13th Annual Groundwater Quality Workshop

4040 Paramount Boulevard
Lakewood, CA 90712

June 28, 2018 (9:30AM ~ 2:30PM)

WRD
WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

Speaker Bio’s

WRD's 13th Annual Groundwater Quality Workshop - Speaker Bios

(In order of presentation)

Brian Partington is a senior hydrogeologist at the Water Replenishment District of Southern California. He is responsible for managing a basin-wide groundwater contamination program and is also a lead participant in groundwater sustainability discussions with key stakeholders in the Central Subbasin, Southern Los Angeles County, California. Prior to WRD, Brian managed a large portfolio of environmental investigation / remediation work and was part of a technical practice group responsible for providing technical support for contamination projects nationally and internationally while working for URS/AECOM. He has over 20 years of groundwater experience and received a Bachelor of Science degree in geology from California State University Fullerton. He is also a California Professional Geologist and Certified Hydrogeologist (PG/CHg).

Dmitriy Ginzburg is a senior water resource control engineer at the State Water Resource Control Board, Division of Drinking Water (DDW). He is the Hollywood District Engineer responsible for managing the flow of work and staff engineers in Hollywood District Office and taking actions to issue domestic water supply permits to public water systems under the California Safe Drinking Water Act (SDWA) and issue enforcement actions against public water systems for violations of the SDWA. He responds to media requests for information and interviews concerning drinking water issues. He also oversees and provides technical assistance to Los Angeles County Health Department that has been delegated the responsibility to regulate all public water systems in LA county with less than 200 customers. Dmitriy also actively participates in development of state wide policies and programs. Besides his work in DDW, Dmitriy is an adjunct professor at Los Angeles Trade Technical College teaching water distribution and treatment operator certification courses. Dmitriy has over 15 years of experience in drinking water regulatory oversight and treatment technologies and received his Bachelor of Science degree in chemical and environmental engineering from UCLA. He is also a licensed California Professional Chemical Engineer (P.E.).

Erik Gaiser is a California Professional Geologist with over 20 years' experience in the environmental and water resources fields. He received a Bachelor's of Science degree in Geology from California State University Fullerton and later obtained his state licensing in 2011. While at Yellow Jacket Drilling, he was the business development manager for California and cultivated professional connections with over 2,500 personnel at a variety of organizations including consulting firms, public and private water entities, watermasters and government agencies. He has also served as the lead hydrogeologist and project manager for a multitude of water resource projects and environmental sites ranging from retail petroleum to USEPA Superfund projects. While at ARCADIS, he acted as the West Coast Lead for their High-Resolution Site Characterization Sub-Discipline functioning as a technical resource for projects across the United States. Currently, he serves as the President of the newly formed Inland Empire Branch of the Groundwater Resource Association of California.

Leila Munla is a Process Engineer with GHD. Leila has over 7 years of experience in Membrane Filtration Systems, with a focus on ceramic membrane filtration, fouling mitigation and quantification, and membrane system design and operation. She also has several years of experience as a project engineer designing greywater systems for commercial properties, which include rainwater harvesting systems and tanks. Leila has her PhD in Environmental Engineering from the University of Waterloo in Canada.

WRD's 13th Annual Groundwater Quality Workshop - Speaker Bios

(In order of presentation)

Ryan Kristensen is a civil engineer working with the GHD Water Team in Irvine, CA. Mr. Kristensen has experience in groundwater remediation, stormwater management, recycled water retrofitting, rehabilitation and asset management, and renewable energy design. Ryan has served as a project engineer on feasibility assessments and conceptual studies, facility master plans and capital improvement programs, design management, engineering services during construction, and has helped clients obtain compliance with regulations and permitting requirements. Ryan has a B.S. in Earth and Environmental Engineering from Columbia University and an M.S. in Hydrology and Water Resources Engineering from the UCLA.

Rick Zimmer is the Client Manager at Eurofins Eaton Analytical, LLC, the largest potable water testing laboratory in the United States. Mr. Zimmer holds both Bachelor's and Master's degrees and has over 25 years of experience working in the water industry as a Project Manager, Account Manager, Customer Service Manager and Regulatory Specialist. Mr. Zimmer presently manages projects for Eurofins' customers in California, Hawaii, American Samoa, Guam, the CNMI and Japan. Mr. Zimmer also serves as Safe Drinking Water Committee Chairman for the California-Nevada Section of the AWWA, and Water Quality Committee Member for the Association of California Water Agencies.

Michael Bodart is the President and has been Director of Engineering for General Pump Company for the past 24 years. He is recognized as an expert in the field of pump engineering and well rehabilitation for over 30 years. He has been invited to speak for numerous professional water related associations and conventions. Mike has a Bachelor of Science Degree in civil engineering from the University of Missouri. His post graduate studies included geohydrology from USC and many pump engineering classes. Mike has been speaking professionally for more than 25 years and has presented in nationally known associations such as AWWA, Tri-State, Southern California Water Utility Associations, Inland Water Works Association, Groundwater Resources Association, Southern California Gas Company, Southern California Edison and Central Coast Water Association. Mike teaches courses in water well drilling and rehabilitation. He is responsible for more than 30,000 State approved CEUs. Mike was chosen to be part of a six-person panel who met in Kansas City in 1992 to assist in training nationwide engineers in the water well pump business.

Esther Valle Rojas is a senior water resources planner at the Water Replenishment District of Southern California. She represents the District and acts as the administrator for one of the five Greater Los Angeles County IRWM sub-regions, is responsible for grants management, assists with the administration of the Central Basin and West Coast Basin Watermaster Administrative Body and is the program lead for the new well construction and rehabilitation program. Prior to WRD, Esther served as an analyst and government liaison for the Southern Nevada Water Authority. She has more than ten years' experience in water resources policy and planning and received her Master's degree in City and Regional Planning from California Polytechnic University, San Luis Obispo.

Speaker #1

WRD Overview – June 2018

Brian Partington

Water Replenishment District

bpartington@wrd.org

WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

Overview – June 2018

Brian Partington, PG, CHg

June 28, 2018

Program

9:30 – 10:00

WRD Overview

Brian Partington, Water Replenishment District of Southern California

10:00 – 10:30

DDW Regulatory Updates

Dmitriy Ginzburg, SWRCB – Division of Drinking Water

10:30 – 11:00

Water Well Destruction Standards – County of Los Angeles Department of Public Health

Erik Gaiser, Consultant

11:00 – 11:30

Ex-Situ Biological Treatment of Perchlorate Impacted Groundwater

Leila Munla and Ryan Kristensen, GHD

11:30 – 12:00

Sampling and Analytical Challenges for Coliforms, Pathogens, Volatiles, 1,4-Dioxane and Nitrosamines

Rick Zimmer, Eurofins Eaton Analytical

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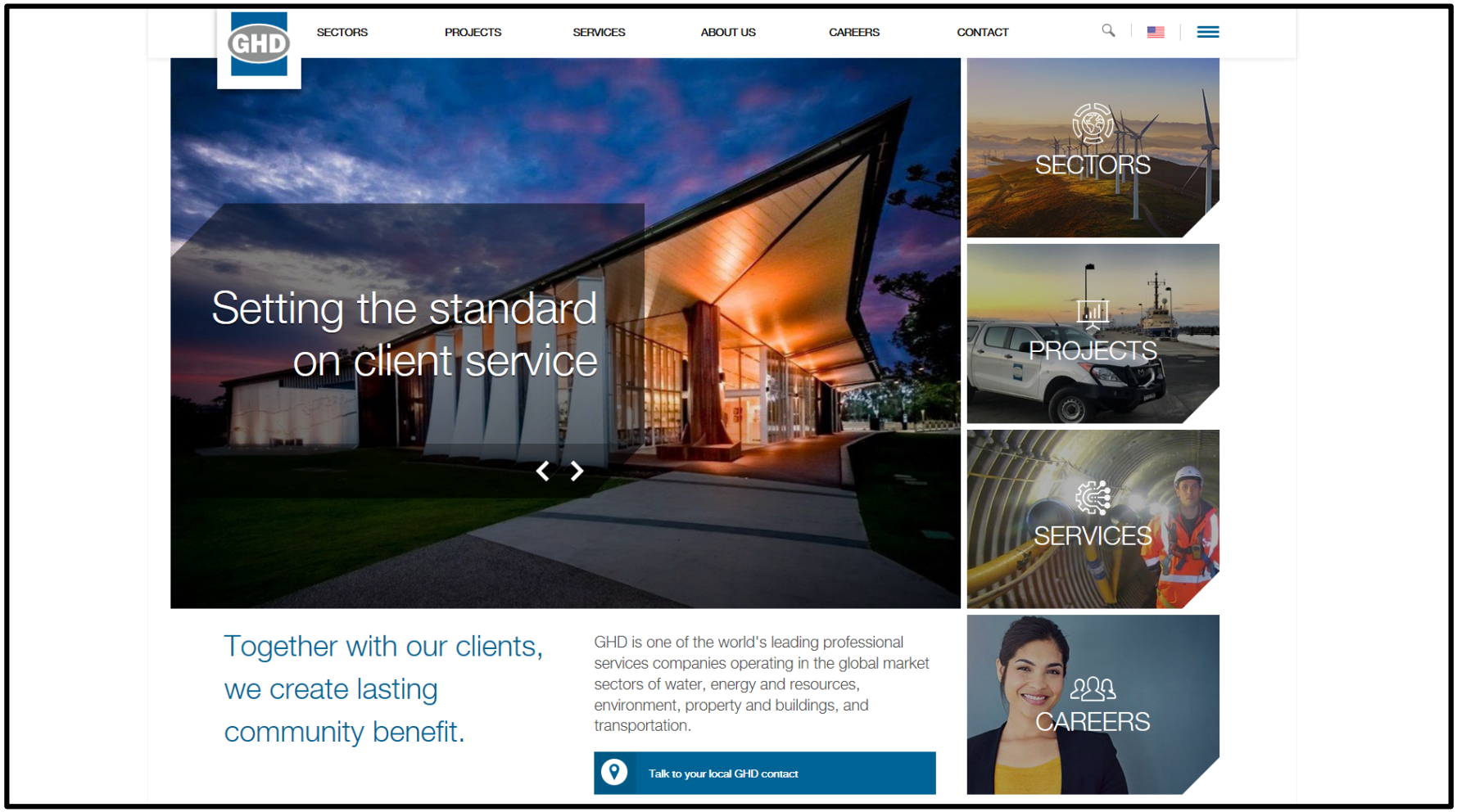
Program

12:00 – 12:45

Lunch provided by GHD



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Program

12:45 – 1:15

Best Way to Address Reoccurring Bacteria Problems in a Water Supply Well

Michael Bodart, General Pump Company

1:15 – 1:45

How to Write the Perfect Well Redevelopment Specification

Michael Bodart, General Pump Company

1:45 – 2:15

WRD's New Program for Well Rehabilitation and Well Construction

Esther Valle Rojas, Water Replenishment District of Southern California

2:15 – 2:30

Questions and Certificates

The presentations will be emailed to the participants and/or uploaded to http://www.wrd.org

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High Level Overview of WRD

- History and Mission
- Major Programs
- Resources and Online Programs
- Water Independence Now

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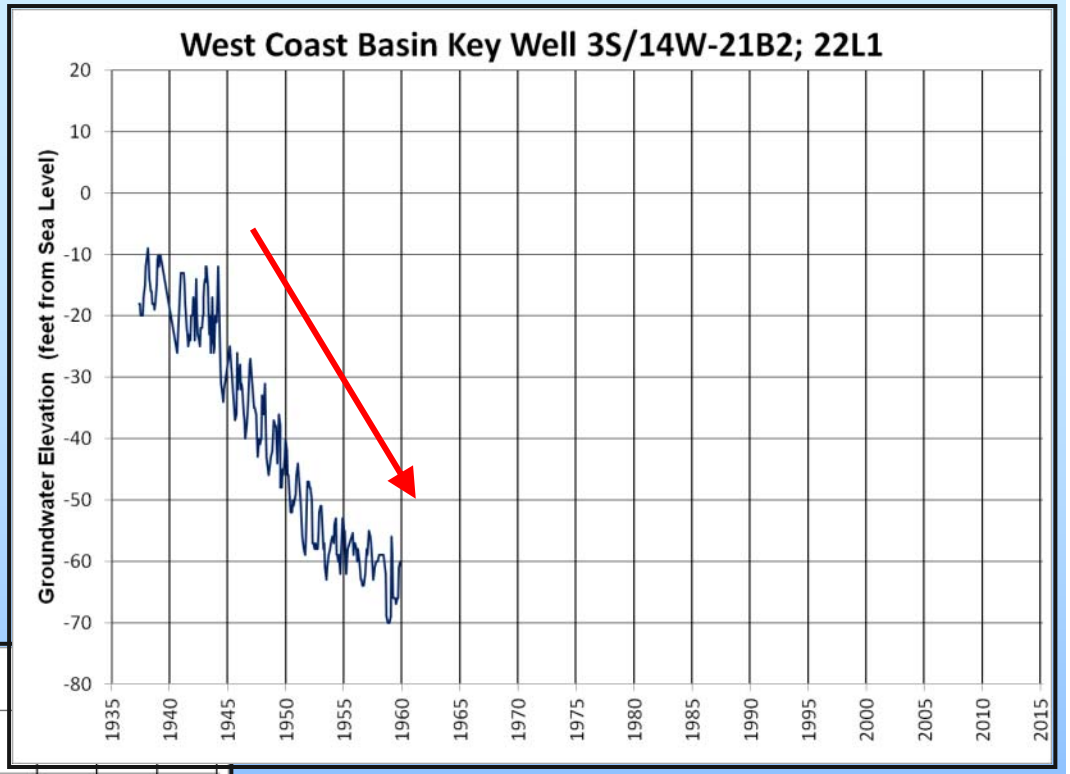
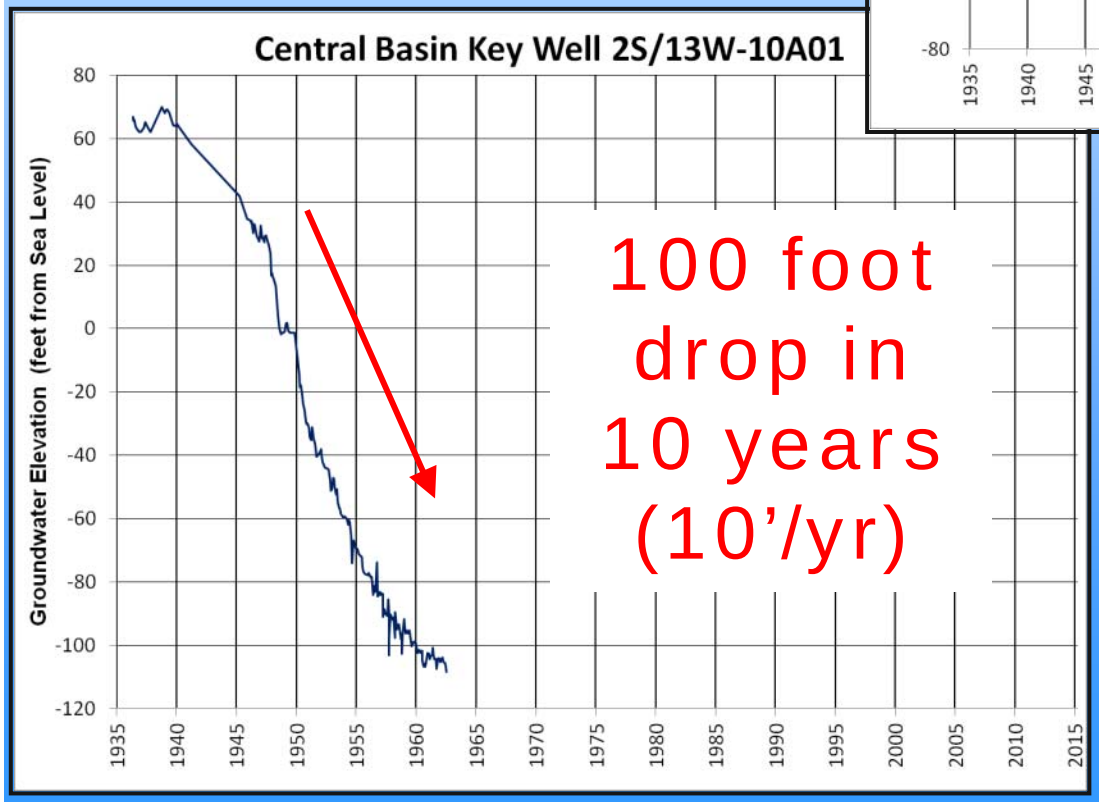
Past History:

1900s-1950s

Pumping Double Natural Replenishment.

OVERDRAFT





100 foot drop in 10 years (10'/yr)

- Plunging Water Levels
- Loss of Supply
- Wells going Dry
- Seawater Intrusion

Solutions

- **WRD formed in 1959 to eliminate overdraft via Managed Aquifer Recharge (MAR).**
- **Pumping adjudicated at 281,835 acre feet/year (AFY).**
- **Higher than natural recharge within the basin, but the difference is made up WRD.**

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GROUNDWATER BASINS IN THE WRD SERVICE AREA

SERVICE AREA = 420 SQUARE MILES

43 CITIES

POPULATION > 4 MILLION

550,000 ACRE FEET USED PER YEAR

50% GROUNDWATER FROM LOCAL WATER WELLS

50% IMPORTED WATER

WRD SUPPLEMENTS NATURAL GROUNDWATER RECHARGE

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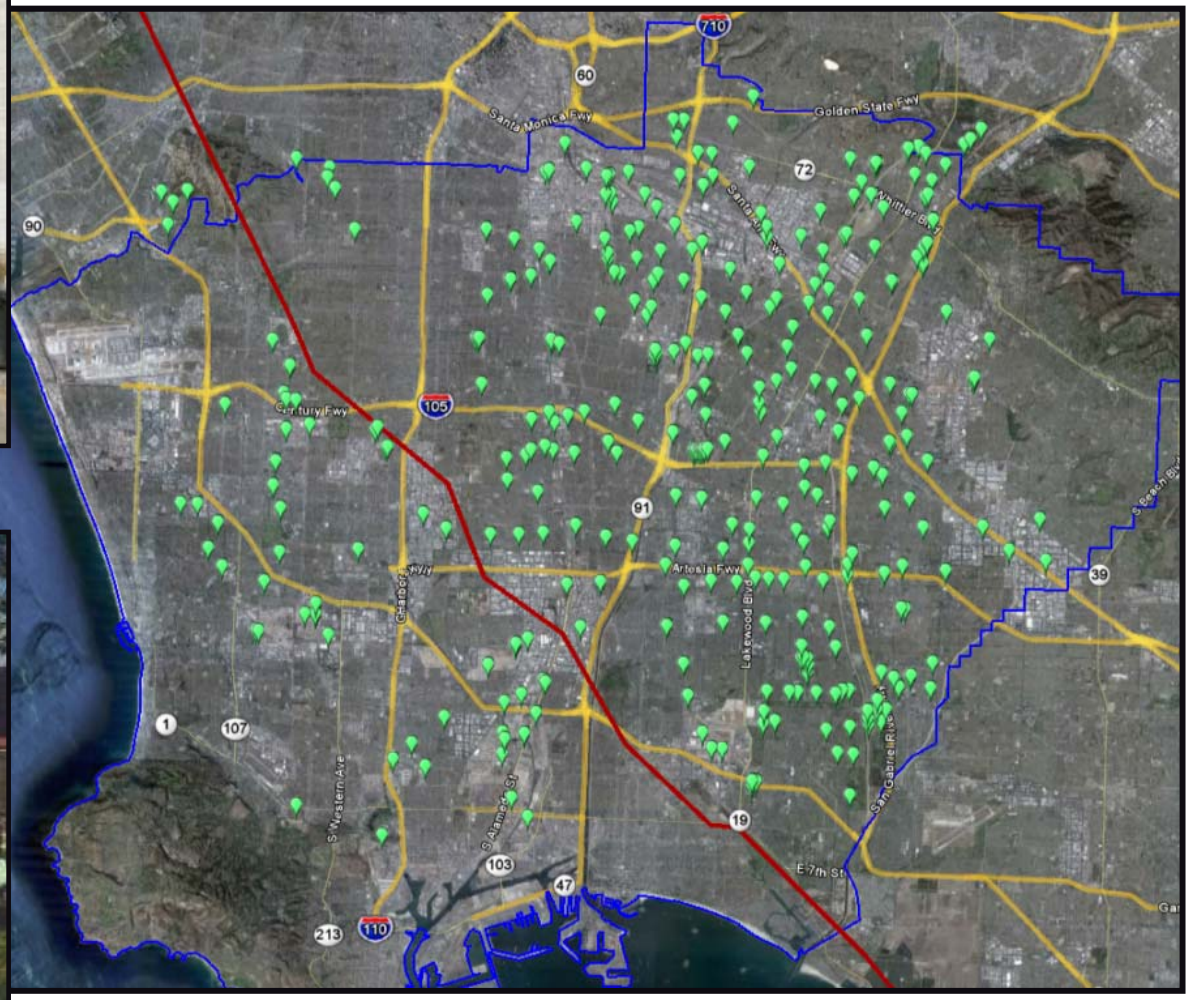
Over 400 Wells Provide Water Supply



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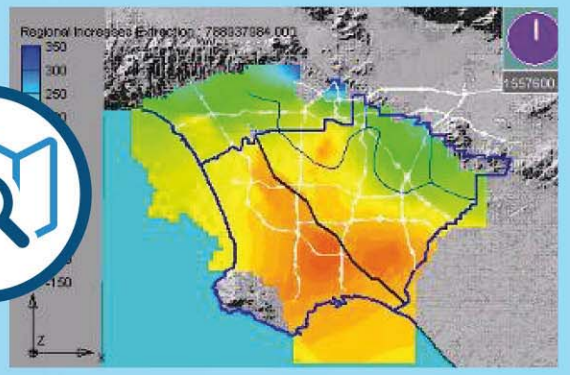
HOW WRD MANAGES THE BASINS

REPLENISHMENT OF GROUNDWATER

GROUNDWATER CLEAN UP

BASIN MONITORING

BASIN MODELING



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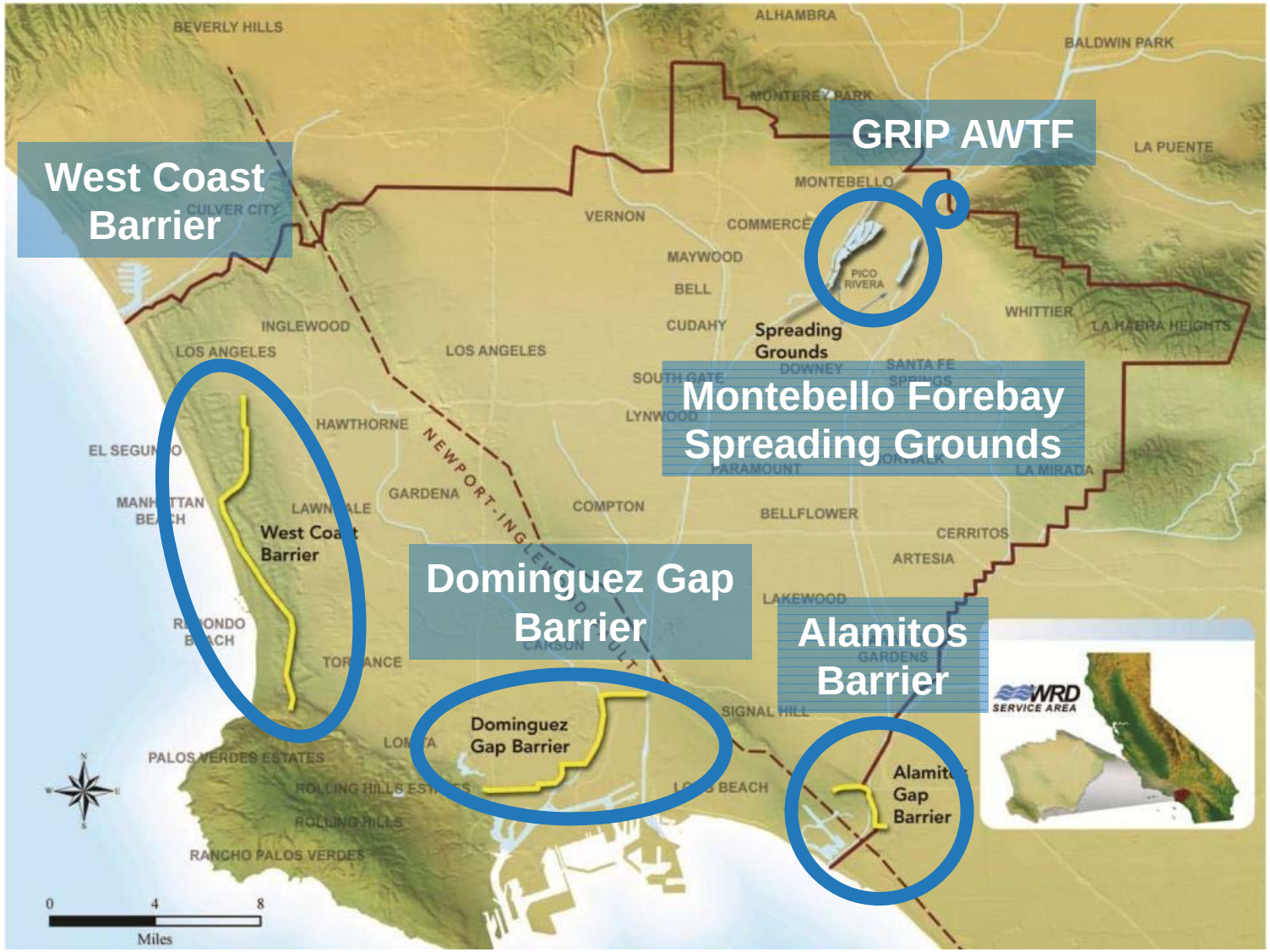
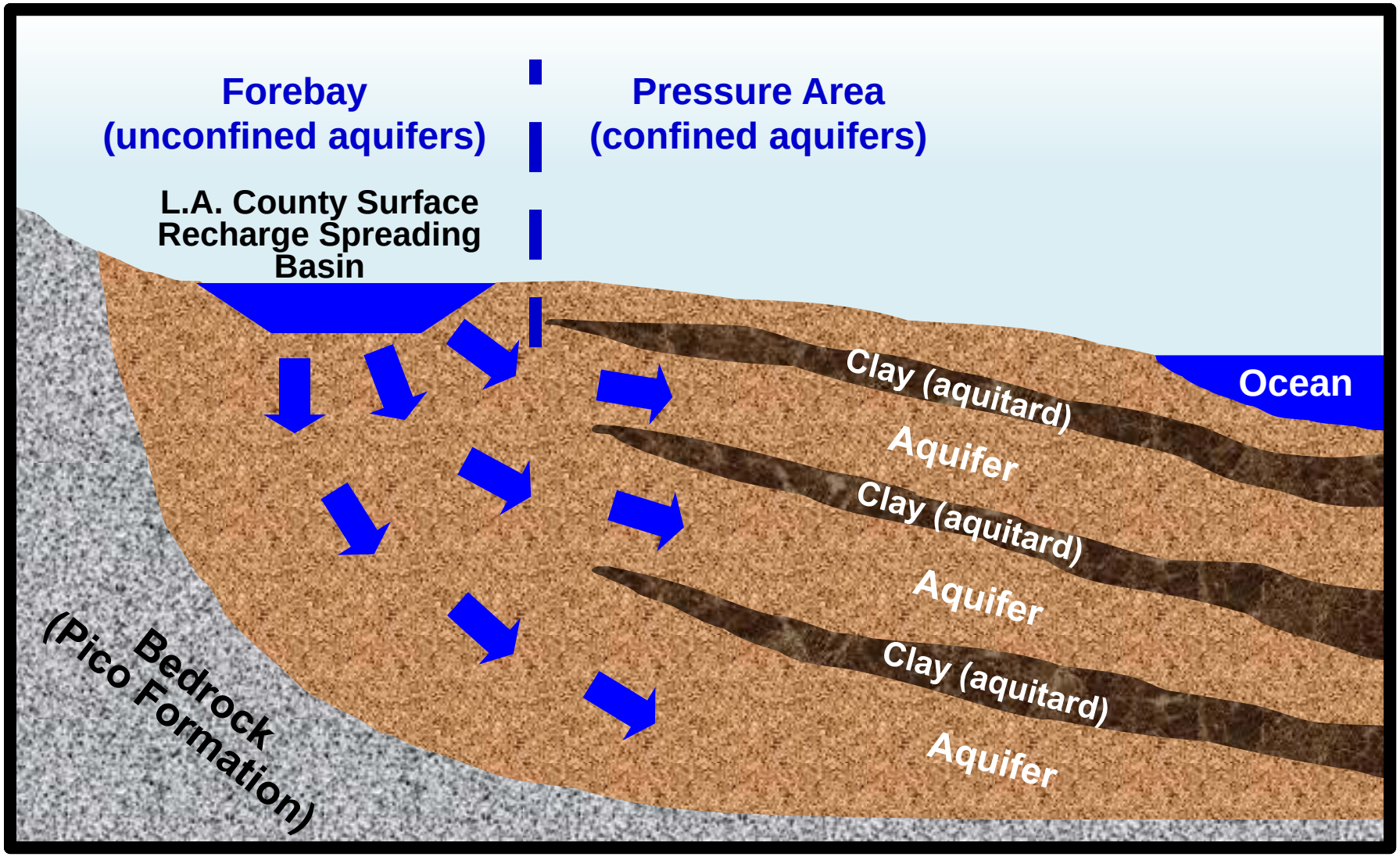
Replenishment Facilities



