROL PROGRAMS
 - 26 RECOMMENDATIONS IN ALL

STUMBLING BLOCKS?

■ OTHER:

- BALANCING NEED FOR PUBLIC HEALTH PROTECTION WITH PRACTICAL REGULATION
- MULTI-AGENCY INVOLVEMENT
- EMERGING CONTAMINANTS & ASSOCIATED UNKNOWNNS

CDPH WEB SITE

■ [www.cdph.ca.gov/healthinfo/
environhealth/water/pages/
waterecycling.aspx](http://www.cdph.ca.gov/healthinfo/environhealth/water/pages/waterecycling.aspx)