LA County Public Works Recharge Facilities

Replenishing Groundwater Basin



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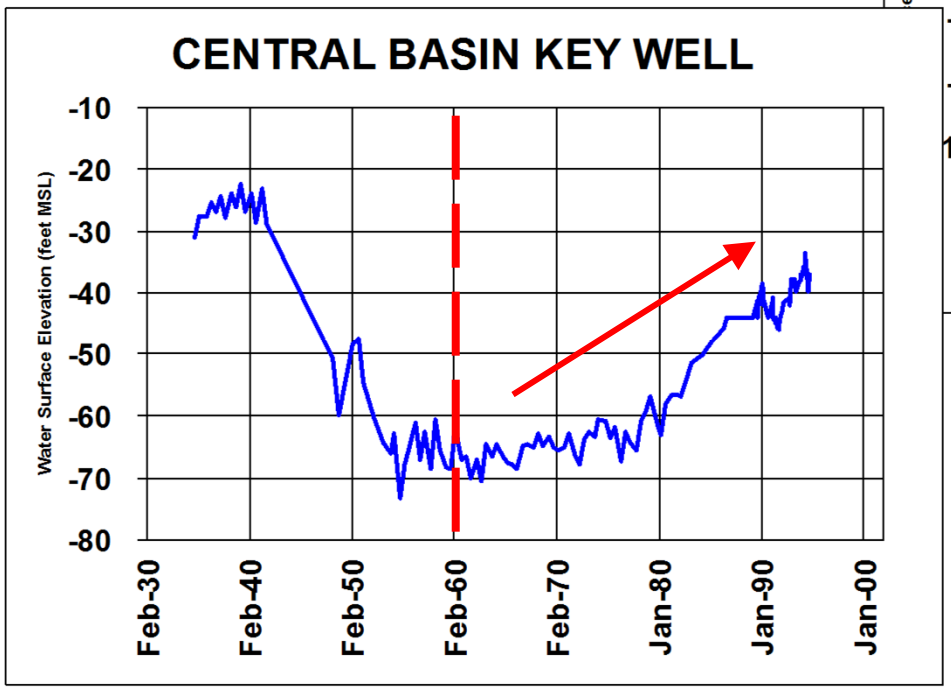
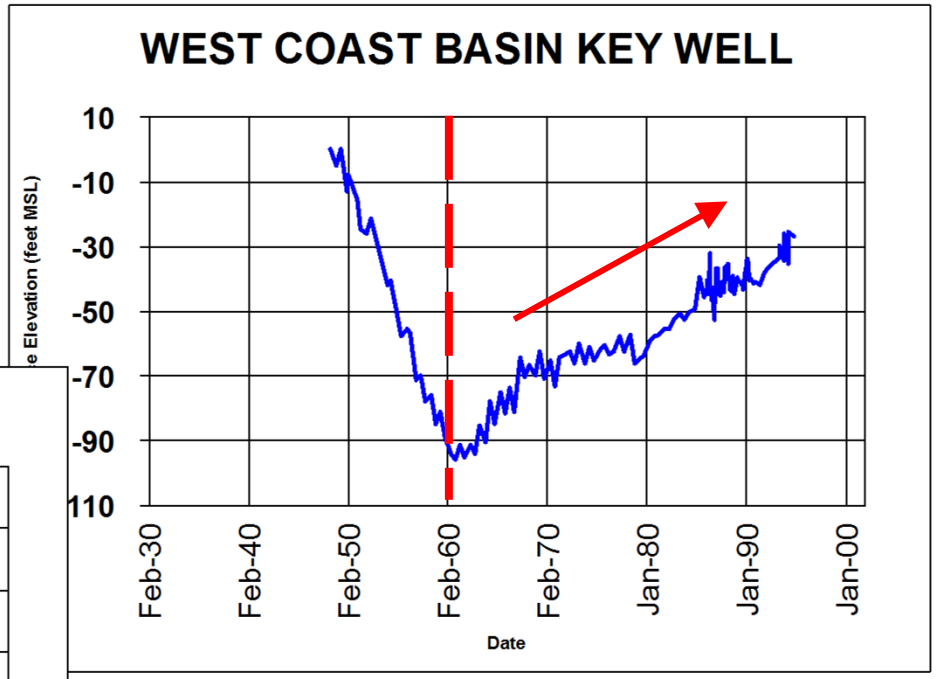
Results of WRD Basin Management





Rising water levels & drought protection

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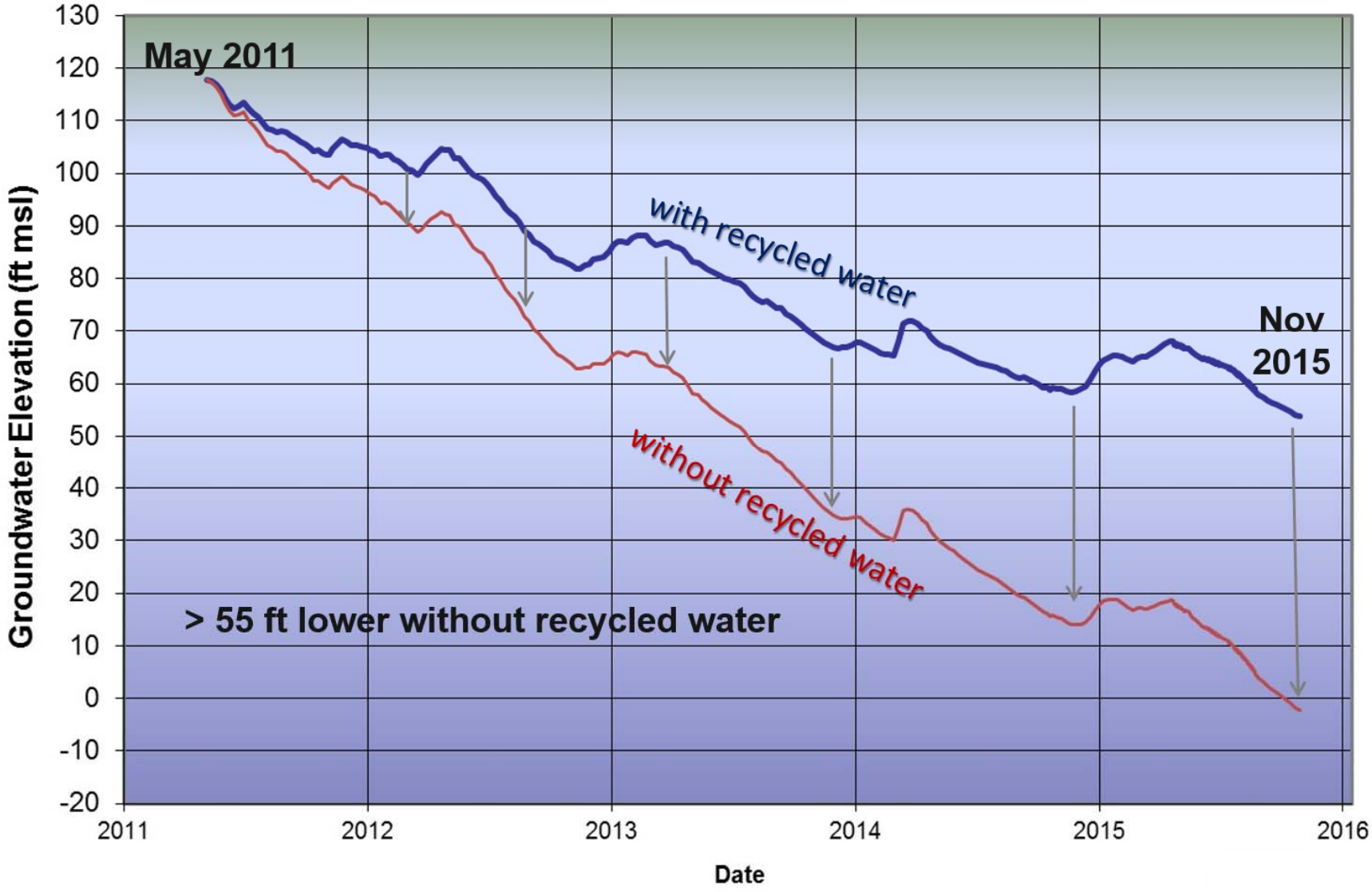
Forecasted water levels during drought without recharge



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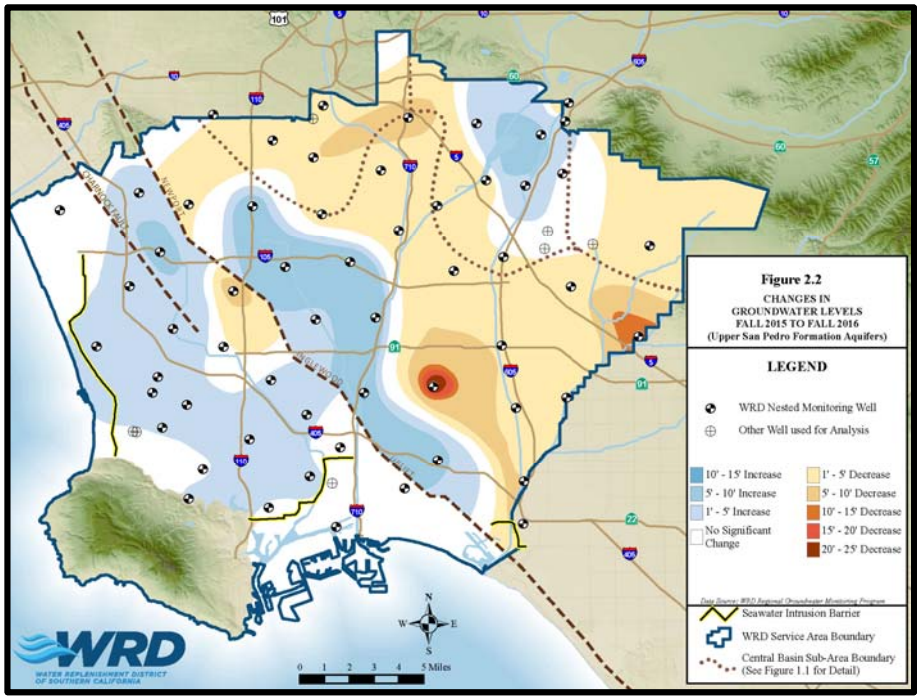
Regional Groundwater Monitoring Program

Sampling

Nested Monitoring Wells

Drilling with USGS



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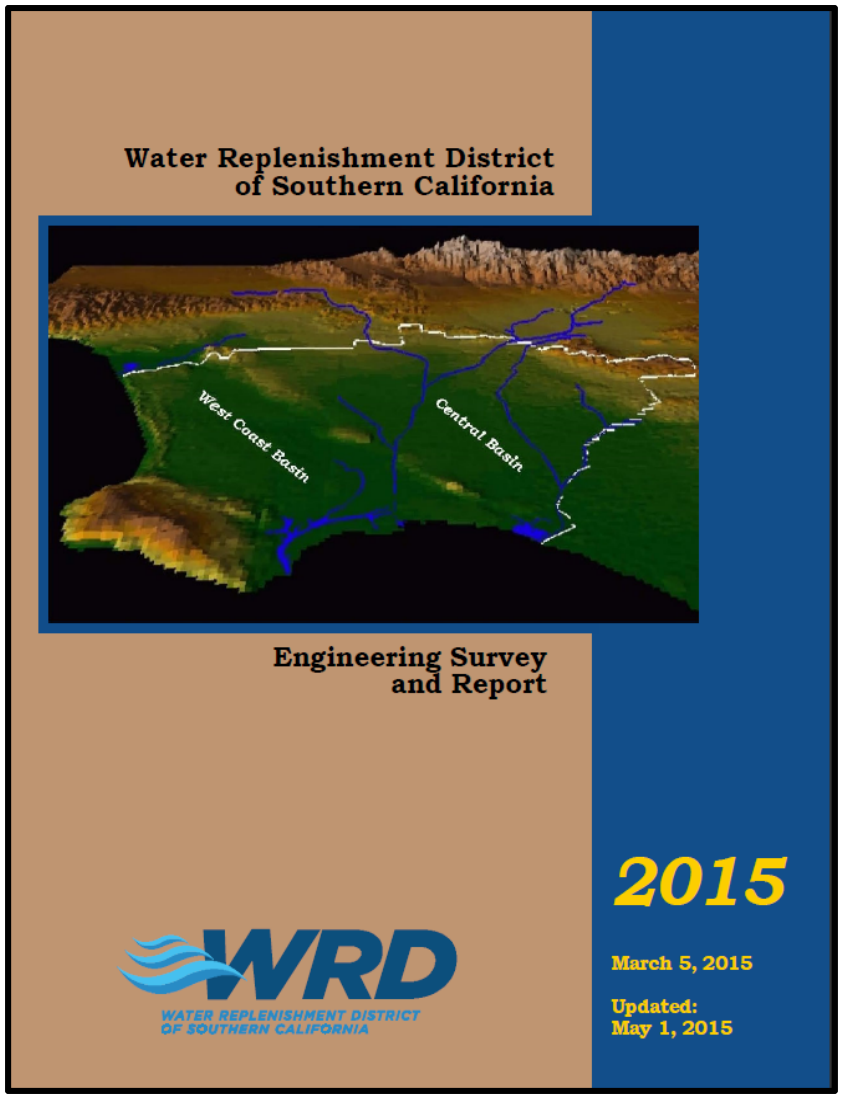
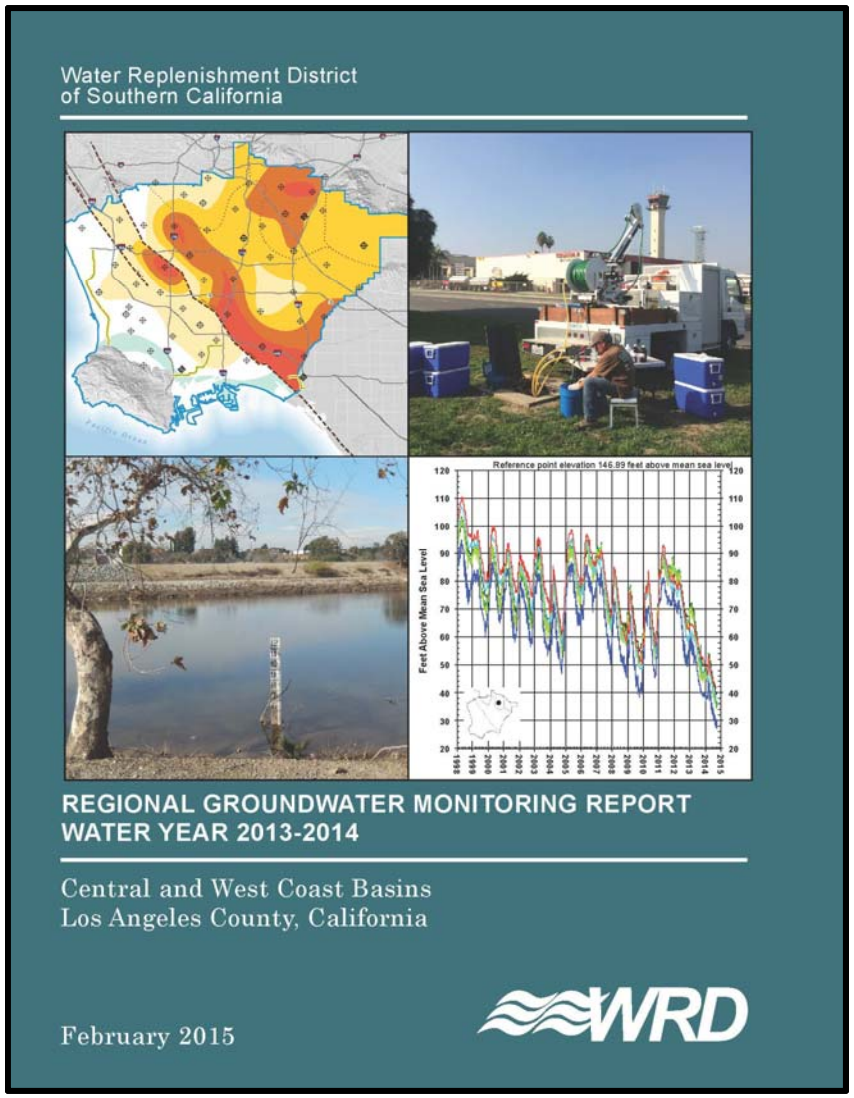
Data Presented in Two Annual Reports





Reports are available at http://www.wrd.org

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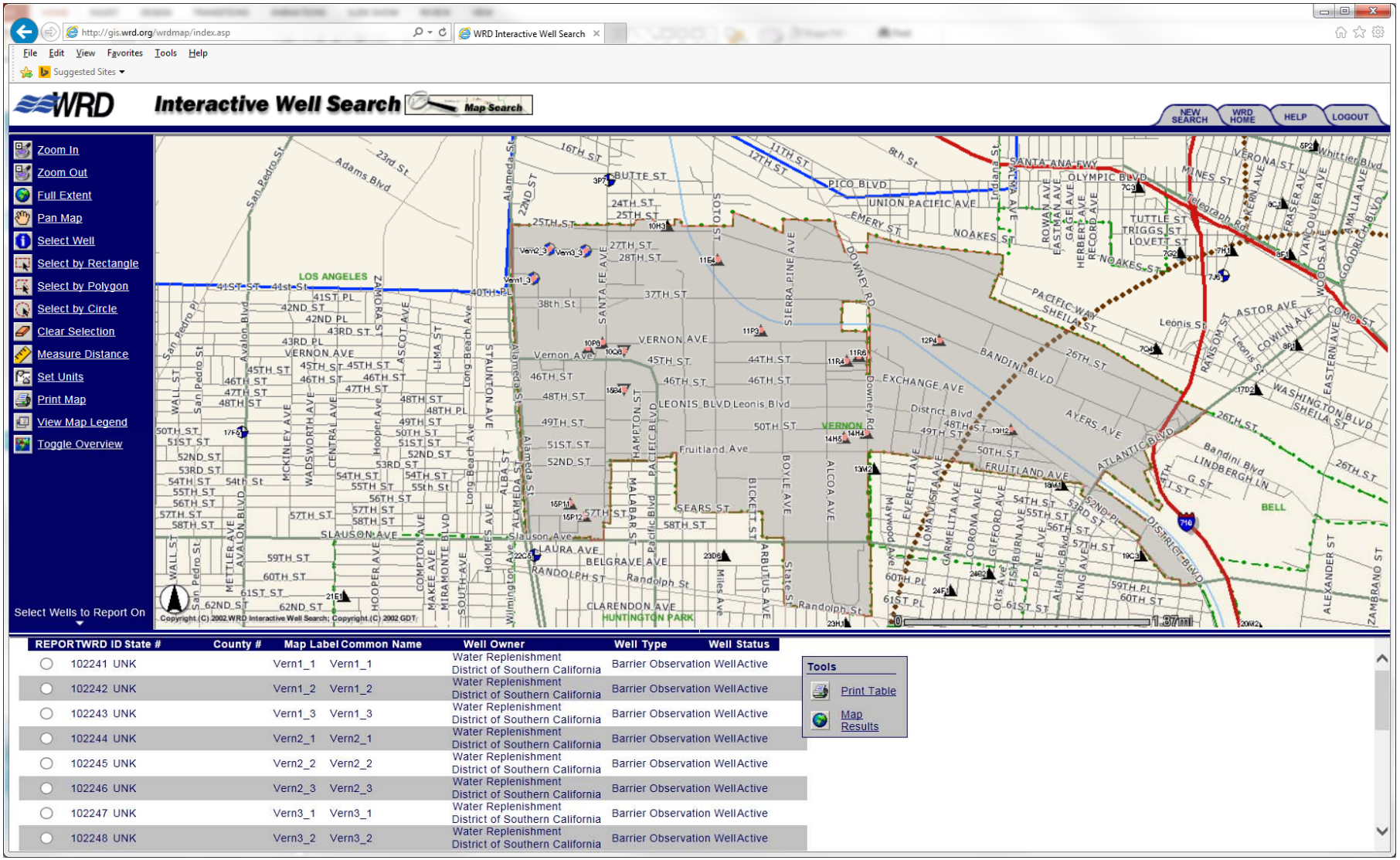
Interactive Well Search



REPORT	WRD ID	State #	County #	Map Label	Common Name	Well Owner	Well Type	Well Status
○	102241	UNK		Vern1_1	Vern1_1	Water Replenishment District of Southern California	Barrier Observation Well	Active
○	102242	UNK		Vern1_2	Vern1_2	Water Replenishment District of Southern California	Barrier Observation Well	Active
○	102243	UNK		Vern1_3	Vern1_3	Water Replenishment District of Southern California	Barrier Observation Well	Active
○	102244	UNK		Vern2_1	Vern2_1	Water Replenishment District of Southern California	Barrier Observation Well	Active
○	102245	UNK		Vern2_2	Vern2_2	Water Replenishment District of Southern California	Barrier Observation Well	Active
○	102246	UNK		Vern2_3	Vern2_3	Water Replenishment District of Southern California	Barrier Observation Well	Active
○	102247	UNK		Vern3_1	Vern3_1	Water Replenishment District of Southern California	Barrier Observation Well	Active
○	102248	UNK		Vern3_2	Vern3_2	Water Replenishment District of Southern California	Barrier Observation Well	Active

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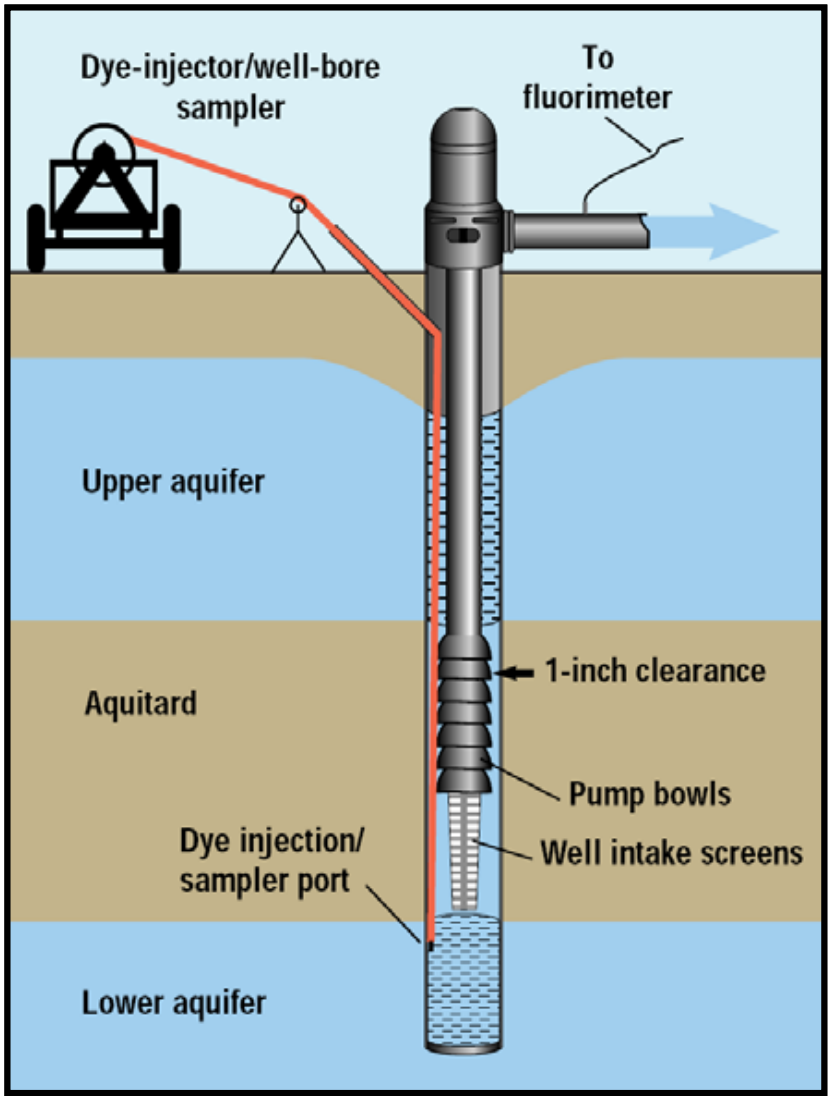
Interactive Well Search

Account requests at http://gis.wrd.org/wrdmap/login.asp

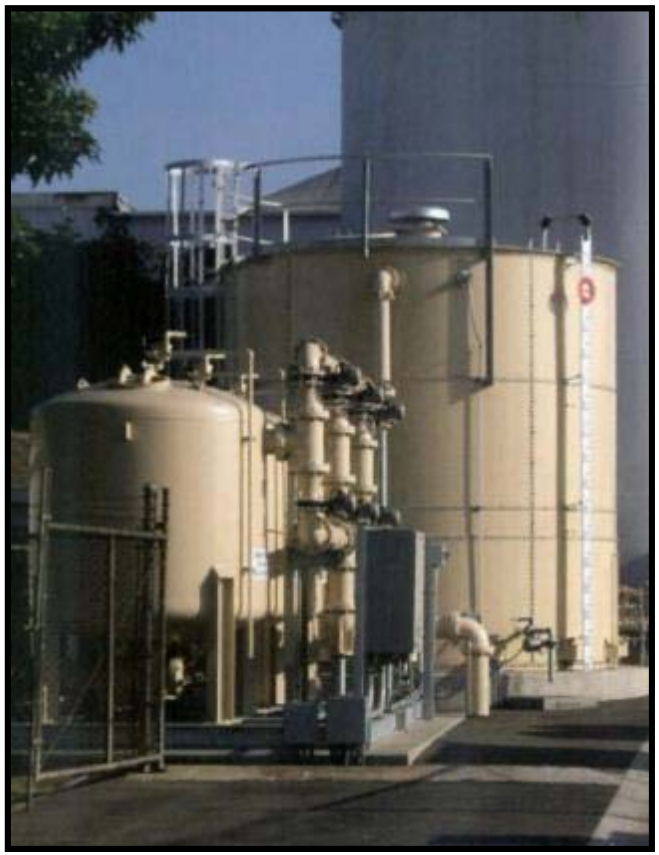
Well Profiling Program

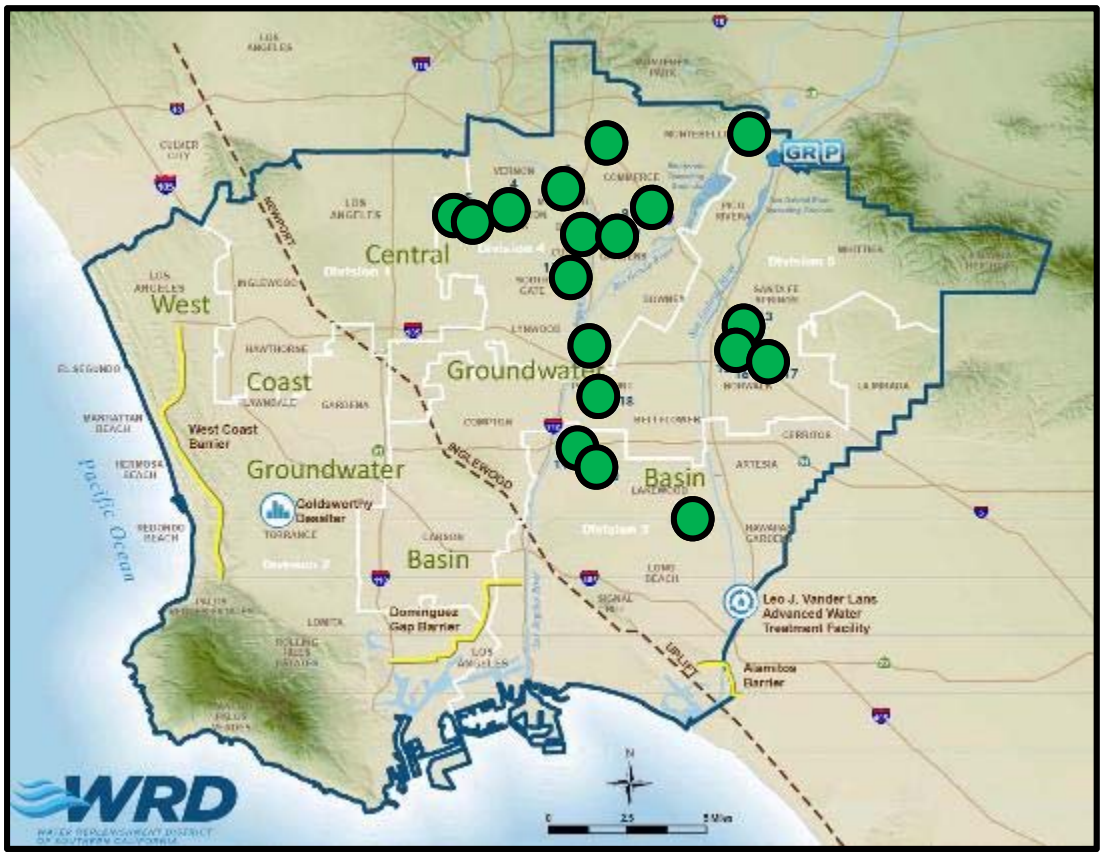


Contact Charlene King at cking@wrd.org (562.275.4252)

Safe Drinking Water Program (since1991)

- **Financial assistance for wellhead treatment.**
- **Outreach program for DACs.**





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Groundwater Contamination Program

- **WRD staff track the progress of high priority environmental investigations located in the West Coast Basin and Central Basin (currently 46).**
- **Conduct high level reviews and when necessary provide feedback to the various regulatory agencies including EPA, DTSC, RWQCB.**

WRD awarded $7.28M in Proposition 1 grant funds to cleanup a Perchlorate and VOC “hot spot” in the City of Vernon (March 30, 2017).

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Contact Brian Partington at bpartington@wrd.org (562.275.4249)

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(WIN) WATER INDEPENDENCE NOW PROGRAM

COLLECTION OF PROJECTS TO ELIMINATE REMAINING DEMAND FOR IMPORTED WATER

WIN
WATER INDEPENDENCE NOW

A key to developing independence from imported water is the development of local recycled water sources.

PROJECTS TO:

- CAPTURE AND CONSERVE ADDITIONAL STORMWATER
- INCREASE USE OF RECYCLED WATER FOR GROUNDWATER REPLENISHMENT

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(WIN) WATER INDEPENDENCE NOW PROGRAM

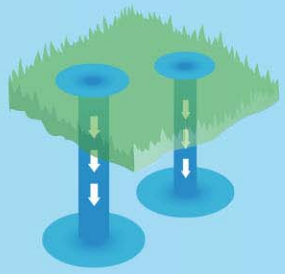
GOAL IS TO REPLACE IMPORTED WATER WITH LOCALLY AVAILABLE WATER (E.G. RECYCLED WATER) FOR AQUIFER REPLENISHMENT.

WIN
WATER INDEPENDENCE NOW

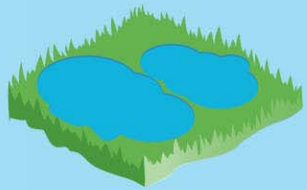
BENEFITS OF RECYCLED WATER OVER IMPORTED WATER:

INCREASED RELIABILITY

COST-EFFECTIVE



LOCALLY CONTROLLED



DROUGHT PROOF

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GROUNDWATER RELIABILITY IMPROVEMENT ADVANCED WATER TREATMENT FACILITY

GRIP IS THE CORNERSTONE OF WRD'S WIN PROGRAM

GRP
GROUNDWATER RELIABILITY IMPROVEMENT PROJECT

GRIP WILL PROVIDE 21,000 ACRE-FEET PER YEAR OF RECYCLED WATER IN PLACE OF EXPENSIVE IMPORTED WATER.

UPON COMPLETION, GROUNDWATER BASINS WILL BE COMPLETELY LOCALLY SUSTAINABLE

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Thank You!

Brian Partington

bpartington@wrd.org

562.275.4249

GROUNDWATER RELIABILITY IMPROVEMENT PROJECT

WATER INDEPENDENCE NOW

Speaker #2

DDW Regulatory Update

Dmitriy Ginzburg

SWRCB - DDW

Dmitriy.Ginzburg @waterboards.ca.gov

DIVISION OF DRINKING WATER REGULATORY UPDATES

2018 ANNUAL GROUNDWATER QUALITY WORKSHOP

JUNE 28, 2018

DMITRIY GINZBURG, P.E., HOLLYWOOD DISTRICT

DIVISION OF DRINKING WATER (DDW)

STATE WATER RESOURCES CONTROL BOARD

DDW REGULATORY UPDATES

- LEAD SAMPLING IN SCHOOLS
- LEAD SERVICE LINE INVENTORY
- 1,2,3 TCP MCL
- 2018 REGULATORY PRIORITIES

LEAD SAMPLING IN SCHOOLS

2017 PERMIT AMENDMENT & 2018 ASSEMBLY BILL 746

- PERMIT AMENDMENT ISSUED IN JANUARY 2017 – ANY K-12 SCHOOL (PUBLIC & PRIVATE) IN CALIFORNIA CAN REQUEST SAMPLING FOR LEAD
  - OPTIONAL PROGRAM FOR BOTH PUBLIC AND PRIVATE SCHOOLS
- ASSEMBLY BILL 746 – WENT INTO EFFECT JANUARY 2018, REQUIRES ALL COMMUNITY WATER SYSTEMS TO TEST PUBLIC K-12 SCHOOLS FOR LEAD
  - MANDATORY PROGRAM FOR PUBLIC SCHOOLS

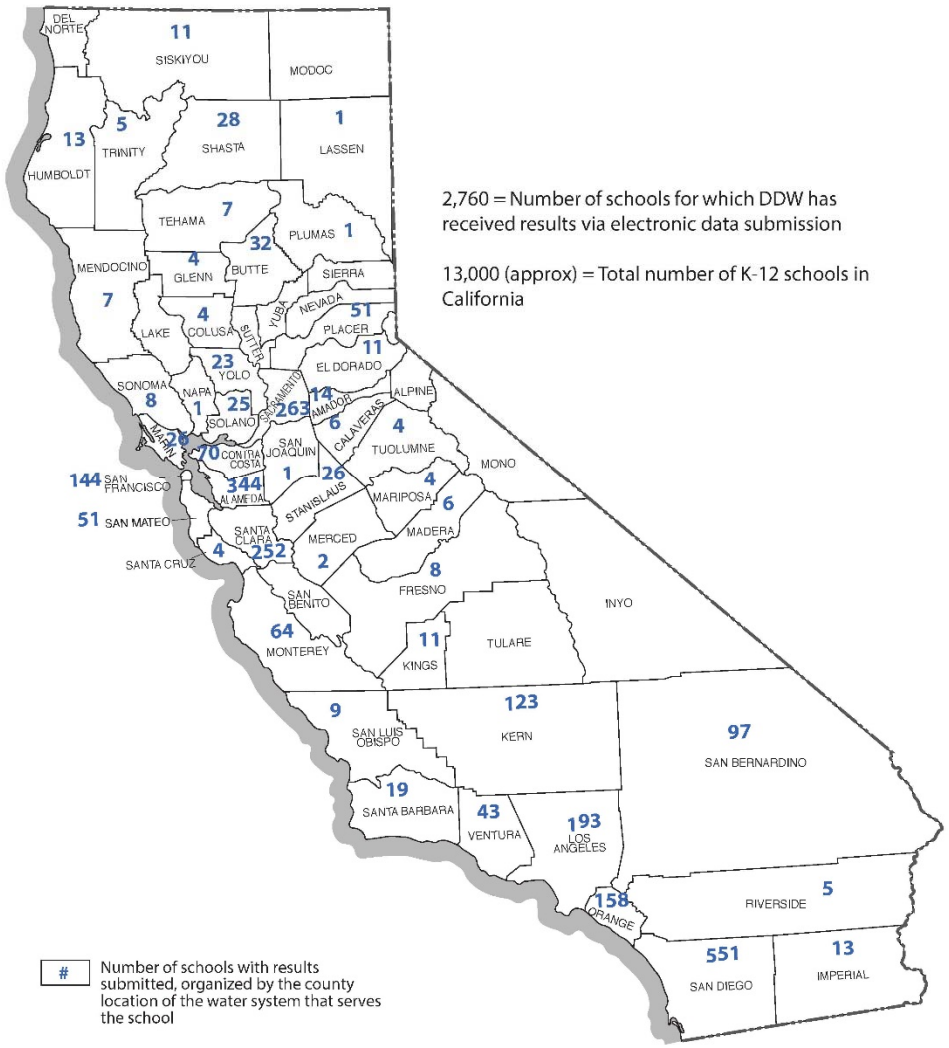
TESTING RESULTS
(BOTH PERMIT AMENDMENT AND AB746)

AS OF APRIL 22, 2018:

- RESULTS HAVE BEEN RECEIVED FOR 12,986 SAMPLES
- ACTION LEVEL = **15 PPB** OR **15 MICROGRAMS/LITER**
- LEAD HAS BEEN DETECTED BETWEEN 0 (PARTS PER BILLION) PPB AND 15 PPB IN > 99% OF ALL SAMPLES
- 90 SAMPLE LOCATIONS AT 81 SCHOOLS HAD ONE OR MORE RESULT >15 PPB (**<1% OF SAMPLE LOCATIONS**)

Number of Results Received as of April 22, 2018

Lead Sampling in California Schools



2,760 = Number of schools for which DDW has received results via electronic data submission

13,000 (approx) = Total number of K-12 schools in California

Number of schools with results submitted, organized by the county location of the water system that serves the school

April 22, 2018 State Water Board -SWRCB.DDW/AM

ACTION LEVEL EXCEEDANCES: WHAT ARE SCHOOLS DOING?

- 90 LOCATIONS W/ ACTION LEVEL EXCEEDANCES (<1%)

  (AS OF APRIL 22, 2018)

- EXAMPLES OF FOLLOW-UP ACTIONS
  - REPLACED FIXTURE
  - COLLECTED MORE SAMPLES/NO FURTHER ACTION
  - REMOVED FROM SERVICE
  - MORE SAMPLES/INVESTIGATION/REPLACED BUBBLER PLUS PART OF LINE
  - ADDED POINT-OF-USE FILTER

LEAD SAMPLING OF DW IN CA SCHOOLS AB 746

- AB 746 WAS SIGNED ON OCTOBER 13, 2017
- ADDED SECTION 116277 TO H&S CODE (1/1/2018)
- SIMILAR REQUIREMENTS TO DDW PERMIT
- REQUIRES CWS TO SAMPLE ALL "LOCAL EDUCATIONAL AGENCIES" DEFINED AS **SCHOOL DISTRICT, COUNTY OFFICE OF EDUCATION, PRE SCHOOL, OR CHARTER SCHOOL LOCATED IN A PUBLIC FACILITY**

LEAD SAMPLING OF DW IN CA SCHOOLS AB 746

- SAMPLING GUIDANCE FROM DDW WILL BE THE SAME AS DDW PERMIT
- LEAD TESTING EXEMPT FOR:
  - SCHOOLS THAT WERE CONSTRUCTED OR MODERNIZED AFTER JULY 1, 2010 (REPLACED OF ALL WATER PIPING AND FIXTURES)
  - SCHOOLS THAT ARE CURRENTLY PERMITTED AS PUBLIC WATER SYSTEMS AND ARE CURRENTLY REQUIRED TO TEST FOR LEAD IN THE POTABLE WATER SYSTEM.
  - SCHOOLS THAT HAVE INDEPENDENTLY COMPLETED LEAD TESTING OF THEIR POTABLE WATER SYSTEM AFTER JANUARY 1, 2009 AND HAVE POSTED ALL INFORMATION ABOUT THE TESTING ON THEIR PUBLIC INTERNET WEB SITE
  - SCHOOLS THAT HAVE REQUESTED LEAD TESTING UNDER THE 2017 PUBLIC WATER SUPPLY PERMIT AMENDMENT
- EXEMPTION FORM POSTED TO DDW WEBSITE

LEAD IN SCHOOLS - AB 746 VS. PERMIT AMENDMENTS

Requirements	AB 746 (CHSC §116277)	Lead In Schools Permit Amendment (Jan. 2017)
Audience	**Community Water Systems (CWS) serving a schoolsite of a local education agency (LEA*) w/ building constructed before 1/1/2010.** ***(Includes K-12, preschools and child daycare located on public school property)***	Public Water System serving K-12 school for which sampling request is made prior to 11/1/2019
Number of Initial Samples	N/A *(DDW will continue to reference DDW posted guidance and 3Ts to CWS/LEAs)*	One to five samples from regularly used sinks, faucets, fill stations
Sampling Time	**Anytime, but must be completed before 7/1/2019** *(DDW guidance prescribes sampling while school is in session and not immediately following weekends or holidays)*	During school year, on Tues/Wed/Thurs/Fri. when in session and in session for one day prior. (Within 90 days after receiving request)
PWS Reporting to School	Report findings to schoolsite within 10 business days after receiving results from lab	Provide/discuss sample results with school within 10 days of receiving results from lab
PWS Reporting to State	N/A *(DDW will need the submittal of data to LIS website to determine compliance)*	• Compile list of names/addresses K-12 by 7/1/2017, submit to DDW's LIS website • Require lab to submit data to DDW's LIS website

LEAD IN SCHOOLS - AB 746 VS. PERMIT AMENDMENTS

Requirements	AB 746 (CHSC §116277)	Lead In Schools Permit Amendment (Jan. 2017)
Action Level (AL)	15 ppb	15 ppb
AL Exceedance Response by PWS	• Report to school within 2 business days • **Collect repeat sample at the service connection between CWS and schoolsite**	• Notify school within 2 school business days • Collect resample within 10 business days if sample site remains in service • Collect third sample within 10 business days after notification that resample is ≤ 15ppb • Following corrective action, collect resample
AL Response by LEAs	• **Notify parents and guardians of pupils where elevated levels found** • **Take immediate steps to make fountains/faucets inoperable (shut down) where levels above AL found** • **Additional testing (may be?) required to determine if all or just some of fountains/faucets require shut down** *(Enforced by DDW & CDE; DDW will continue tracking)*	N/A – School corrective actions not enforceable by DDW.

LEAD IN SCHOOLS - AB 746 VS. PERMIT AMENDMENTS

Requirements	AB 746 (CHSC §116277)	Lead In Schools Permit Amendment (Jan. 2017)
Sampling Plan	**CWS, in cooperation with LEA, shall prepare a sampling plan for each schoolsite where sampling is required. CWS/LEA may request assistance from State Board or Local Health Dept.**	Respond in writing within 60 days of receiving the school's sampling request, and schedule meeting with school to develop sampling plan (3Ts referenced). Finalize within 90 days of request.
Laboratory Cert.	N/A *(DDW guidance prescribes USEPA's 3Ts and ELAP-certified laboratories)*	ELAP Certified
PWS Data Disclosure	N/A	Not release data to public for 60 days following receipt of initial results unless complying with PRA. Discuss results with school prior to release.

DDW CONTACTS FOR LEAD SAMPLING IN SCHOOLS

- DDW STAFF AVAILABLE TO ASSIST SCHOOLS AND WATER SYSTEMS. PLEASE USE CONTACT INFO BELOW
  - BETI GIRMA: (916) 322-9602 OR
  - ARIEL CHAVEZ: (916) 322-9601
  - DDW-PLU@WATERBOARDS.CA.GOV
- MORE INFO ON WEBPAGE: HTTPS://WWW.WATERBOARDS.CA.GOV/DRINKING_WATER/CERTLIC/DRINKINGWATER/LEADSAMPLINGINSCHOOLS.HTML

LEAD USER SERVICE LINES IN PUBLIC WATER SYSTEMS

- SECTION 116885 OF THE CALIFORNIA HEALTH AND SAFETY CODE

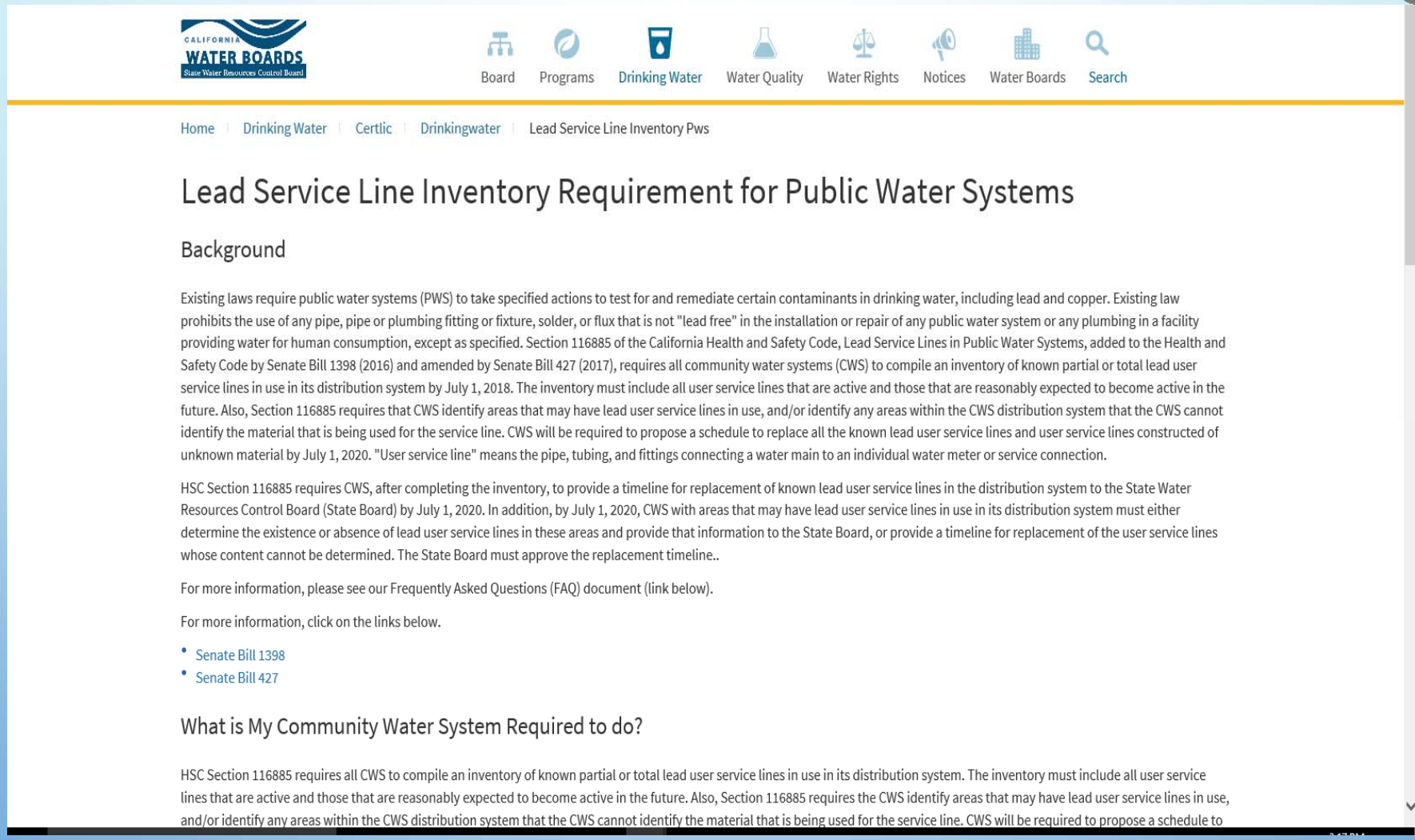
  REQUIRES ALL PUBLIC WATER SYSTEMS (PWS) TO COMPILE AN INVENTORY OF KNOWN PARTIAL OR TOTAL LEAD USER SERVICE LINES IN USE IN ITS DISTRIBUTION SYSTEM. THE INVENTORY MUST INCLUDE ALL USER SERVICE LINES THAT ARE ACTIVE AND THOSE THAT ARE REASONABLY EXPECTED TO BECOME ACTIVE IN THE FUTURE.

  SECTION 116885 ALSO REQUIRES THE PWS IDENTIFY AREAS THAT MAY HAVE LEAD USER SERVICE LINES IN USE, AND/OR IDENTIFY ANY AREAS WITHIN THE PWS DISTRIBUTION SYSTEM THAT THE PWS CANNOT IDENTIFY THE MATERIAL THAT IS BEING USED FOR THE SERVICE LINE.

LEAD USER SERVICE LINES REQUIREMENTS

- **INVENTORY MUST BE COMPLETED BY JULY 1, 2018**
- THE LSL INVENTORY SUBMITTED VIA THE ELECTRONIC ANNUAL REPORT. EAR IS DUE **JUNE 1** AND CAN BE SUBMITTED WITHOUT THE LSL INFORMATION. IF SUBMITTING WITHOUT LSL INFO, YOU MUST ASK YOUR DISTRICT OFFICE TO SEND IT BACK TO YOU PRIOR TO **JULY 1** AND RESUBMIT.
- LEGISLATION IS ONLY CONCERNED ABOUT LEAD LINES AND UNKNOWN MATERIAL, ALL OTHER IDENTIFIED MATERIAL (COPPER, GALVANIZED, POLY, ETC.), ARE ACCEPTABLE.
- PWS WILL BE REQUIRED TO PROPOSE A SCHEDULE TO REPLACE ALL THE KNOWN LEAD USER SERVICE LINES AND USER SERVICE LINES CONSTRUCTED OF UNKNOWN MATERIAL.
- **BY JULY 1, 2020**, THE PROPOSED SCHEDULE OR TIMELINE IS REQUIRED TO BE SUBMITTED TO DDW AND THEN POSTED ON OUR WEBSITE.
- FOR MORE CLARIFICATION, WATER SYSTEMS SHOULD DIRECT QUESTIONS TO THEIR RESPECTIVE SWRCB DISTRICT OFFICE

DDW LEAD USER SERVICE LINES REQUIREMENTS WEBSITE



CALIFORNIA WATER BOARDS
State Water Resources Control Board

Board | Programs | Drinking Water | Water Quality | Water Rights | Notices | Water Boards | Search

Home | Drinking Water | Certlic | Drinkingwater | Lead Service Line Inventory Pws

Lead Service Line Inventory Requirement for Public Water Systems

Background

Existing laws require public water systems (PWS) to take specified actions to test for and remediate certain contaminants in drinking water, including lead and copper. Existing law prohibits the use of any pipe, pipe or plumbing fitting or fixture, solder, or flux that is not "lead free" in the installation or repair of any public water system or any plumbing in a facility providing water for human consumption, except as specified. Section 116885 of the California Health and Safety Code, Lead Service Lines in Public Water Systems, added to the Health and Safety Code by Senate Bill 1398 (2016) and amended by Senate Bill 427 (2017), requires all community water systems (CWS) to compile an inventory of known partial or total lead user service lines in use in its distribution system by July 1, 2018. The inventory must include all user service lines that are active and those that are reasonably expected to become active in the future. Also, Section 116885 requires that CWS identify areas that may have lead user service lines in use, and/or identify any areas within the CWS distribution system that the CWS cannot identify the material that is being used for the service line. CWS will be required to propose a schedule to replace all the known lead user service lines and user service lines constructed of unknown material by July 1, 2020. "User service line" means the pipe, tubing, and fittings connecting a water main to an individual water meter or service connection.

HSC Section 116885 requires CWS, after completing the inventory, to provide a timeline for replacement of known lead user service lines in the distribution system to the State Water Resources Control Board (State Board) by July 1, 2020. In addition, by July 1, 2020, CWS with areas that may have lead user service lines in use in its distribution system must either determine the existence or absence of lead user service lines in these areas and provide that information to the State Board, or provide a timeline for replacement of the user service lines whose content cannot be determined. The State Board must approve the replacement timeline..

For more information, please see our Frequently Asked Questions (FAQ) document (link below).

For more information, click on the links below.

- Senate Bill 1398
- Senate Bill 427

What is My Community Water System Required to do?

HSC Section 116885 requires all CWS to compile an inventory of known partial or total lead user service lines in use in its distribution system. The inventory must include all user service lines that are active and those that are reasonably expected to become active in the future. Also, Section 116885 requires the CWS identify areas that may have lead user service lines in use, and/or identify any areas within the CWS distribution system that the CWS cannot identify the material that is being used for the service line. CWS will be required to propose a schedule to

https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/lead_service_line_inventory_pws.html

1,2,3-TCP: MCL & Public Health Goal

1. THE MAXIMUM CONTAMINANT LEVEL (MCL) FOR THIS SYNTHETIC ORGANIC CHEMICAL (SOC) IS 0.000005 MG/L (PPM)

2. MCL = 5 PARTS PER TRILLION (PPT)

3. THE PUBLIC HEALTH GOAL (PHG) OF 0.7 PPT WAS ESTABLISHED IN 2009 BASED ON CARCINOGENIC EFFECTS

4. THERE IS NO FEDERAL MCL FOR 1,2,3-TCP

1 ppm = 1 cup of water in a swimming pool

1 ppb = 1 mL (less than one teaspoon) of water in an Olympic sized swimming pool

1 ppt = Less than half of a drop of oil in a super tanker containing six million gallons of oil.

CA 1,2,3-TCP REGULATIONS

1,2,3-Trichloropropane at a Glance	
Analyte Group	Synthetic Organic Chemical
Public Health Goal	0.7 ppt
Detection Level for Purposes of Reporting	5 ppt
Maximum Contaminant Level	5 ppt
Best Available Technology	Granular Activated Carbon
Effective Date of New Regulations	December 14, 2017
Initial Sampling Start Date	Quarterly beginning January 2018
Public Water Systems Required to Monitor	Community and Nontransient-Noncommunity

1,2,3-TCP MCL COMPLIANCE

- **COMPLIANCE**
  - BASED ON RUNNING ANNUAL AVERAGE (RAA)
  - MAY BE OUT OF COMPLIANCE BEFORE COLLECTING 4 QUARTERLY SAMPLES (*E.G.*, 35 PPT SAMPLE)
- **MONITORING**
  - INITIAL QUARTERLY MONITORING FOR 1 YEAR – STARTED **JANUARY 2018**
  - IF 1,2,3-TCP IS DETECTED AT OR ABOVE THE MCL -

FOR **SMALLER SYSTEMS (< = 3,300 POPULATION)**

- QUARTERLY FOLLOW-UP SAMPLES FOR ONE YEAR
- COMPLIANCE IS BASED ON THE RUNNING ANNUAL AVERAGE (RAA)

1,2,3-TCP MCL COMPLIANCE

FOR **LARGER SYSTEMS (> 3,300 POPULATION)**

- COMPLIANCE IS BASED ON THE AVERAGE OF THE INITIAL, CONFIRMATION SAMPLE(S), AND SIX MONTHLY SAMPLES.
- IF THE AVERAGE IS LESS THAN THE MCL:
  - SWITCH TO QUARTERLY MONITORING
  - DETERMINE COMPLIANCE BASED ON THE RUNNING ANNUAL AVERAGE
- A SINGLE RELATIVELY HIGH SAMPLE RESULT CAN CAUSE THE RAA TO EXCEED THE MCL FOR THE WHOLE YEAR (EVEN IF THE YEAR IS NOT YET COMPLETE)

CONSISTENT WITH EXISTING REGULATIONS FOR SYNTHETIC ORGANIC CHEMICALS

Compliance Determinations – Example 1

ANY size system with **No detections**				
Month	**Compliance Period**	**Result**	**Average for Quarter**	**Average for FULL Year**
February	1st Quarter	**ND = 0**	0	0
May	2nd Quarter	**ND = 0**	0	0
August	3rd Quarter	**ND = 0**	0	0
November	4th Quarter	**ND = 0**	0	**0**
✓ **Initial Sampling Requirements are met!**				

Compliance Determinations – Example 2

Larger system (> 3,300 people) with a Low Detection in 1st Quarter			
Month	**Compliance Period**	**Result**	**RAA of seven samples**
February	**1st Quarter**	**7**	
March	Monthly	**9**	
April	Monthly	**5**	
May	Monthly	**ND (0)**	
June	Monthly	**6**	
July	Monthly	**9**	
August	Monthly	**ND (0)**	**5.1** **(Average for 7 months)**

- ✓ **System is in compliance through August for the year.**
- ✓ **System MUST collect another quarterly sample in November.**

Compliance Determinations – Example 3

Larger system (>3,300 People) with a Detection in the 1st Quarter			
Month	**Compliance Period**	**Result**	**RAA of ALL 7 samples**
February	**1st Quarter**	**12**	
March	Monthly	**9**	
April	Monthly	**21**	***6 ppt*** ***(MCL has been exceeded – even if the rest of the results are Non-detect)***
May	Monthly	**ND**	
June	Monthly	**ND**	
July	Monthly	**ND**	
August	Monthly	**ND**	**6** =(Average for 7 months)
Source exceeds the MCL based on the April result			

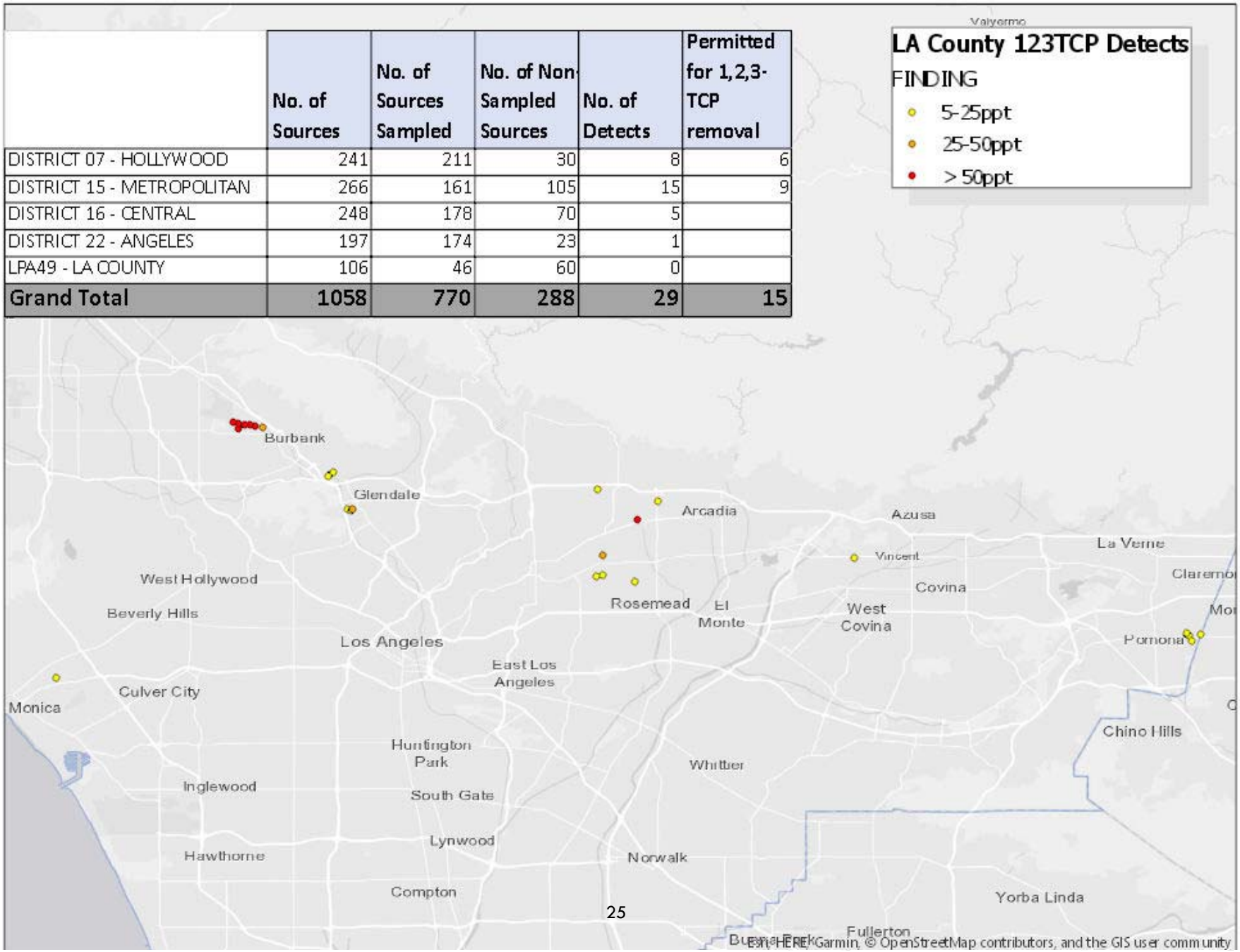
1,2,3-TCP Compliance Options

- OPTIONS FOR A WELL THAT IS OUT OF COMPLIANCE:
  - PROVIDE TREATMENT (GAC OR OTHER DISTRICT-APPROVED TREATMENT)
  - DRILL NEW WELL
  - REMOVE THE WELL FROM USE
  - PURCHASE WATER FROM A NEARBY UTILITY
  - CONSOLIDATE WITH A NEARBY LARGER WATER SYSTEM

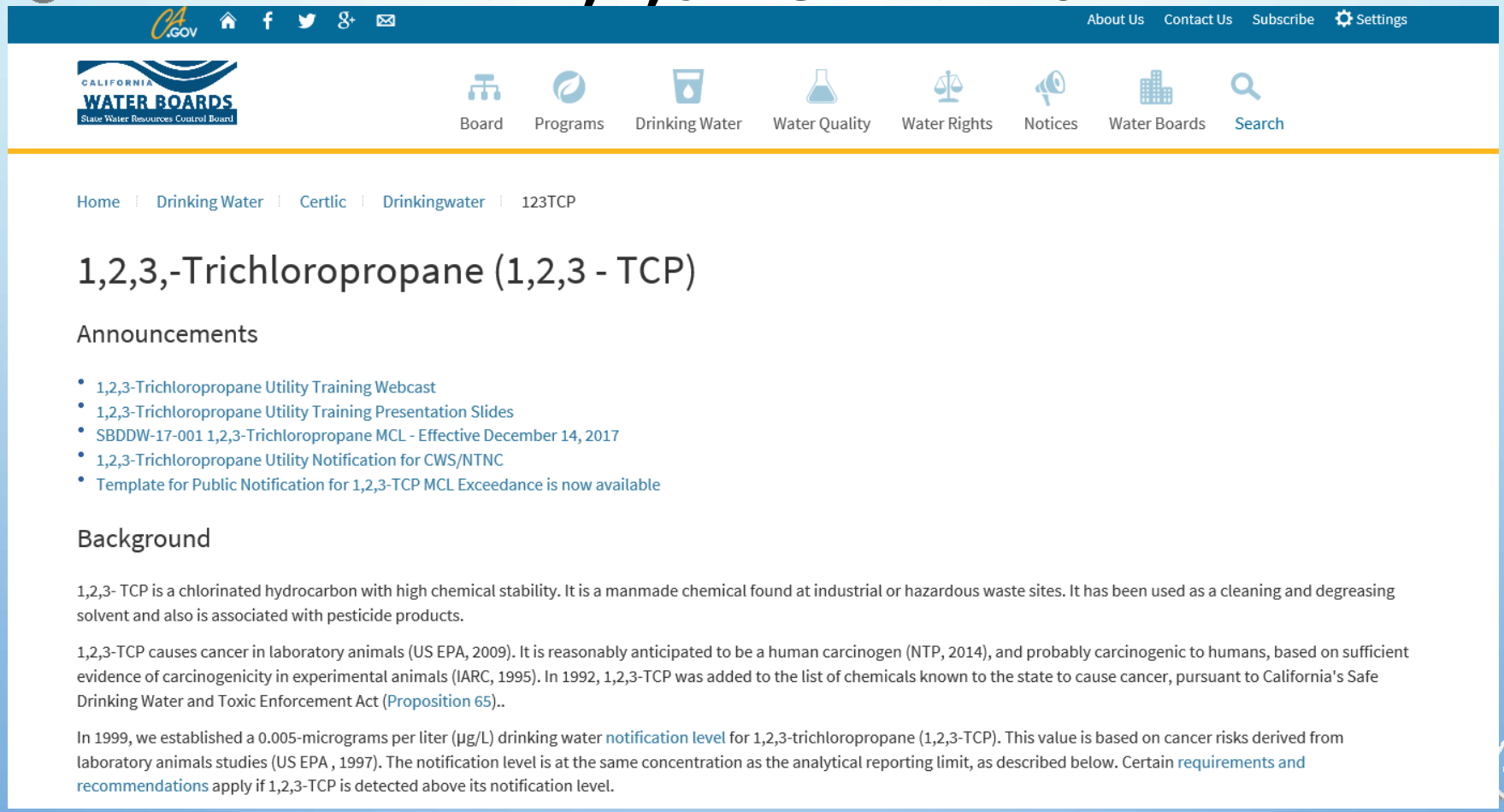
OPERATIONS AND CARBON LIFE

- GAC IS A PROVEN TREATMENT TECHNOLOGY FOR ORGANIC CONTAMINANTS
- CARBON LIFE CAN VARY DEPENDING ON CARBON TYPE AND SOURCE WATER
- PWS SHOULD PILOT TEST THE PROPOSED CANDIDATE GAC MEDIA TO ESTIMATE TREATMENT CAPACITY
- NSF/ANSI 61 CERTIFIED VIRGIN GAC SHOULD BE USED TO MINIMIZE DELAY IN PERMIT REVIEW

	No. of Sources	No. of Sources Sampled	No. of Non-Sampled Sources	No. of Detects	Permitted for 1,2,3-TCP removal
DISTRICT 07 - HOLLYWOOD	241	211	30	8	6
DISTRICT 15 - METROPOLITAN	266	161	105	15	9
DISTRICT 16 - CENTRAL	248	178	70	5	
DISTRICT 22 - ANGELES	197	174	23	1	
LPA49 - LA COUNTY	106	46	60	0	
Grand Total	**1058**	**770**	**288**	**29**	**15**



DDW 1,2,3-TCP WEBSITE



https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/123TCP.html

DDW REGULATORY PRIORITIES FOR 2018

1. ECONOMIC FEASIBILITY CRITERIA
2. HEXAVALENT CHROMIUM MCL
3. LEAD AND COPPER RULE REVISIONS (LCR)
4. SURFACE WATER AUGMENTATION (SWA) REGULATION
5. DIRECT POTABLE RE-USE (DPR) – RESEARCH AND FRAMEWORK
6. REVISED TOTAL COLIFORM RULE (RTCR)
7. CROSS-CONNECTION CONTROL REGULATIONS
8. ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM (ELAP) REGULATIONS
9. PRIMACY PACKAGE APPLICATIONS
10. DIRECT POTABLE RE-USE – REGULATIONS
11. REVISED DETECTION LIMIT FOR PURPOSES OF REPORTING FOR PERCHLORATE

QUESTIONS/COMMENTS?

DMITRIY.GINZBURG@WATERBOARDS.CA.GOV

(818) 551-2022

HTTPS://WWW.WATERBOARDS.CA.GOV/DRINKING_WATER/PROGRAMS/INDEX.HTML

Speaker #3

Well Destruction: The Standards (And a few Oddities)

Erik Gaiser

Consultant

Well Destruction: The Standards

(And a Few Oddities)

WRD
WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

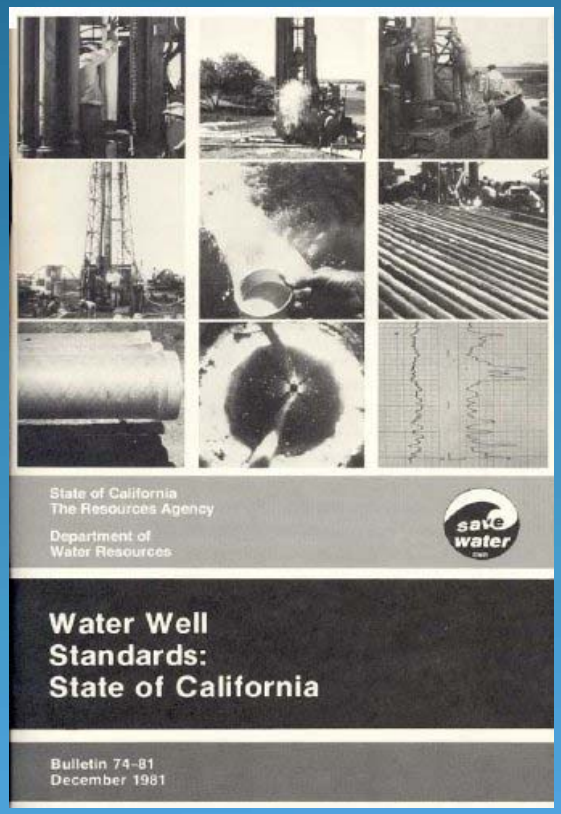
2018 Annual Groundwater Quality Workshop

Presented by: Erik Gaiser, CA PG 8879

Well…What are the Standards?

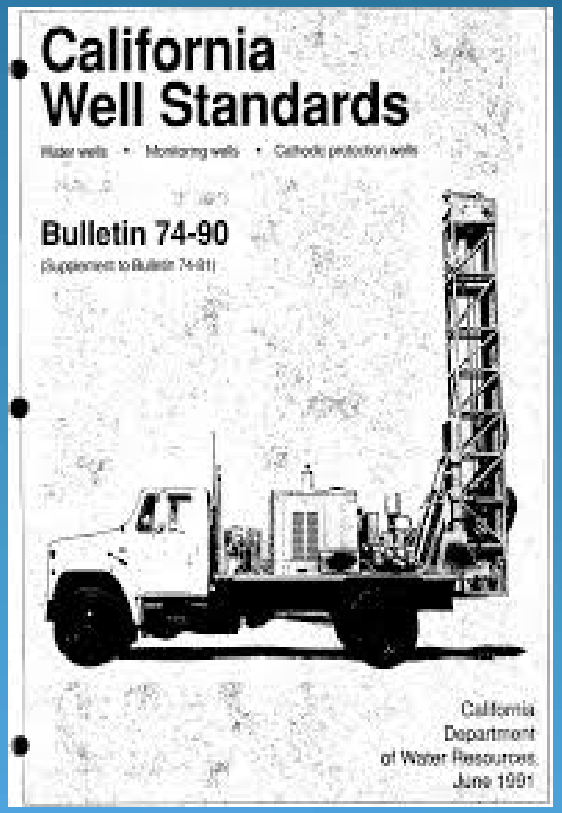
California Department of Water Resources

Bulletin 74-81



And

Bulletin 74-90



http://wdl.water.ca.gov/groundwater/wells/california_well_standards/well_standards_content.cfm

To Maintain or Destroy…That is the Question

Chapter II. Part III. Section 21.

A well is considered 'abandoned' or permanently inactive if *it has not been used for one year, unless the owner demonstrates intention to use the well again.* In accordance with Section 115700 of the California Health and Safety Code, the well owner shall properly maintain an inactive well as evidence of intention for future use in such a way as the following requirements are met:

1) The well shall not allow impairment of the quality of water within the well and groundwater encountered by the well
2) The top of the well/well casing shall be provided with a cover, that is secured by a lock or by other means to prevent its removal without the use of tools, to prevent unauthorized access, to prevent a safety hazard to humans and animals, and to prevent illegal disposal of wasters into the well
3) The well shall be marked and labeled so as to be easily visible and identified
4) The area around the well shall be kept clear of brush, debris, and waste materials

Chapter II. Part III. Section 22.

All 'abandoned' wells and exploration or test holes shall be destroyed.

Erik Gaiser, CA PG 8879

Why Destroy a Well?

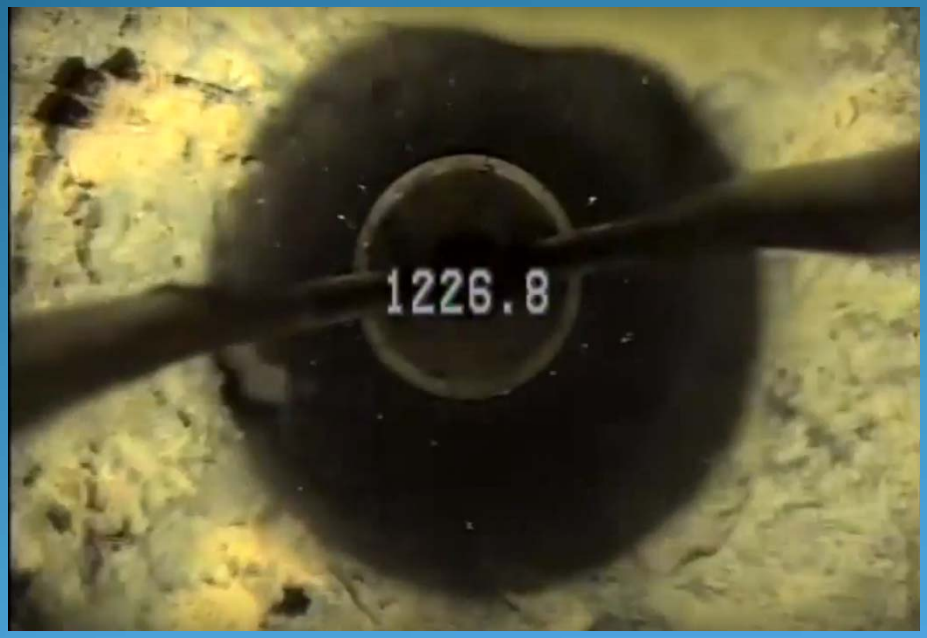
So You've Decided to Destroy

First comes Condition, Construction, and Obstructions

Chapter II. Part III. Section 23.

Before a well can be destroyed, it shall be investigated to determine its:

1) Condition

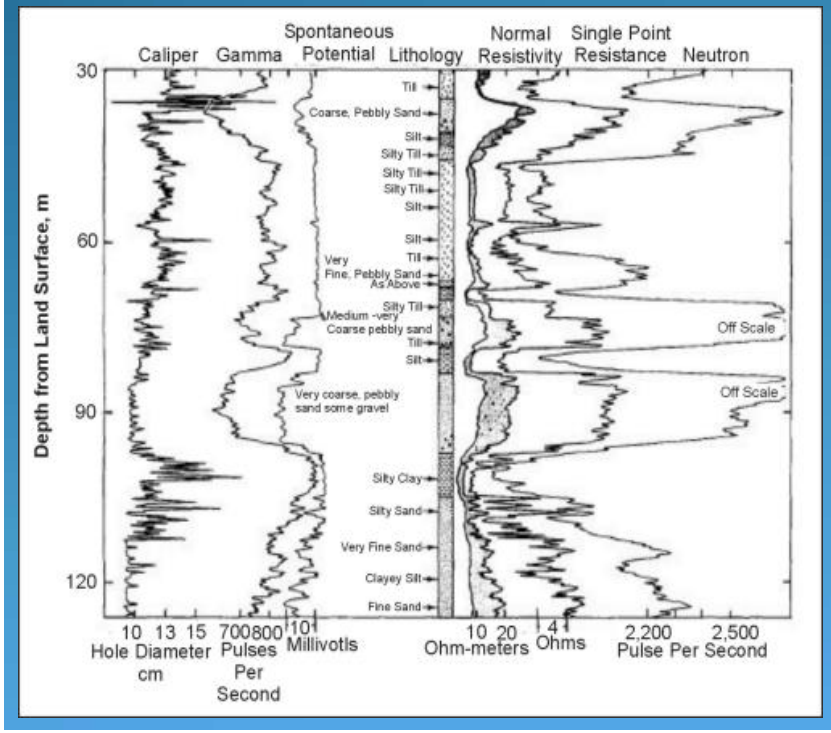


So You've Decided to Destroy

First comes Condition, Construction, and Obstructions Chapter II. Part III. Section 23.

Before a well can be destroyed, it shall be investigated to determine its:

1) Condition
2) Details of its construction, and



*This free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. 332123

DWR Use Only – Do Not Fill In

State Well Number/Site Number

N W

Latitude Longitude

APN/TRS/Other

Page 1 of 1

Owner's Well Number BZ059

Date Work Began 02/07/95 Date Work Ended 02/21/95

Local Permit Agency Any County Public Health

Permit Number WEL01-0001 Permit Date 01/24/95

Geologic Log

Orientation ○ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Direct Rotary Drilling Fluid Mud

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
0	90	Brown sand & gravel with
		streaks of sand
90	160	blue clay w/streaks of sand
160	175	brown clay and sand
175	180	brown sand and gravel
180	220	brown clay with streaks of
		sand

Well Owner

Name Carlos Santana

Mailing Address 123 Water Drive

City Palm Springs State CA Zip 95476

Well Location

Address 123 AVE A

City Los Angeles County Los Angeles

Latitude Deg Min Sec N Longitude Deg Min Sec W

Datum Dec. Lat. Dec. Long

APN Book 123 Page 322 Parcel 03

Township 0 Range 0 Section 0

Location Sketch

(Sketch must be drawn by hand after form is printed.)

North

Activity

◉ New Well

○ Modification/Repair

○ Deepen

Downhole Cameras

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So You've Decided to Destroy

First comes Condition, Construction, and Obstructions
Chapter II. Part III. Section 23.

Before a well can be destroyed, it shall be investigated to determine its:

1. Condition
2. Details of its construction, and
3. Whether there are obstructions that will interfere with the process of filling and sealing

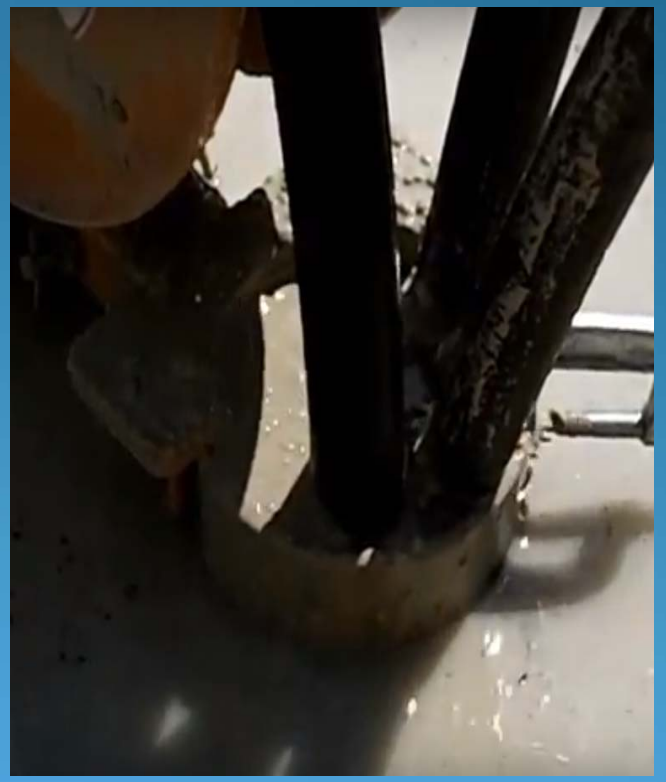
Ready to Destroy…What are the Options?

Two Basic Methods:

Overdrill

Or

Seal



Condition, Construction, and Obstructions will Determine Which is Best

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Suitable Sealing/Filler Materials

September 2015 Statewide Advisory on Sealing Materials

Task Force findings indicate that *bentonite slurries do not perform adequately as a sealing material in the unsaturated zone.* Bentonite slurries can shrink and crack when they dry out, and they do not adequately hydrate and swell once water is reintroduced to the seal. **(http://wdl.water.ca.gov/groundwater/wells/standards.cfm)**

So What Does Work?

Part II. Section 9. D.

1) Neat Cement – Type I or II Portland cement mixed at a ratio of one 94-pound sack of cement to 5 to 6 gallons of 'clean' water
2) Sand-Cement – Type I or II Portland cement mixed at a ratio of one 94-pound sack of cement to 188 pounds of sand and ~7 gallons of 'clean' water (10.3 sack mix)
3) Concrete – At least six-94 pound sacks of Portland cement per yard^3 of aggregate
4) High Solids Bentonite Grout – Sand-to-Bentonite ratio of 4:1 to 8:1 by dry weight, and a solids content (i.e. sand and soduim bentonite) between 64%-72% by dry weight to the total weight of the mixed grout

Suitable Sealing/Filler Materials

Additives

1) Hydrated Lime – Up to 10% of the volume of cement
   - Benefit – increases the plasticity/fluidity of the sand-cement mixture and reduces shrinkage cracking
2) Bentonite – Up to 6% by weight of cement
   - Benefit – reduces heat generated during the curing process
3) Accelerants – Must meet ASTM C494, Standard Specification for Chemical Admixtures for concrete, and latest revision thereof
   - Benefit – reduces curing time (CAUTION – increases the heat generated during the curing process)

Filler Materials

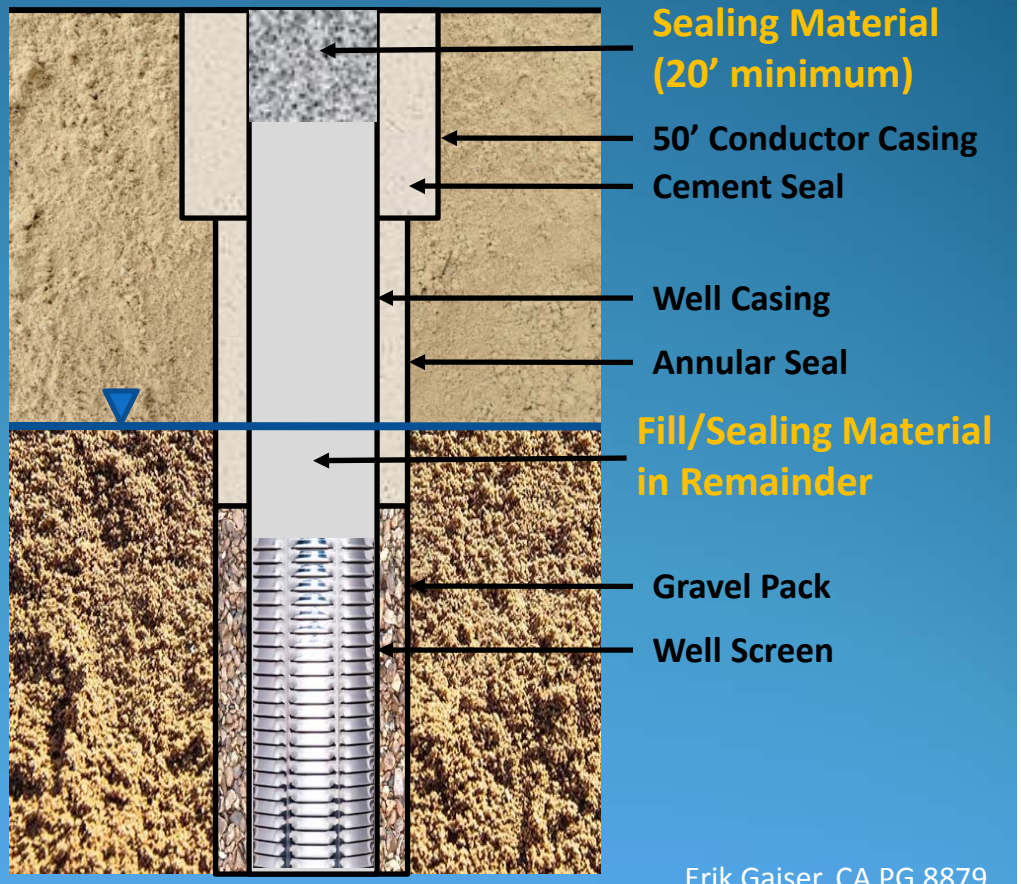
1) Crushed Stone, Gravel, and Sand are the most commonly used
2) Silt, Clay, and Native Soils can be used but are uncommon due to the additional care that must be used during emplacement

Sealing Scenarios

Well in Unconsolidated Material and Unconfined Groundwater

Part III. Chapter II. Section 23. B. 1.

1) Sealing material in upper 20 feet
2) Fill or Sealing material in remainder



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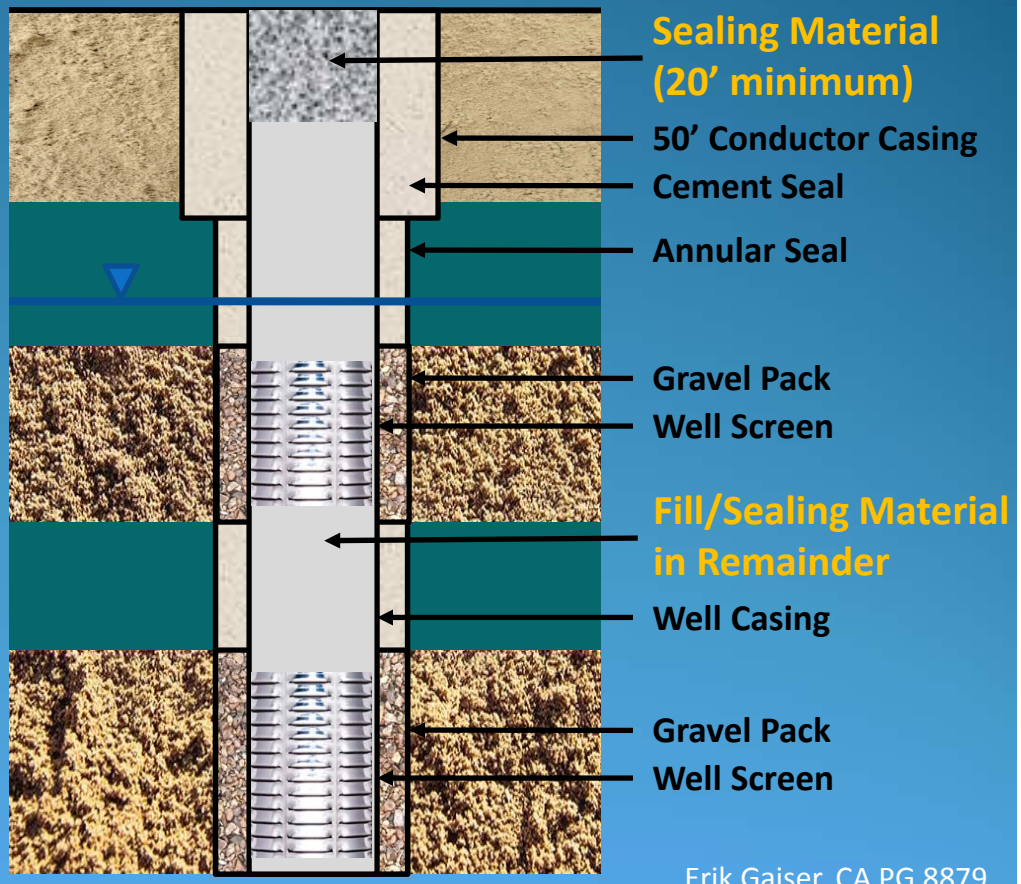
Sealing Scenarios

Well Penetrating Several Aquifers or Formations

Part III. Chapter II. Section 23. B. 2.

1) Sealing material in upper 20 feet
2) Where interchange between zones is in *no way detrimental*, suitable fill or sealing material may be placed opposite the formations penetrated

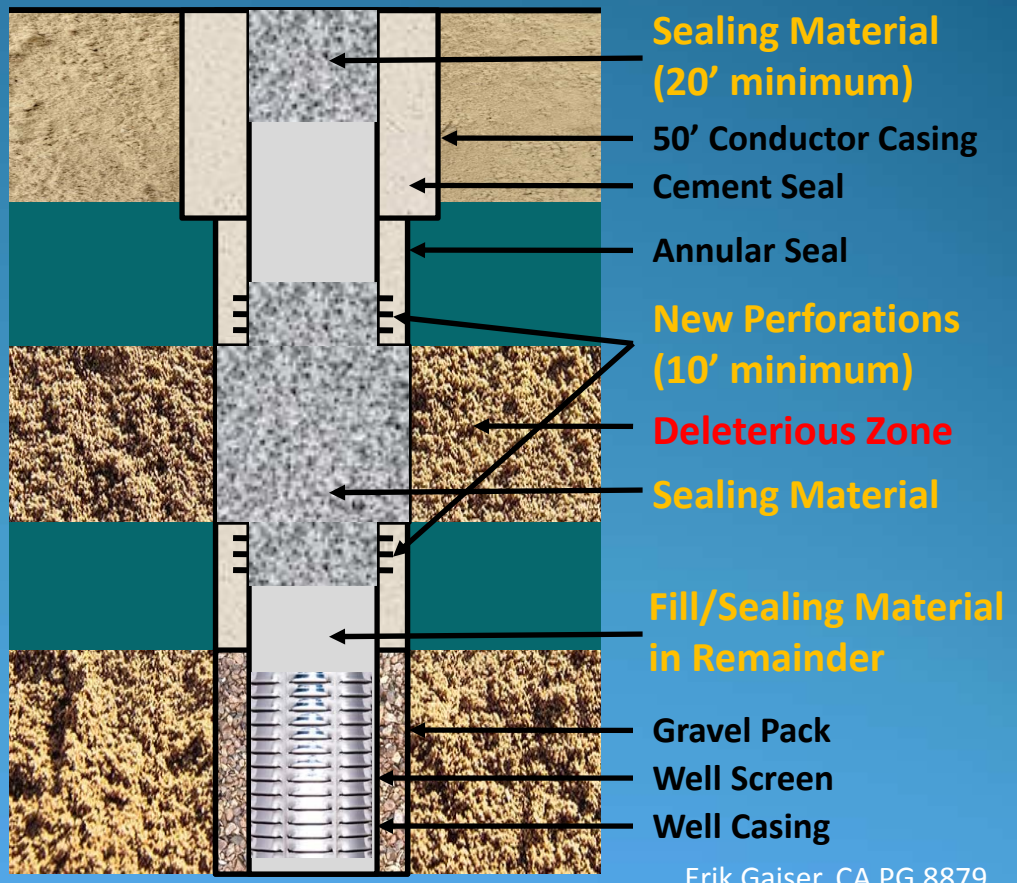


Sealing Scenarios

Well Penetrating Several Aquifers or Formations (Deleterious Water)

Part III. Chapter II. Section 23. B. 2.

1) Sealing material in upper 20 feet
2) Where interchange between zones will result *in a significant deterioration* of water quality in one or more aquifers, the formation(s) producing the deleterious water *shall be sealed by placing impervious material opposite the formation , and opposite the confining layers above and below for no less than 10 feet*
3) Fill/Sealing material can be placed in the remainder



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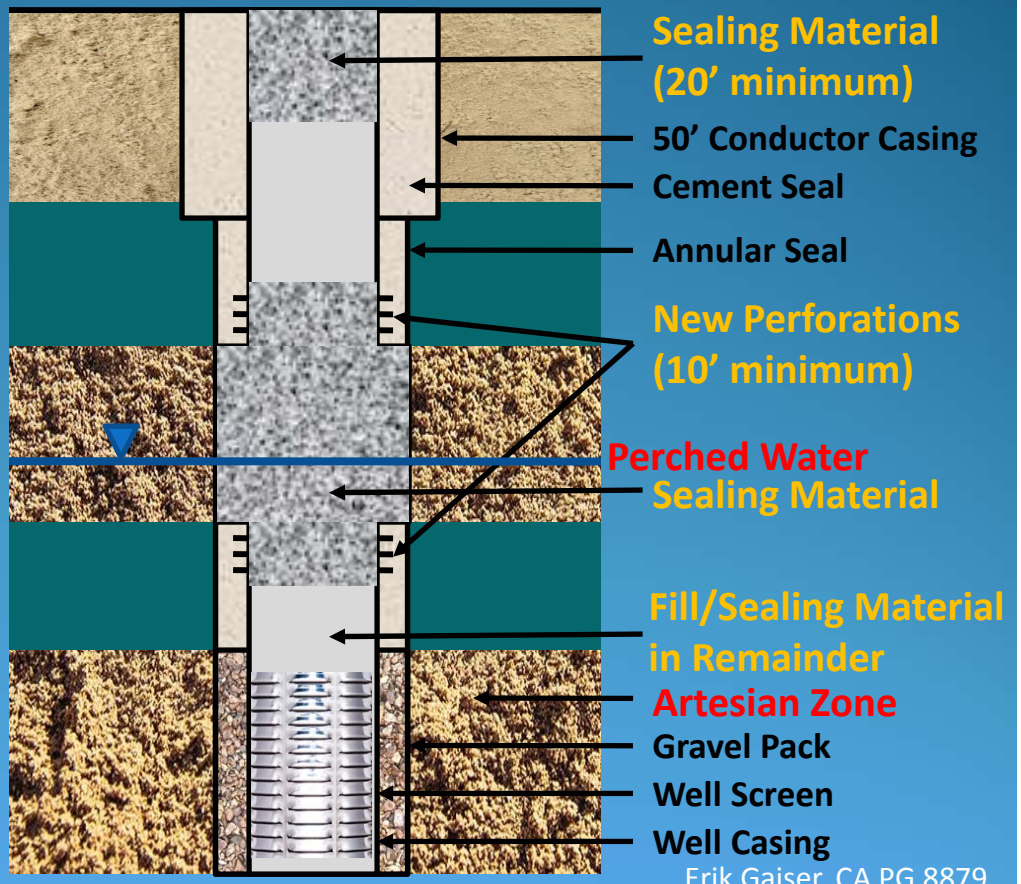
Sealing Scenarios

Well Penetrating Several Aquifers or Formations (Artesian)

Part III. Chapter II. Section 23. B. 2.

1) Sealing material in upper 20 feet
2) Where interchange between zones will result *in a loss of artesian pressure*, the formation(s) causing the pressure loss *shall be sealed by placing impervious material opposite the formation , and opposite the confining layers above and below for no less than 10 feet*
3) Fill/Sealing material can be placed in the remainder



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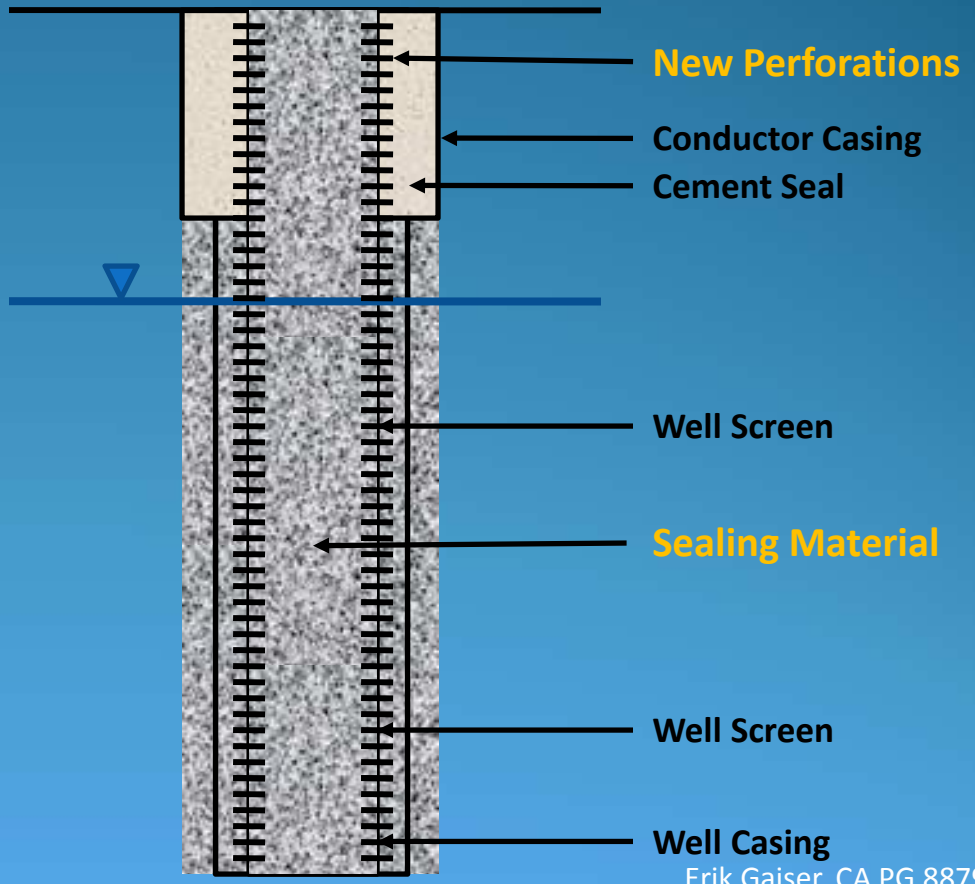
Sealing Scenarios – Pop Quiz

Well with Unknowns

Part III. Chapter II. Section 23. C. 5-7.

1) Perforate the entire length of casing
2) Place sealing material within the casing *under pressure* so that it is forced out into any gravel pack, filling it, and out into the formation
3) Pressure must be maintained for a length of time sufficient for the cementing mixture to set



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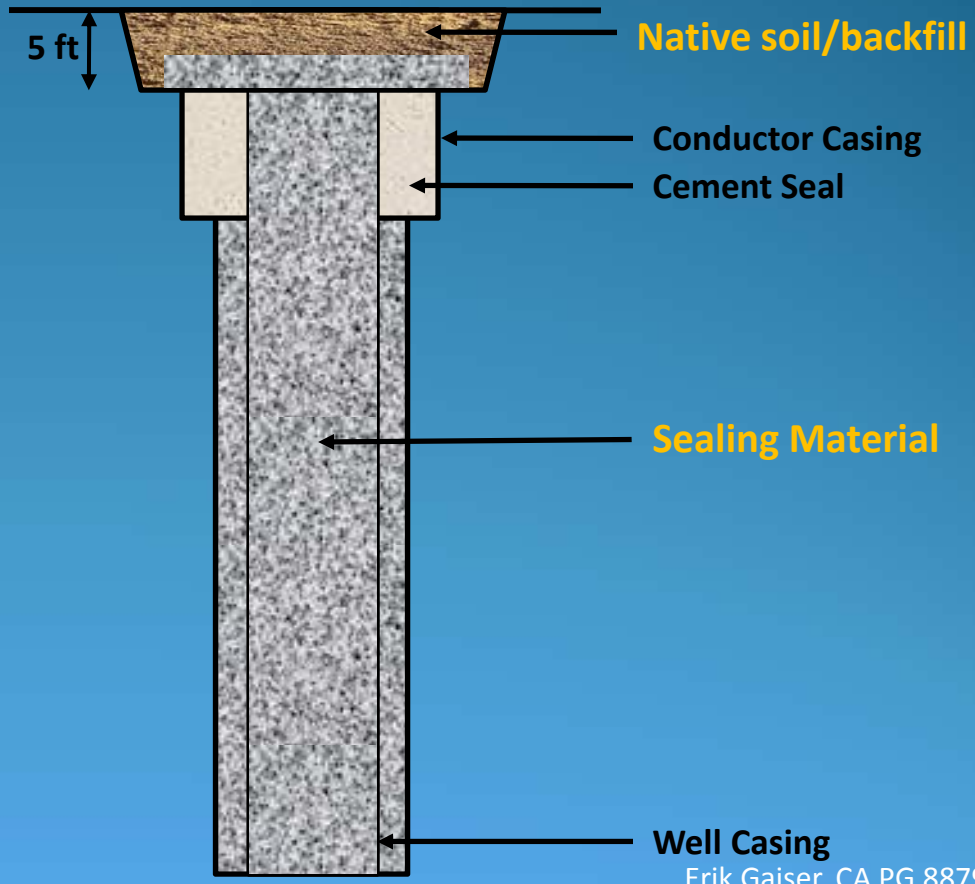
Sealing Scenarios

Additional Requirements for Wells in Urban Areas

Part III. Chapter II. Section 23. E.

1) A hole shall be excavated around the well casing to a depth of 5 feet and the casing removed to the bottom of the excavation
2) The sealing material used for the upper portion shall be allowed to spill over into the excavation to form a cap
3) After sealing material has set, the excavation shall be filled with native soil



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And Now a Few Oddities

What do you do when your well looks like this?

Erik Gaiser, CA PG 8879

And Now a Few Oddities

. . . Or this?

And Now a Few Oddities

What about this?

Questions

Speaker #4

Ex-Situ Biological Treatment of Perchlorate Impacted Groundwater

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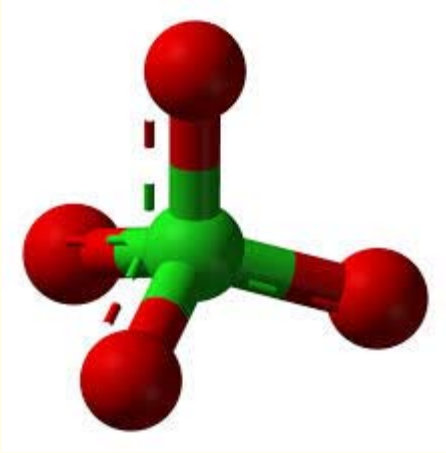
Ex-Situ Biological Treatment of Perchlorate Impacted Groundwater

Leila Munla, PhD| Process Engineer
Ryan Kristensen, PE| Civil Engineer

WRD Annual Groundwater Quality Workshop
June 28th, 2018



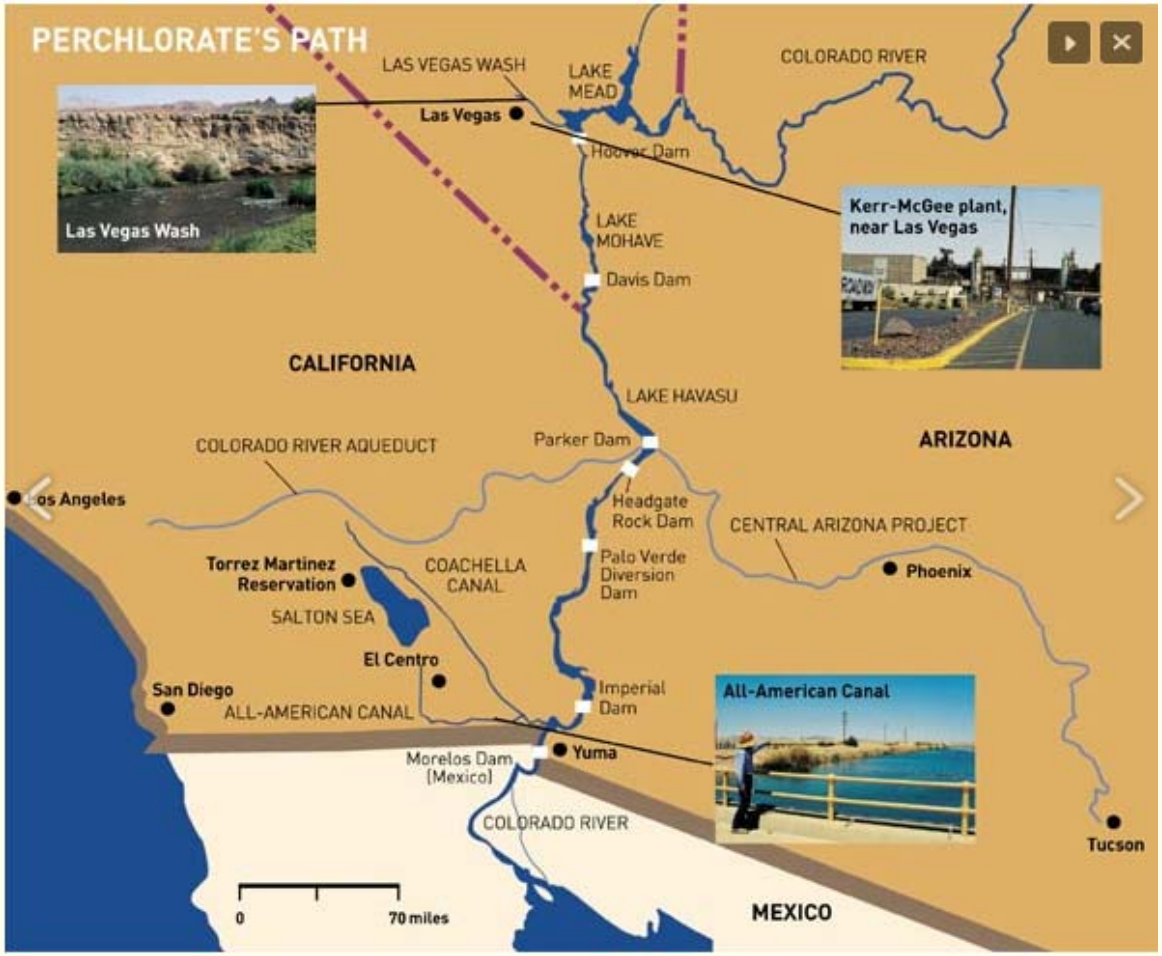
Perchlorate Sources in Groundwater

Sources

- Anthropogenic
- Natural

Properties

- Highly *soluble*
- Very *stable*
- Very *mobile*
- Difficult to detect
- Difficult to treat



Perchlorate Regulatory Update

Health Effects of Perchlorate

Maximum Contaminant Level

- 6 ug/L in 2007

Public Health Goal (PHG)

- 1 ug/L in 2015

Arizonians' Thyroid Problems May Be Linked To Perchlorate In Drinking Water

By Sara Jerome
@sarmje

Perchlorate contamination of drinking water may be the source of thyroid problems among Arizona residents.

Arizona has more perchlorate contamination than most other states, according to KAWC. The Colorado River is contaminated with the chemical because it moves from an industrial facility in Henderson, NV, to groundwater to Lake Mead, which feeds the river.

"Northern Arizona University researchers have received a 200-thousand-dollar grant from the Flinn Foundation to study the contaminant's effects on the Yuma population," KAWC reported. Yuma County is in southwestern Arizona.

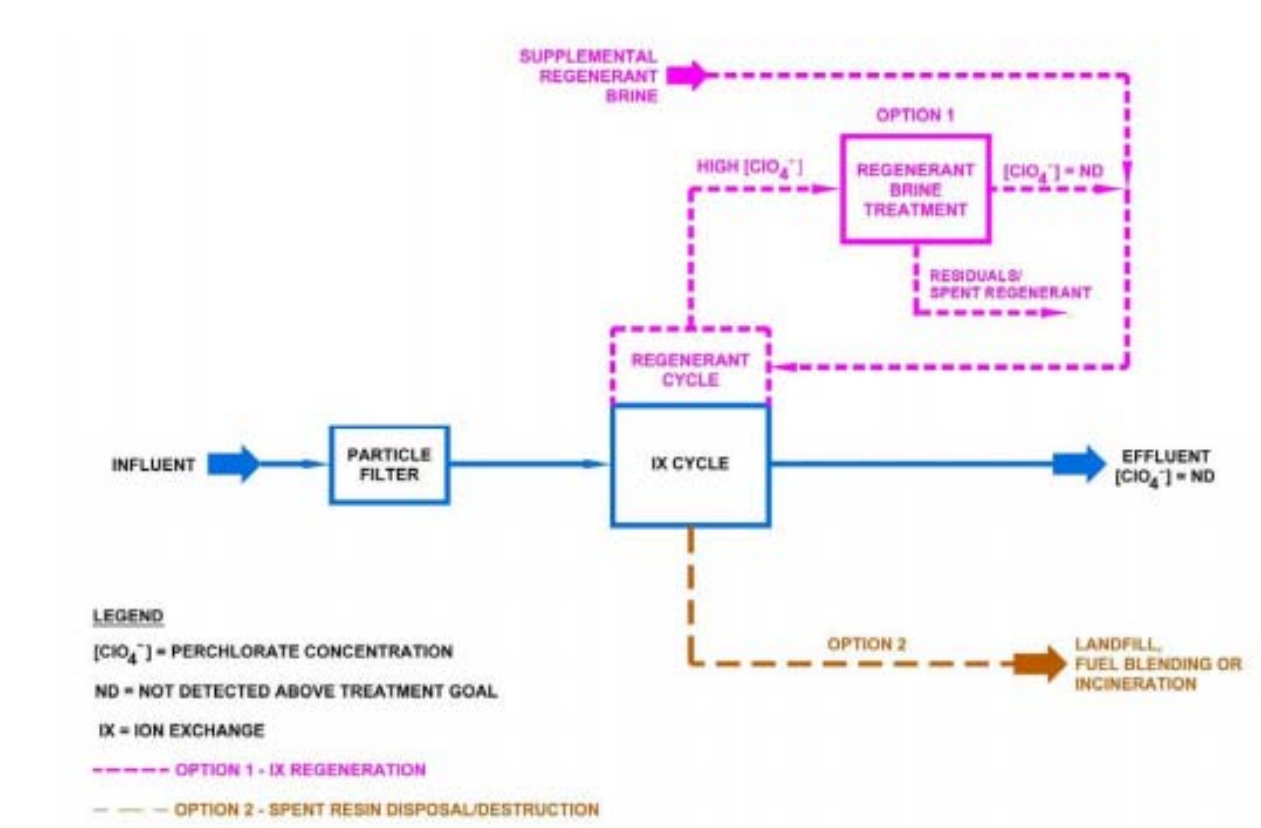
Detection Limit for purposes of Reporting (DLR)

- 4 ug/L
- Under review as per Resolution 2017-0041

Ion Exchange – Process Description

$$R_4N^+Cl^- + ClO_4^- \Leftrightarrow R_4N^+ClO_4^- + Cl^-$$

- Reversible chemical reaction
  - Exchange perchlorate for chloride
  - Can be affected by competing ions

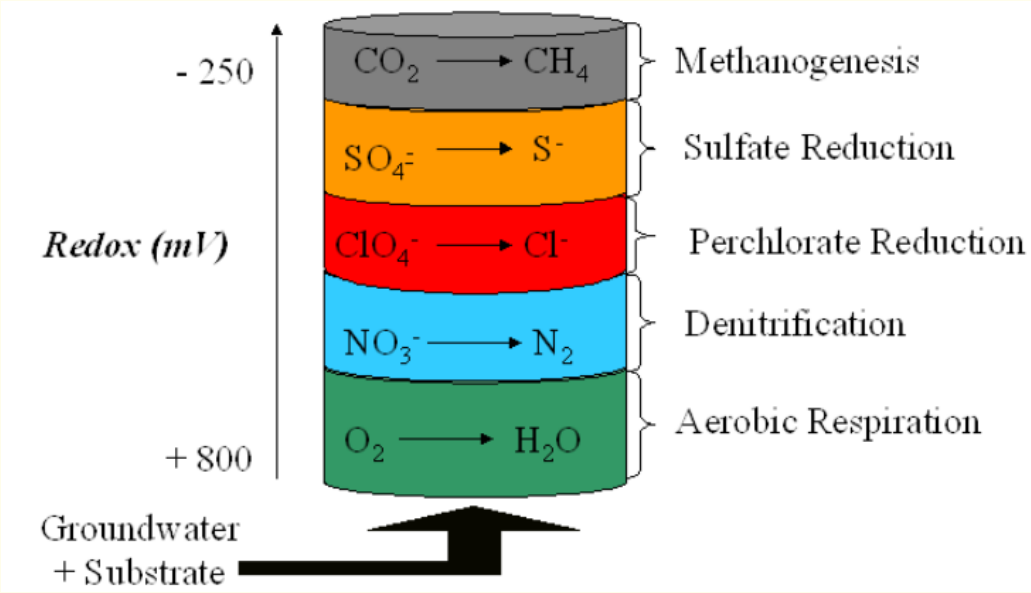


Biological Processes

$$ClO_4^- + CH_3COO^- \rightarrow Cl^- + 2HCO_3^- + H^+$$

Process Description

- Electron Acceptor
  - Order (DO, Nitrate, perchlorate, Sulfate)
- Carbon “Food” Source – Electron Donor
  - Acetate (Acetic Acid)
  - Ethanol
- Nutrient Dosing
  - Phosphoric Acid



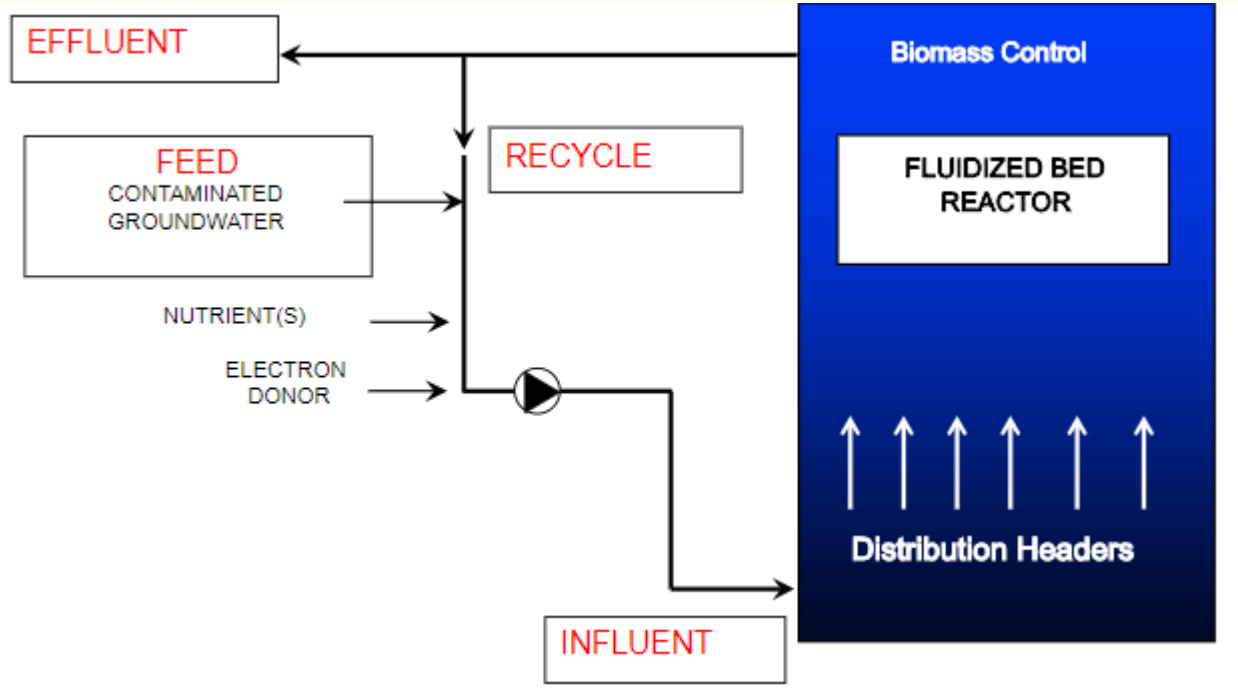
Fluidized Bed Reactor – Process Description

Technology

- Solid media: sand or GAC
- Specific density decreases as biomass grows
- High surface area

Startup

- Up to 2-3 months

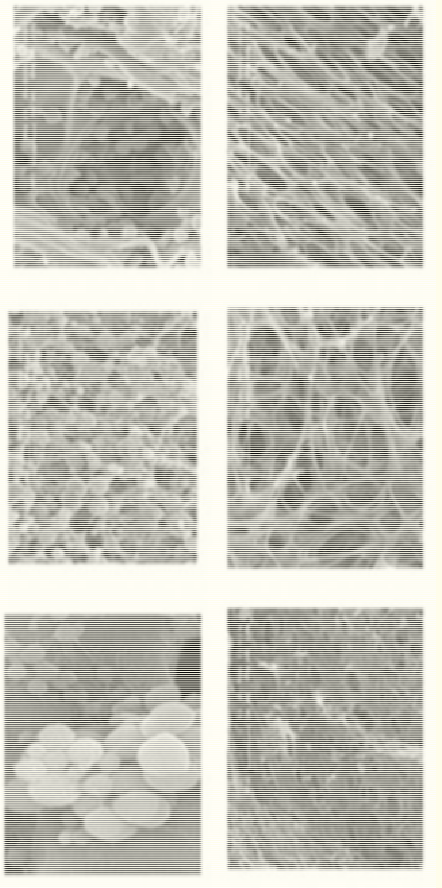


Fluidized Bed Reactor

- Pros
  - Consistent operating cost at various concentrations
  - Effective for high perchlorate concentrations
- Cons
  - High maintenance
  - Long start up time
  - Very sensitive to operating conditions

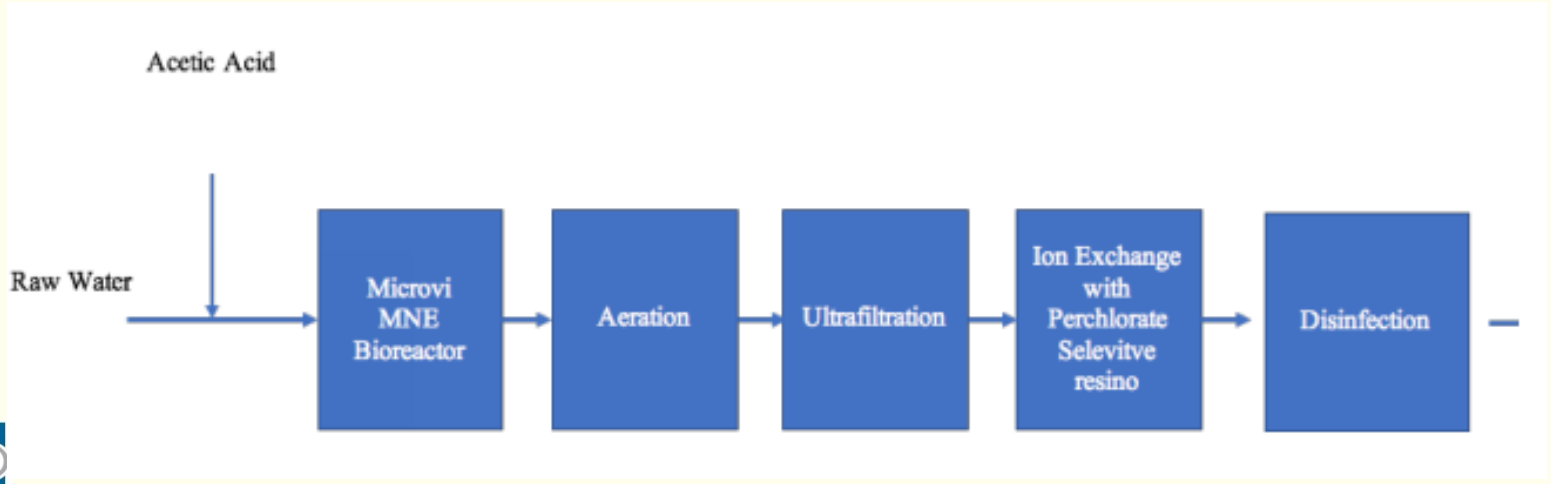
Microvi – Process Description

- Technology
  - Biocatalyst composite – emulates soil conditions
  - Self-contained – no loss or overgrowth
  - 5-10 mm structure – porous and squishy
- Startup
  - 1-2 days
  - 1 hour after short maintenance
- Operation
  - No backwash required
  - Importance of appropriate dosing – online nitrate monitoring
  - Replacement cost of media 10-15% of capital cost
  - Contact time depends on water quality goals
  - Maintenance – Clean tank once/1-2 weeks

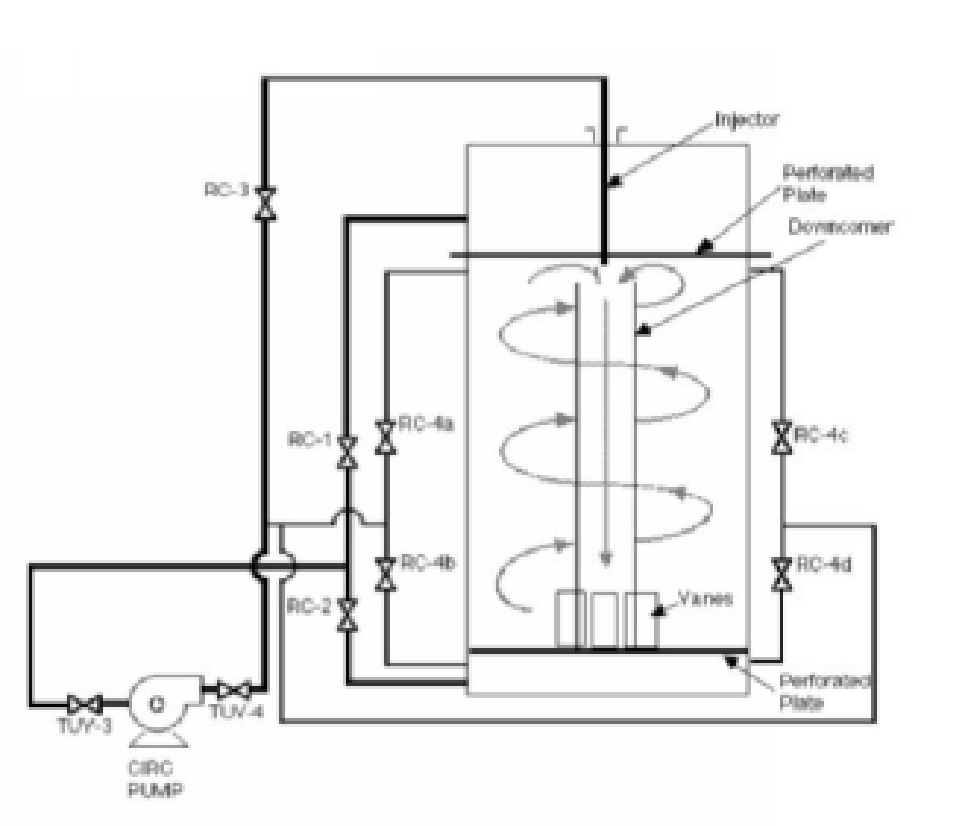


Microvi

- Pros
  - Quick startup times
  - Low operating costs
    - No sludge production
    - Low maintenance
- Cons
  - Post-filtration step required (for potable)
  - Hydraulics – break in head



Continuously Stirred Tank Reactor – Process Description



Perchlorate Removal Technologies

Ion Exchange

- Concentrates perchlorate
  - Difficult waste product
- High removals
- Maintains hydraulics
- Competing ions
- Lower capital cost
- Higher operating costs at higher concentrations

Biological

- Transforms perchlorate into chloride
- Sludge waste produced
- May require post filtration or polishing step
- Online monitoring
- Must fully remove nitrate first
- Breaks head
- Higher capital costs than IX
- Consistent operating costs
- HRT based on influent concentration
- Potential H_2S production

CASE STUDIES

West Valley Water District - FBR

Source Water

- 2000 gpm (3 GW Wells)
- Up to 1000 ppb ClO_4^-
- 5.6 mg/L NO_3-N
- 9 mg/L DO

Turbulence Tank

- Reduce DO to prevent agitation of the FBR biofilm

Fluidization Pumps and Chemical Dosing

- Electron Donor: Acetic Acid
- Nutrient Solution: Phosphoric Acid

Fluidized Bed Reactor

- GAC and Indigenous Microbial Population
- Influent Turbidity: 0.5 NTU
- Effluent Turbidity: 1-18 NTU

Clarification and Filtration

- Aluminum Chlorohydrate (ACH) Coagulant
- Skid Treatment using Trident Clarifier

Dissolved Air Floatation

- Magnafloc E38 Polymer added prior to DAF

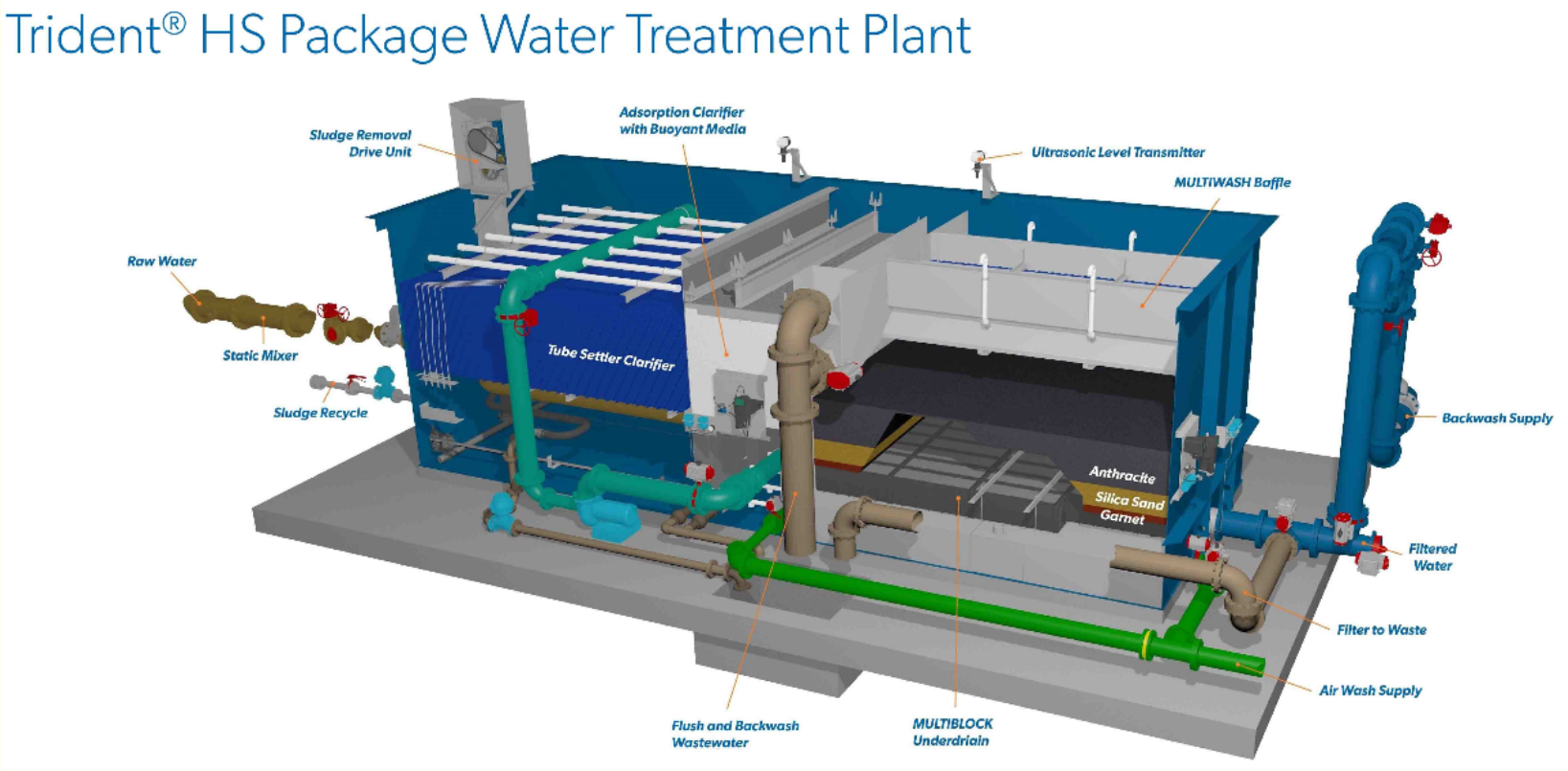
Disinfection

- Chlorination following Clearwell to allow for Recycling

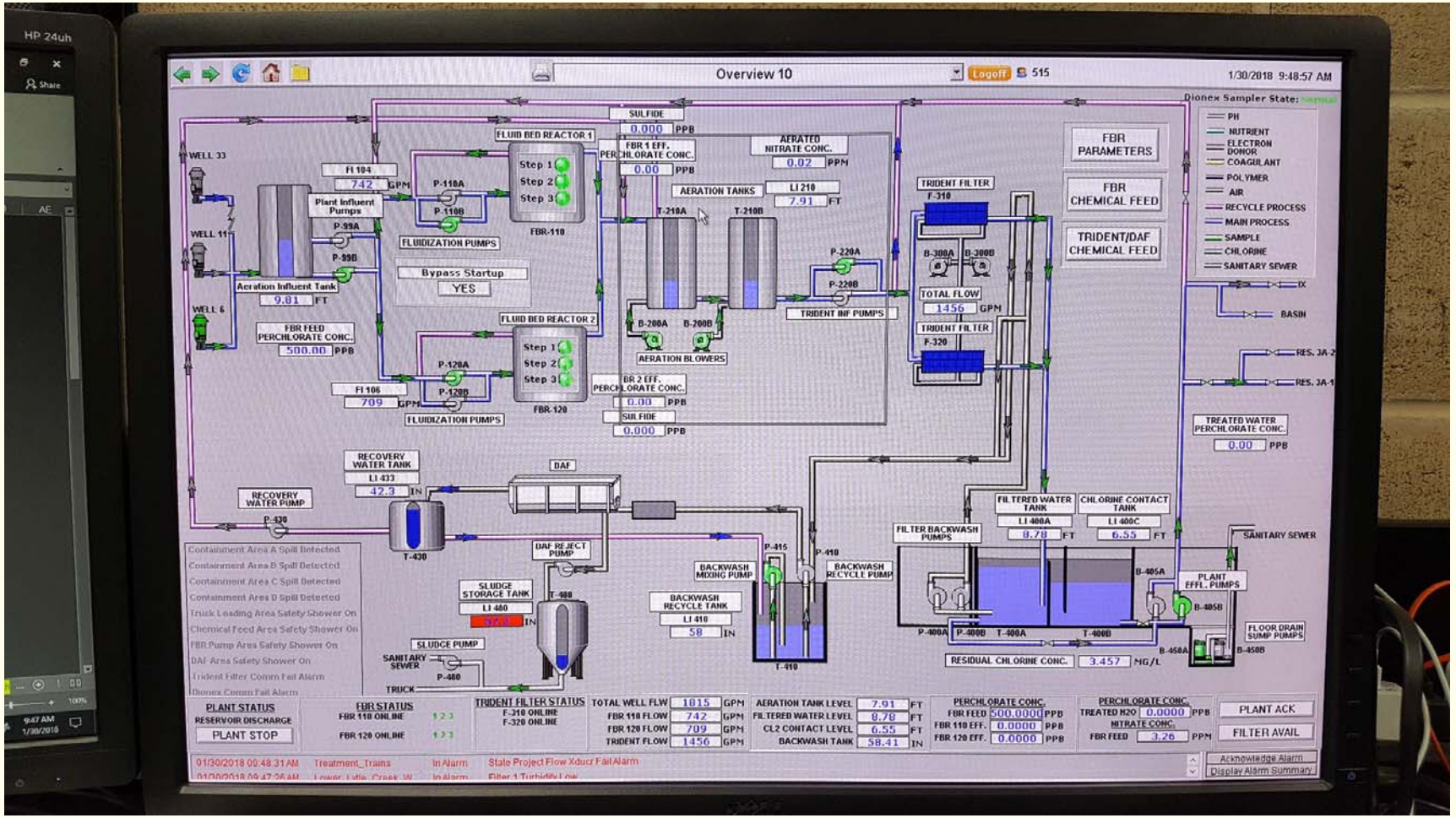
Finished Water

- ND ClO_4^-
- ND NO_3^-
- 0.02-0.1 NTU

WVWD Clarification and Filtration



WVWD SCADA


Overview 10
Logoff
1/30/2018 9:48:57 AM
FBR PARAMETERS
FBR CHEMICAL FEED
TRIDENT/DAF CHEMICAL FEED
FLUID BED REACTOR 1
FLUID BED REACTOR 2
AERATION TANKS
TRIDENT FILTER
TRIDENT INF PUMPS
AERATION BLOWERS
FLUIDIZATION PUMPS
Bypass Startup
YES
Aeration Influent Tank
FBR FEED PERCHLORATE CONC.
RECOVERY WATER TANK
RECOVERY WATER PUMP
DAF
DAF REJECT PUMP
SLUDGE STORAGE TANK
SLUDGE PUMP
BACKWASH MIXING PUMP
BACKWASH RECYCLE TANK
BACKWASH RECYCLE PUMP
FILTER BACKWASH PUMPS
FILTERED WATER TANK
CHLORINE CONTACT TANK
PLANT EFFL. PUMPS
FLOOR DRAIN SUMP PUMPS
TREATED WATER PERCHLORATE CONC.
RESIDUAL CHLORINE CONC.
PLANT STATUS
PLANT STOP
FBR STATUS
TRIDENT FILTER STATUS
PLANT ACK
FILTER AVAIL
Acknowledge Alarm
Display Alarm Summary

WVWD Real Time Monitoring (Dionex)

Whittaker-Bermite Perchlorate Treatment System

Source Water
- 200 gpm (4 GW Wells)
- Up to 4000 ppb ClO_4^-
- VOCs (TCE and PCE)

VOC Treatment
- GAC to remove VOCs prior to FBR

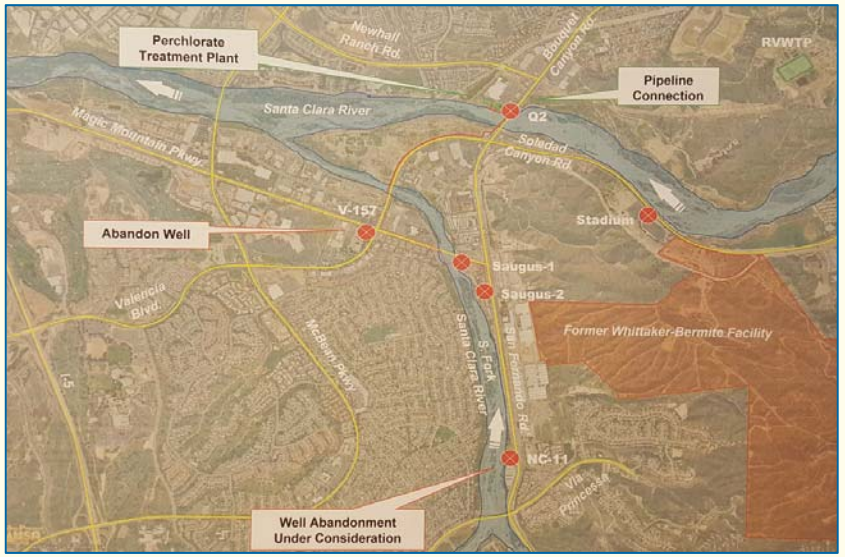
Perchlorate Treatment
- Fluidized Bed Reactor

Fluidization Pumps and Chemical Dosing
- Electron Donor: Acetic Acid
- Nutrient Solution: Phosphoric Acid

Finished Water
- ND ClO_4^-
- ND VOC

Startup-Time
- Circulate water during start-up
- Few weeks to stabilize the FBR
- 2-3 months to reach target effluent water quality

Design Considerations
- Real-Time analysis of influent and effluent water quality
- Careful attention to the design of system controls (SCADA)

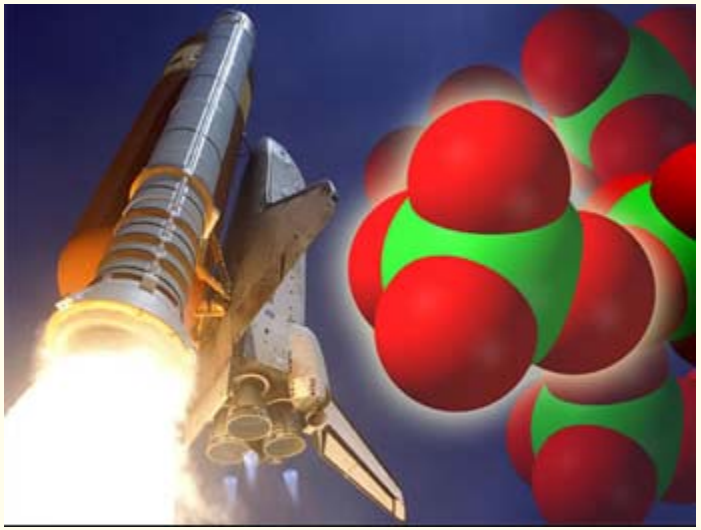


Sunny Slope - Microvi

- Water Quality
  - 10 mg/L nitrate
  - Partially treated and blended
  - Target 8 mg/L nitrate
- Setup
  - Two reactor tanks – each around 300 gpm
  - Only 1 tank fully operational
  - Followed by UF with ACH coagulant
- Maintenance
  - Bi/weekly tank scrub
  - Microvi rep monthly maintenance check

Conclusions

- Both physical and biological processes to treat perchlorate
- Each process has unique pros and cons
- Choice will depend on:
  - Influent water quality
  - Effluent water quality goals
  - Cost
  - Operating conditions



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Speaker #5

Sampling & Analytical Challenges for Common Constituents

Rick Zimmer

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eurofins | Eaton Analytical

WRD

SAMPLING & ANALYTICAL CHALLENGES for common constituents

Rick Zimmer

June 28, 2018

SAMPLING & ANALYTICAL CHALLENGES

PRESENTATION OUTLINE

- Common Terms & Concepts
- Coliforms
- Pathogens
- Volatile Organics
- 1,4-Dioxane
- Nitrosamines
- Conclusion

FIELD SAMPLING

- ✓ Sampler Qualification
- ✓ Dedicated Tap Stations
- ✓ Container Checks
- ✓ Powder-Free/Nitrile Gloves
- ✓ Flush Time
- ✓ Container Handling
- ✓ Sample Segregation
- ✓ Sample Transport
- ✓ Cooler Cleanings
- ✓ Field QC samples
- ✓ Weather Management
- ✓ Chain of Custody

REPORTING LIMITS

METHOD REPORTING LIMIT
PRACTICAL QUANTITATION LIMIT

LOWEST CONCENTRATION
METHOD REPORTING LIMIT

METHOD DETECTION LIMIT

INSTRUMENT
DETECTION LIMIT

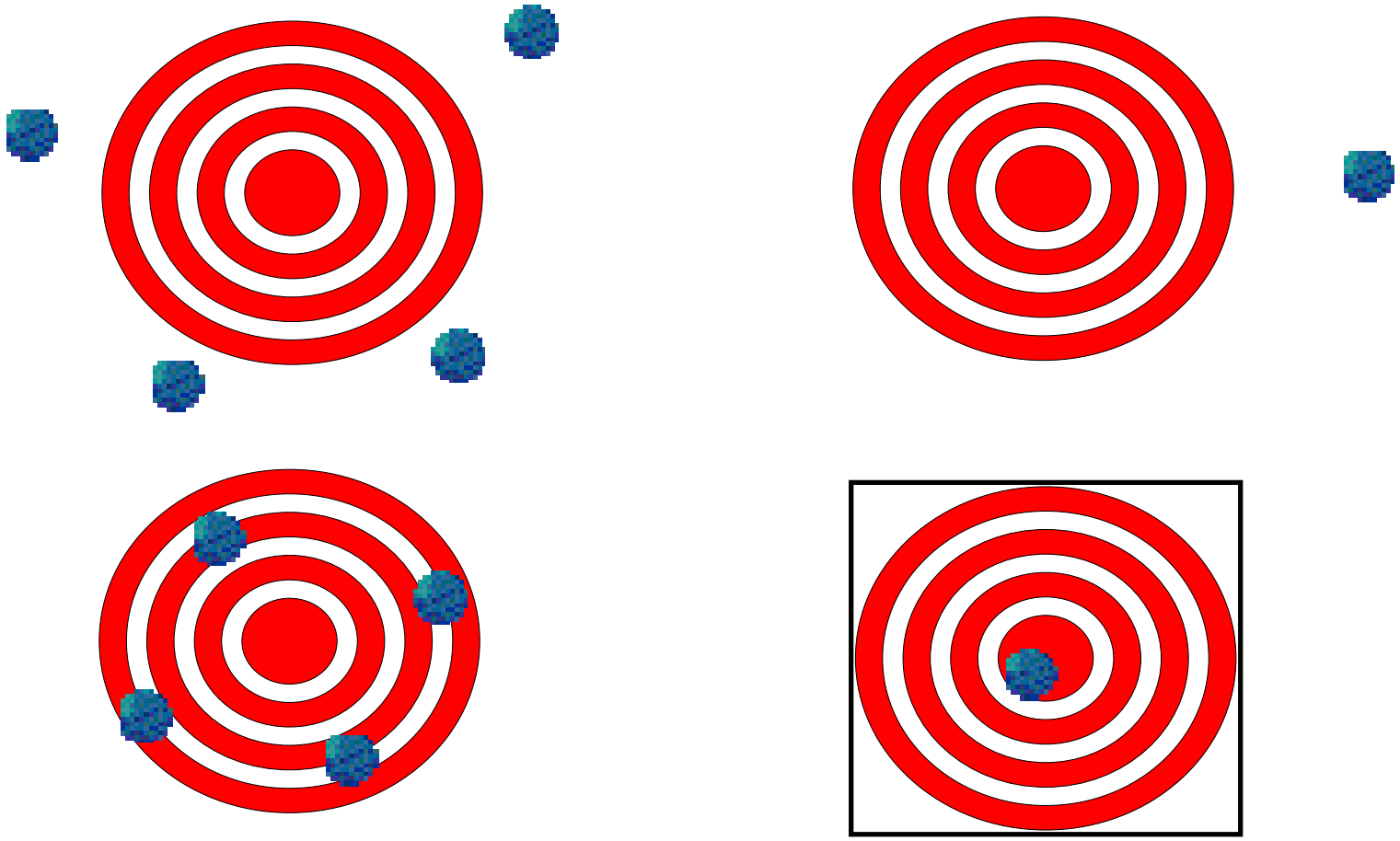
MCL

DLR

PHG

REPORTING LIMITS

QUALITY CONTROL



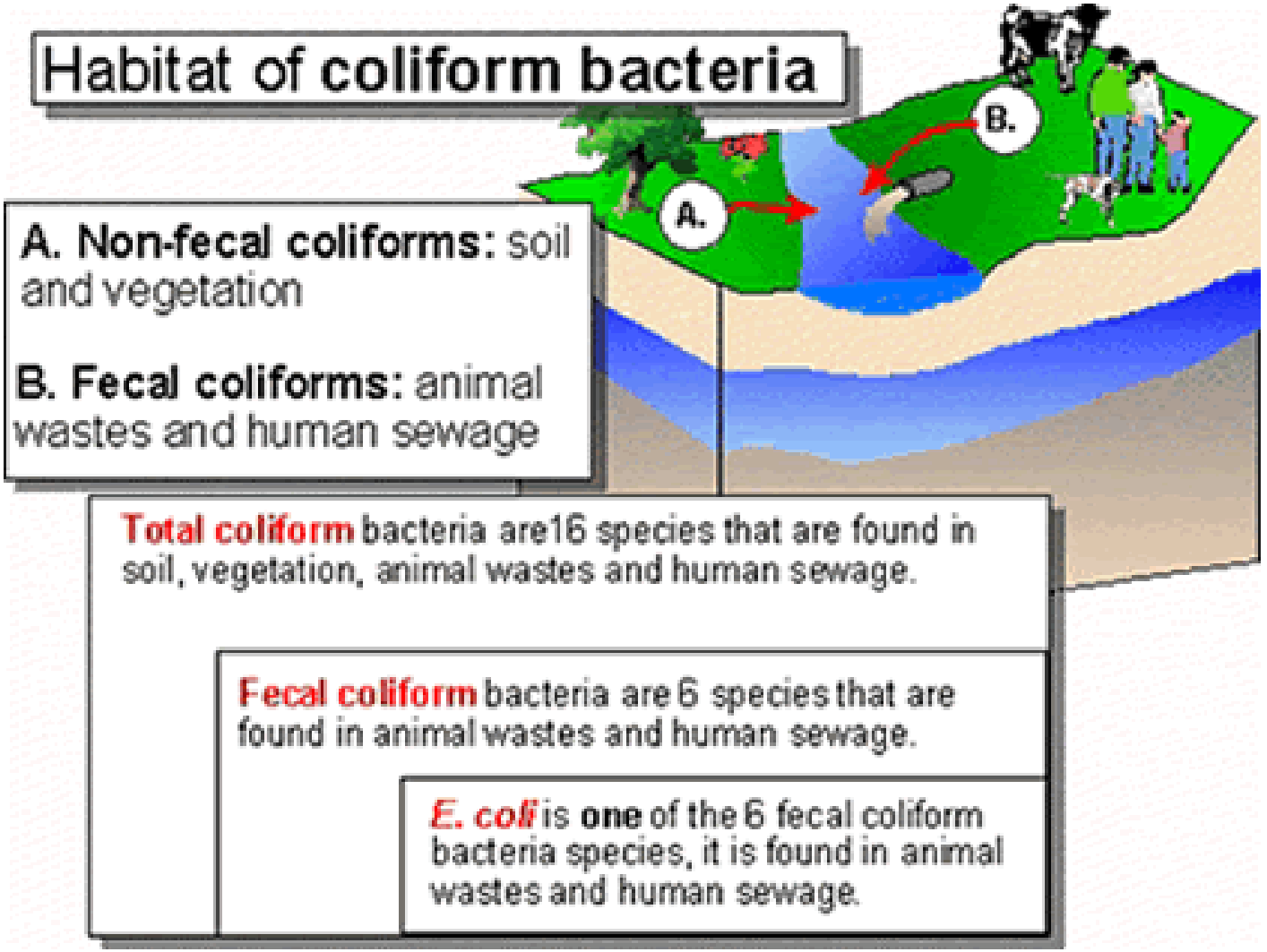
COLIFORMS

REGULATIONS

Federal rTCR

California TCR

California rTCR



COLIFORMS & SAMPLING & ANALYSIS

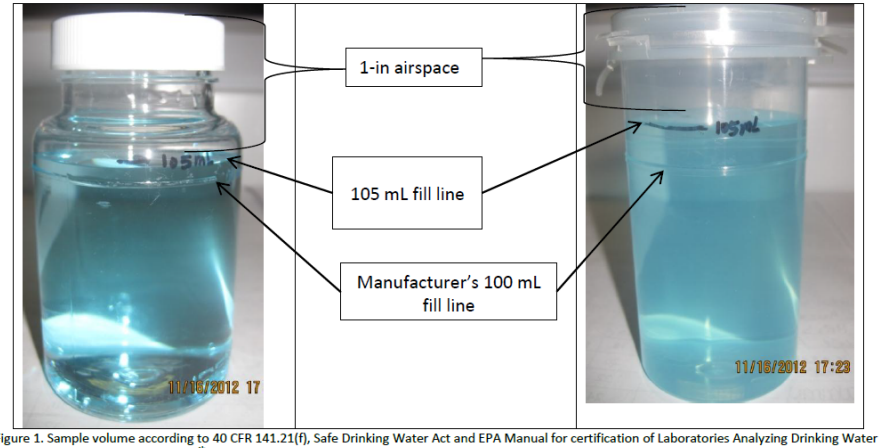
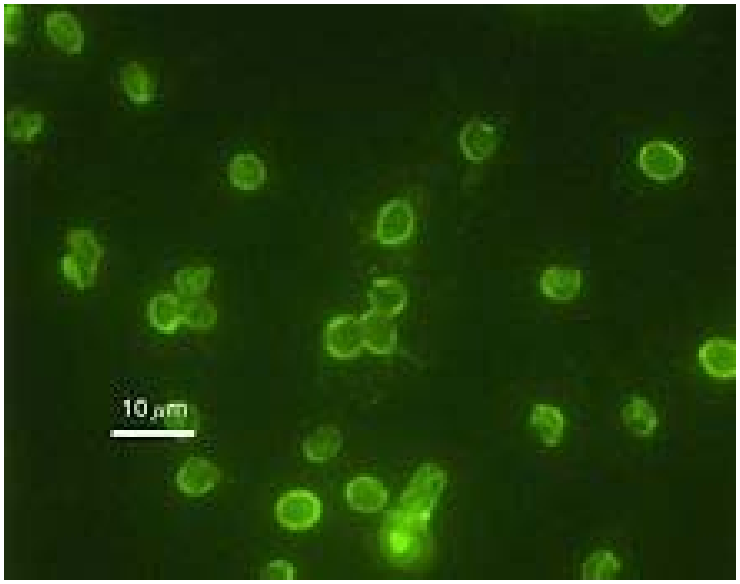


Figure 1. Sample volume according to 40 CFR 141.21(f), Safe Drinking Water Act and EPA Manual for certification of Laboratories Analyzing Drinking Water (EPA 815-R-05-004, January 2005, 5th Edition)

PATHOGENS



- Gastrointestinal illness (sensitive populations)
- Found in Human & Animal fecal waste
- Resistant to conventional treatment

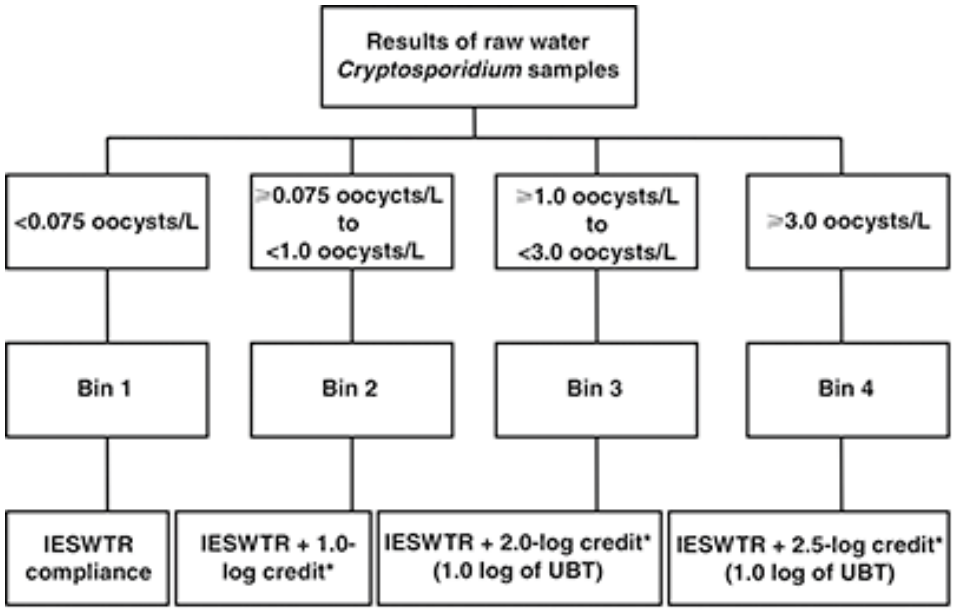
LT2 ESWTR

2-log removal + 0.3 NTU turbidity standard

Monitoring + Bin Classification

Covered Storage Reservoirs

Watershed Protection, Sanitary Surveys



IESWTR—Interim Enhanced Surface Water Treatment Rule, UBT—upper bin technology; UBT includes riverbank (inbank) filtration, slow sand filtration, membranes, ultraviolet irradiation, chlorine dioxide, ozone, bag filter, and cartridge filter.

**Direct filtration facilities will require 0.5 log additional credit.*

PATHOGENS SAMPLING & ANALYSIS

VOLATILE ORGANICS

Known or suspected Carcinogens in groundwater

Industrial solvents, Petroleum products, Fragrances, Paint, Lubricants, Cleaners

REGULATION	COMPOUND	MCL mg/L	REGULATION	COMPOUND	MCL mg/L
Phase I 1987	Benzene	0.005	Phase II 1991	cis-1,2-dichloroethylene	0.07
	Carbon tetrachloride	0.005		Ethylbenzene	0.7
	p-dichlorobenzene	0.075		Chlorobenzene	0.1
	Trichloroethylene	0.005		o-dichlorobenzene	0.6
	Vinyl chloride	0.002		Styrene	0.1
	1,1,1-trichloroethane	0.2		Tetrachloroethylene	0.005
	1,1-dichloroethylene	0.007		Toluene	1
	1,2-dichloroethane	0.005		Trans-1,2-Dichloroethyle	0.1
Phase V 1992	Dichloromethane	0.005		Xylenes (Total)	10
	1,1,2-trichloroethane	0.005		1,2-dichloropropane	0.005
	1,2,4-trichlorobenzene	0.07			

VOCs SAMPLING & ANALYSIS

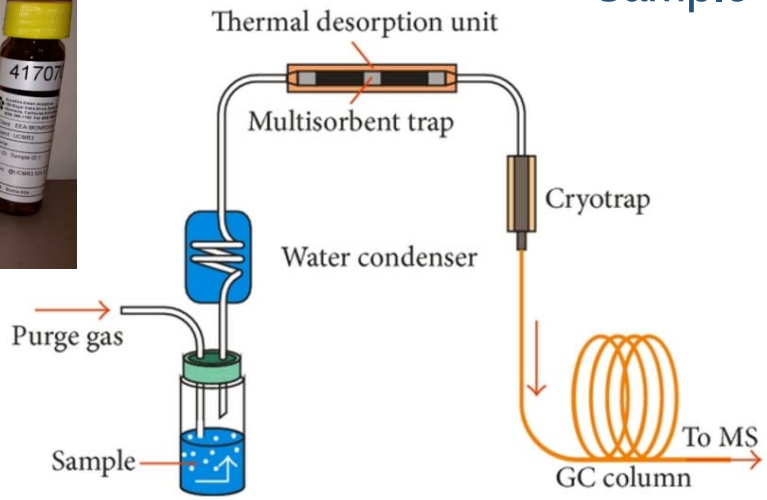
Collection & Analysis (EPA 524.2)

40 mls in Amber Glass – No Headspace

2-Stage Preservation (HCl + $C_6H_8O_6$) **

40 mls + He → Sorbent Trap

Sorbent Trap + He → GCMS Column



Challenges

Plastic, Rubber in collection mechanisms

Residual or Microbial Activity

Purge Water, Helium Gas, Sorbent Traps

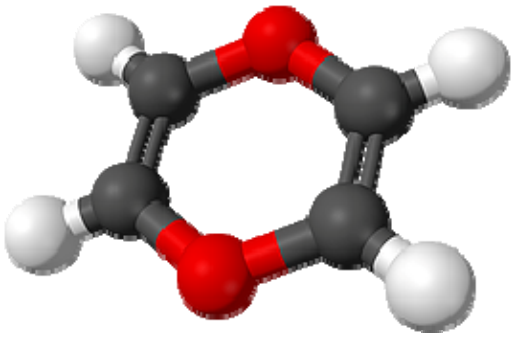
Air Contamination in Field or Lab

Sample Cross Contamination

QUALITY CHECKS

Lab Reagent Blank
MRL Check x 2
Lab Fortified Blank
Lab Control Sample
Continuing Calibration Std
Field Reagent Blank
Trip Blank

1,4-DIOXANE



A probable carcinogen (B2) by all routes of exposure

Highly soluble and mobile in groundwater

FOUND IN

Solvent Stabilizer for 1,1,1-TCA

Degreasing, Deicing, Wetting Agent

Cosmetics & Foods (Ethylene Oxide)

PET plastic by-product

Products with Suds - Sodium Laureth Sulfate

“Ubiquitous Chemical”

REGULATIONS

WHO = 50 ug/L

Risk Level = 0.35 ug/L

NL = 1 ug/L

UCMR3 = 0.07 ug/L

1,4-DIOXANE SAMPLING & ANALYSIS

Collection & Analysis (EPA 522)**

125 mls in Amber Glass

2-Stage Preservation ($NaHSO_3$ + Na_2SO_4)

100 mls → SPE + MeCl

2 mLs + IS → GCMS Column

Challenges

Plastic, Rubber in collection mechanisms

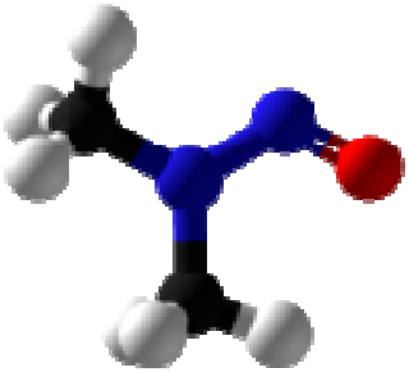
Residual or Microbial Activity

SPE Contamination

Air Contamination in Lab

Sample Cross Contamination

NITROSAMINES



A human carcinogen, Hepatoxin, Liver Fibrosis

Water soluble, mobile in soil

Does not readily biodegrade, absorb or volatize

FOUND IN

UDMH Rocket Fuel by-product

Smoked or Cured Foods, Meat, Beer

Ethanalomines by-product

Tobacco Smoke

DBP from Disinfected Wastewater

Anion Exchange Resins

REGULATIONS

WHO = 50 ug/L

PHG = 3 ug/L

NL = 10 ug/L

UCMR2 = 0.002 ug/L

NITROSAMINES SAMPLING & ANALYSIS

Collection & Analysis (EPA 521)

1 L in Amber Glass

Single Preservation ($Na_2S_2O_3$)

500 mls → SPE/Coconut Charcoal + MeCl

1 mL + IS → GCMS Column

Challenges

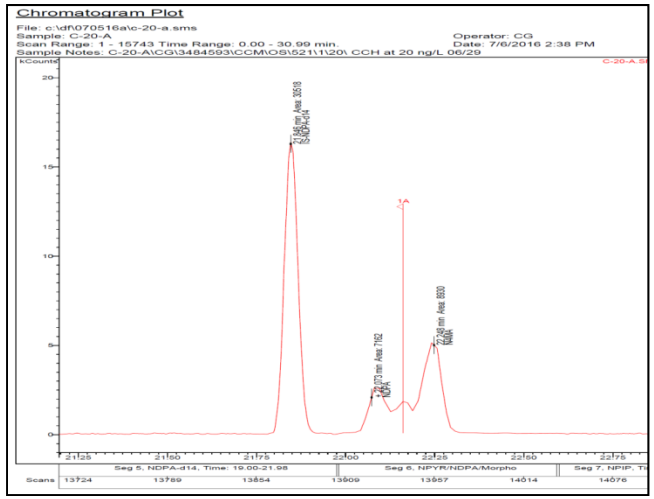
Plastic, Rubber in collection mechanisms

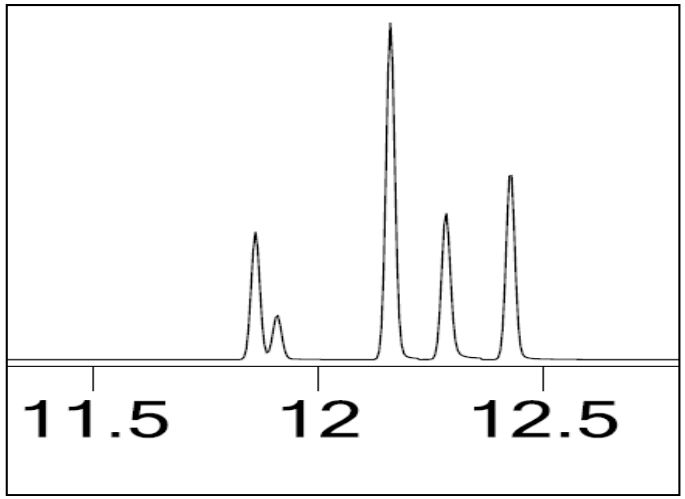
SPE Contamination

Sample Cross Contamination

PTFE from Autosampler vials

Reagent Water & DI System Components





TAKE HOME MESSAGE

1. Proper Field Sampling is essential and necessary in producing a representative sample
2. Good Laboratory Practice has a meaningful impact in manner your samples are handled
3. Quality Controls must be extensive and frequent
4. Test Methods are highly sensitive
5. Not all Results are the same

THANK YOU

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Speaker #6

Best way to Addressing Reoccurring Bacteria Problems in a Water Supply Well

Michael Bodart

General Pump Company

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GENERAL PUMP COMPANY

Best way to Addressing Reoccurring Bacteria Problems in a Water Supply Well 1

Seminar – June 28, 2018

Mike Bodart **12:45 pm**

GENERAL PUMP COMPANY

AWWA Standard

This document is an American Water Works Association (AWWA) standard. It is not a specification. AWWA standards describe minimum requirements and do not contain all of the engineering and administrative information normally contained in specifications. The AWWA standards usually contain options that must be evaluated by the user of the standard. Until each optional feature is specified by the user, the product or service is not fully defined. AWWA publication of a standard does not constitute endorsement of any product or product type, nor does AWWA test, certify, or approve any product. The use of AWWA standards is entirely voluntary. This standard does not supersede or take precedence over or displace any applicable law, regulation, or codes of any governmental authority. AWWA standards are intended to represent a consensus of the water supply industry that the product described will provide satisfactory service. When AWWA revises or withdraws this standard, an official notice of action will be placed on the first page of the Official Notice section of Journal - American Water Works Association. The action becomes effective on the first day of the month following the month of Journal - American Water Works Association publication of the official notice.

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Chlorination of Permanent Equipment and Material Used in Wells

All permanent equipment and material to be installed in the well shall be chlorinated just before installation. This shall be done by spraying exposed areas with a solution having a chlorine residual of not less than 200 mg/L.

Chlorination of Well After Permanent Equipment is Installed

After permanent equipment is installed, the well shall be chlorinated by (1) treating the water in the well casing to provide a chlorine residual of no less than 50 mg/L; (2) circulating the chlorinated water within the well casing and pump column; and (3) pumping the well to waste to remove chlorinated water.

Note: Circulation must be done with care, especially in older existing wells, as it may flush or loosen casings or screens.

4.5.1 Treating the water in the well casing. The water in the casing shall be treated with chlorine so that chlorine residual of no less than 50 mg/L is in the entire volume of water in the casing. This may be done by using granular calcium hypochlorite, calcium hypochlorite tablets, or sodium hypochlorite solution in the amounts shown in Table A.1.

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If calcium hypochlorite tablets are used, they shall be dribbled down the casing vent and at least 30 min shall pass to allow the tablets to fall through the water and dissolve. If sodium hypochlorite, or calcium hypochlorite dissolved on-site, is used, the solution must reach all parts of the well. To accomplish this, a tube shall be suspended through the well-casing vent, when possible, so that it reaches the bottom of the well. After it reaches the well bottom, it shall be withdrawn as the sodium hypochlorite solution is pumped through the tube. If not possible, the use of calcium hypochlorite tablets as described above may be appropriate. After the chlorine has been applied, the well shall be surged at least three times to improve the mixing and induce contact of the chlorinated water with the adjacent aquifer. The chlorine residual of this water shall be verified. The chlorinated water shall be allowed to rest in the casing for at least 12 hr. After the well has been chlorinated and allowed to rest for at least 12 hr, it shall be pumped to waste. The discharge water shall be tested periodically for chlorine residual. When no detectable chlorine residual is measured, the well shall continue to be pumped to waste for at least 15 min before proceeding with bacteriological sampling (Sec 5.1).

Circulating the chlorinated water: optional procedure. Following completion of the procedure described in Sec. 4.5.1, a pressure-tight connection shall be made at least 2 in. in diameter (but not larger than the discharge piping) from the pump discharge piping to the casing vent. The pump shall be operated against a throttled discharge valve to return a flow of several hundred gallons per minute down the well casing while the rest of the pumped water is discharged to waste. In low-producing wells, the rate of return need not exceed one-half the maximum rate of production of the well (see Figure A.2).

Caution: The discharge valve shall not be throttled to the extent that the pressure developed will damage equipment or pipe-restraining ties. This procedure will remove oil or other material that has accumulated on the water surface; care must be used to ensure that such material is recovered for proper waste disposal. The discharge water shall be tested periodically for chlorine residual. When no detectable chlorine residual is measured, the well shall continue to be pumped to waste for at least 15 min. The well shall then be sampled for bacteriological testing.

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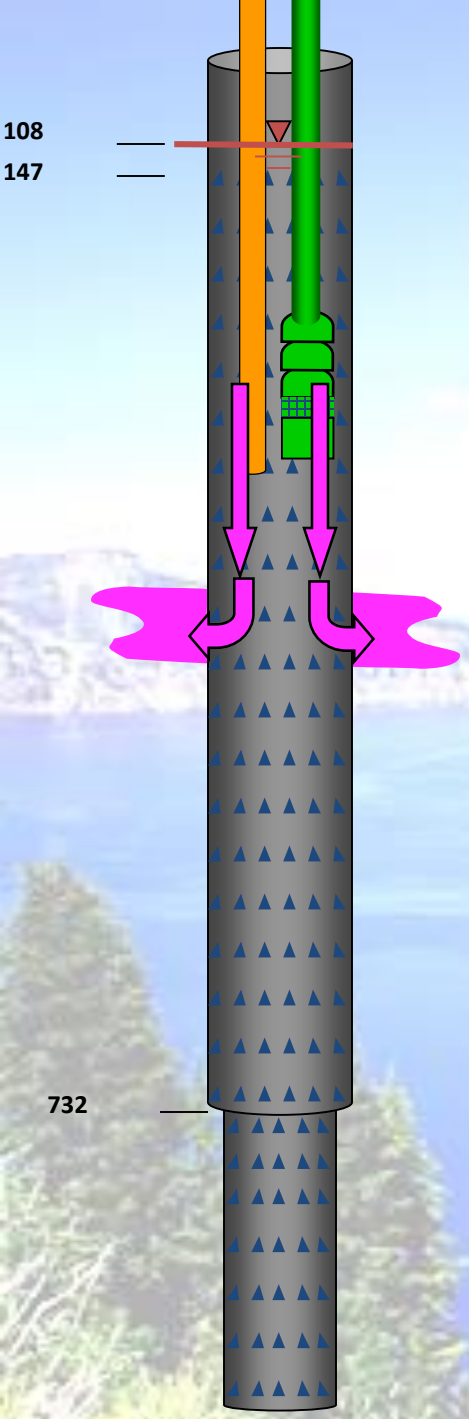

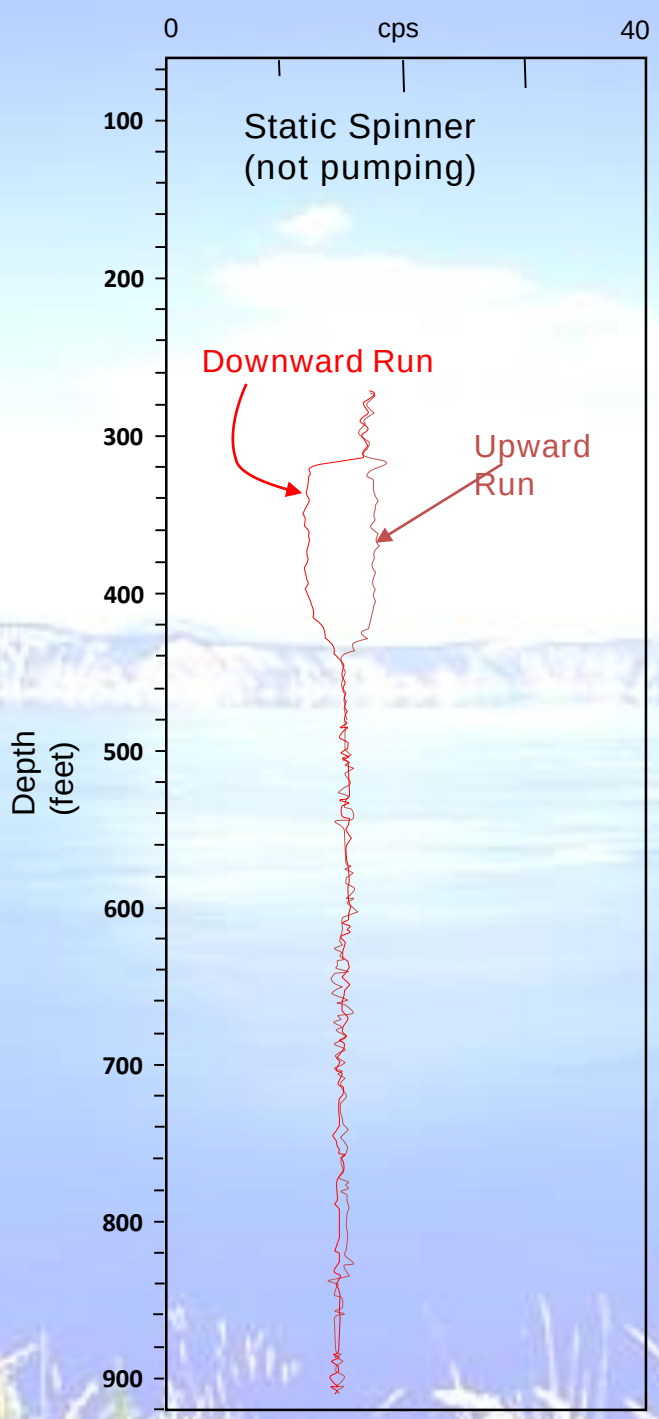

GENERAL
PUMP
COMPANY

1. Sandy material.

$K = 50$ ft/day

$dh/dl = 1$ ft/1000 ft

$n_e = 0.22$

$$v = \frac{K}{n_e} \times \frac{dh}{dl}$$

$$v = \frac{50 \text{ft}}{\text{day}} \times \frac{1}{0.22} \times \frac{1 \text{ ft}}{1000 \text{ ft}}$$

$v = 0.227$ ft/day

2. Clayey material.

$K = 0.00001$ ft/day

$dh/dl = 1$ ft/100 ft

$n_e = 0.02$

$$v = \frac{K}{n_e} \times \frac{dh}{dl}$$

$$v = \frac{0.00001 \text{ft}}{\text{day}} \times \frac{1}{0.02} \times \frac{1 \text{ ft}}{100 \text{ ft}}$$

$v = 0.000005$ ft/day

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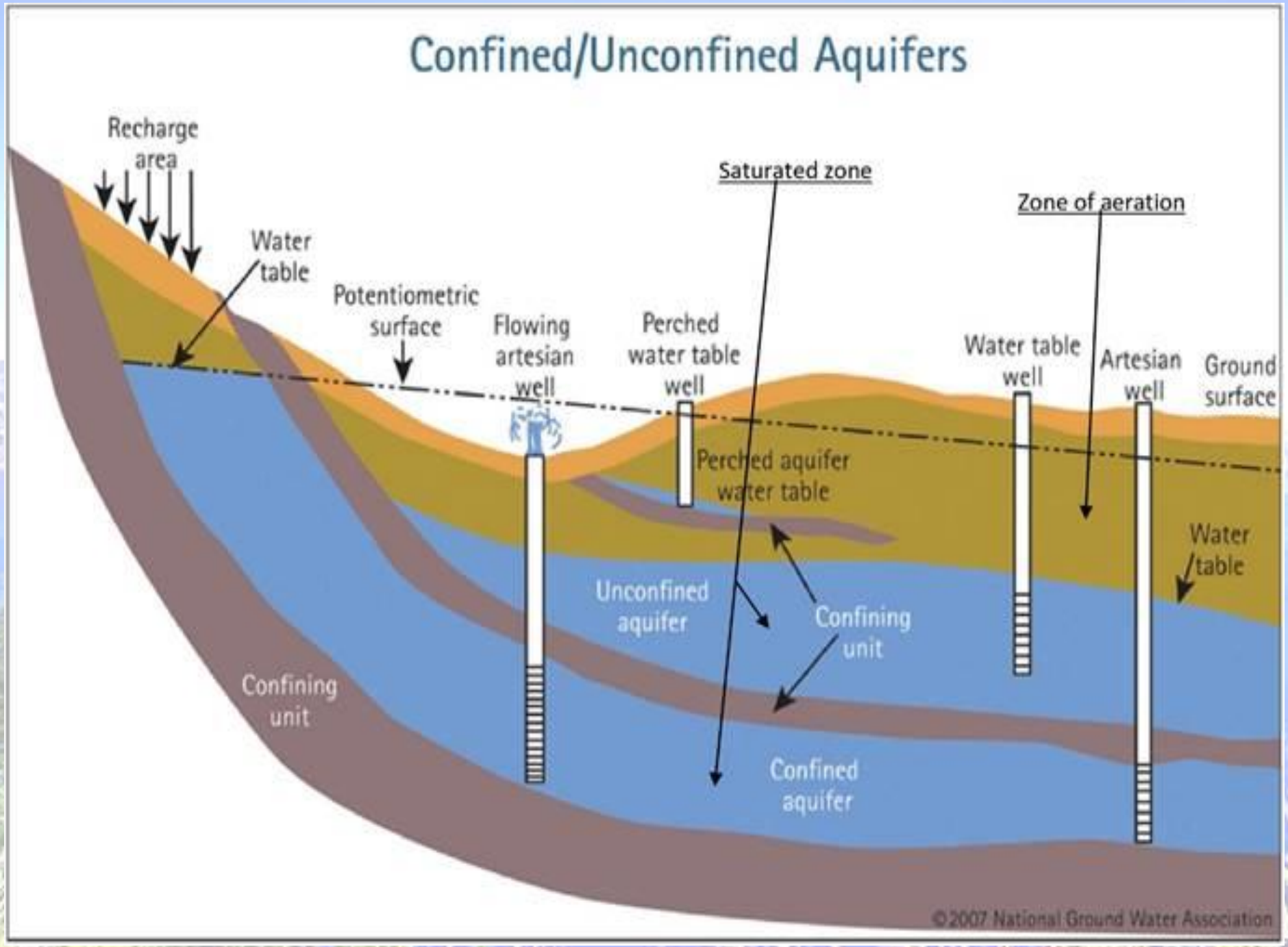
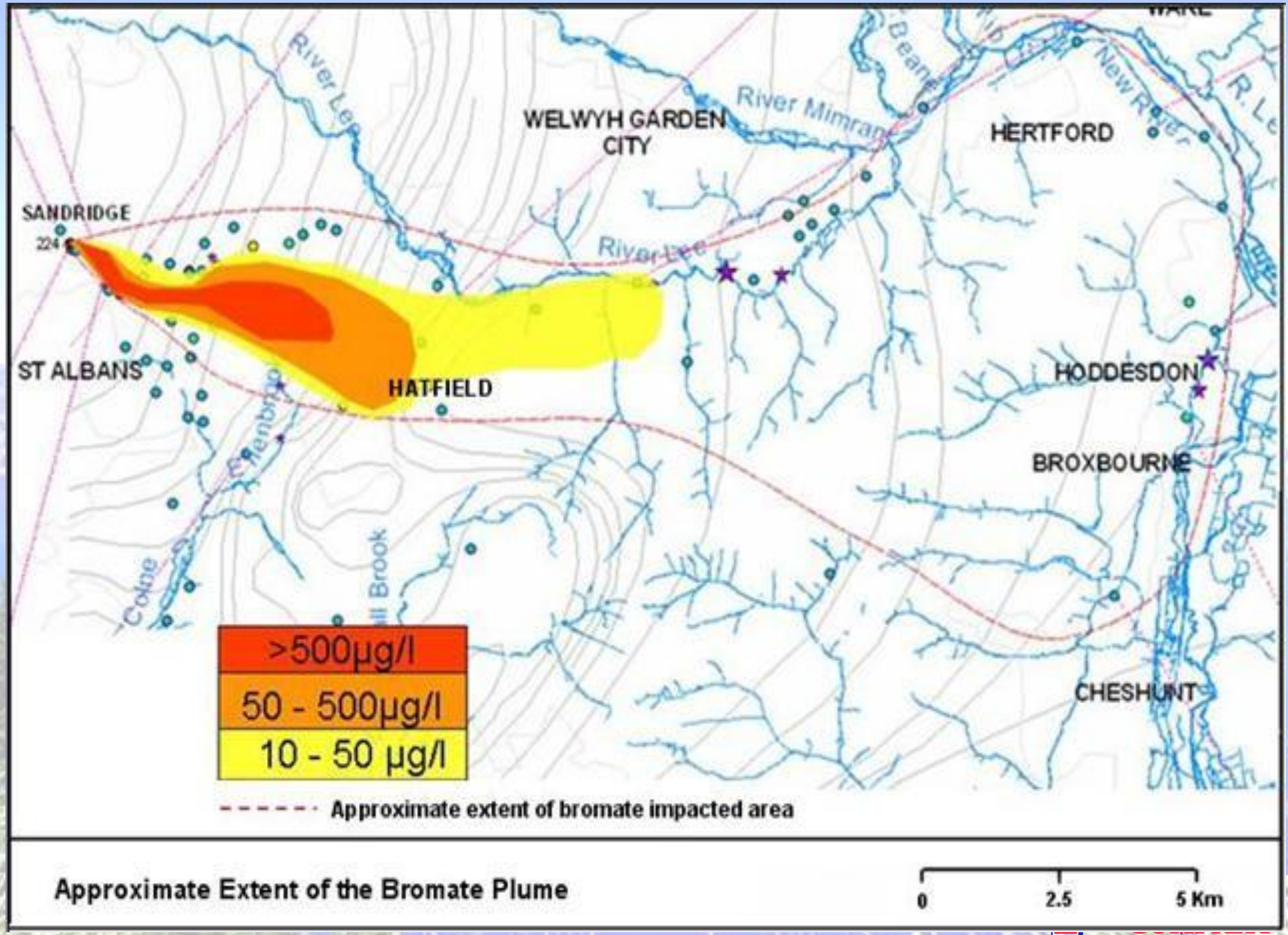
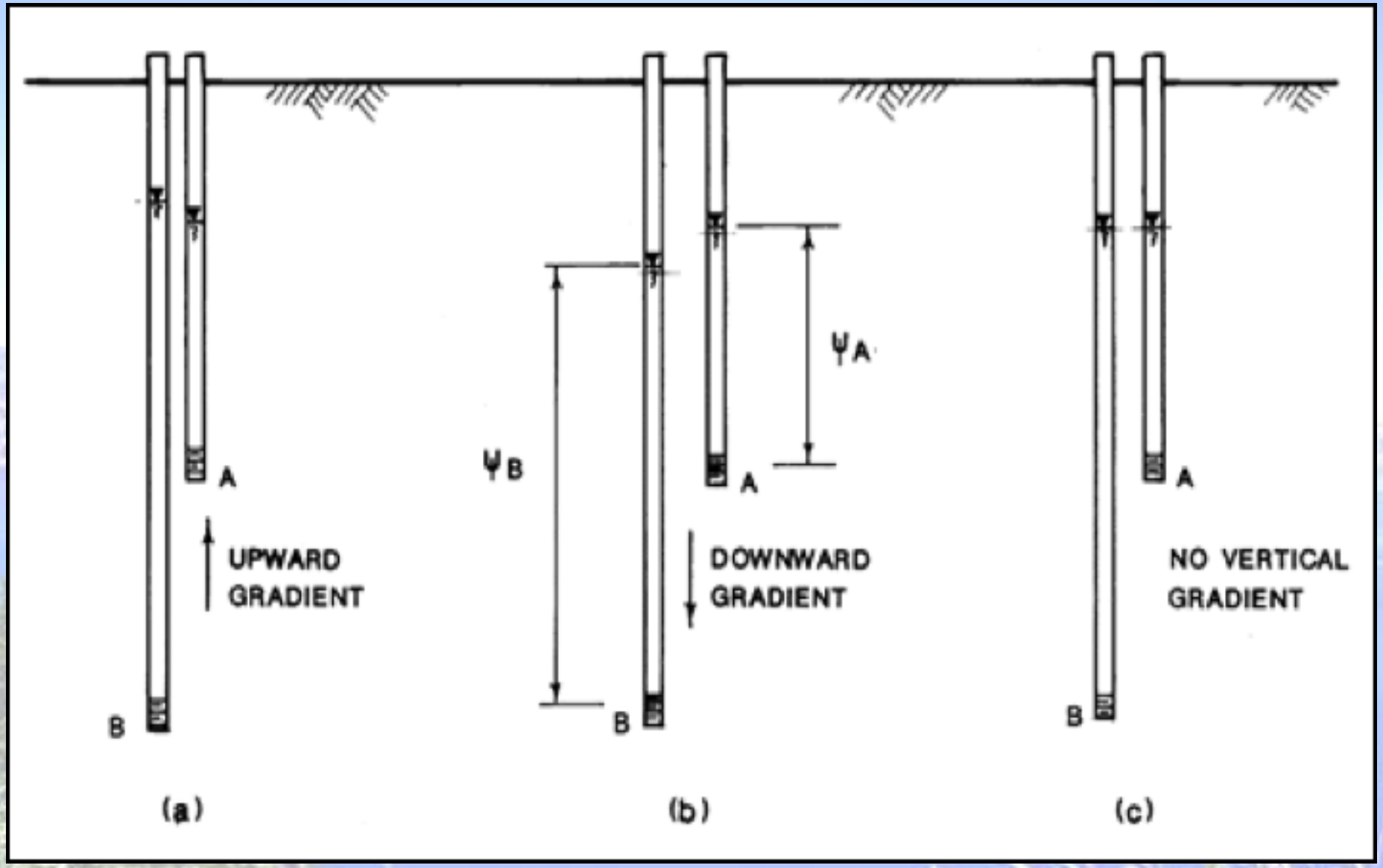
Confined/Unconfined Aquifers




WELWYH GARDEN CITY
HERTFORD
SANDRIDGE
ST ALBANS
HATFIELD
HODDESDON
BROXBOURNE
CHESHUNT
River Lee
River Mimram
New River
>500µg/l
50 - 500µg/l
10 - 50 µg/l
Approximate extent of bromate impacted area
Approximate Extent of the Bromate Plume
0
2.5
5 Km



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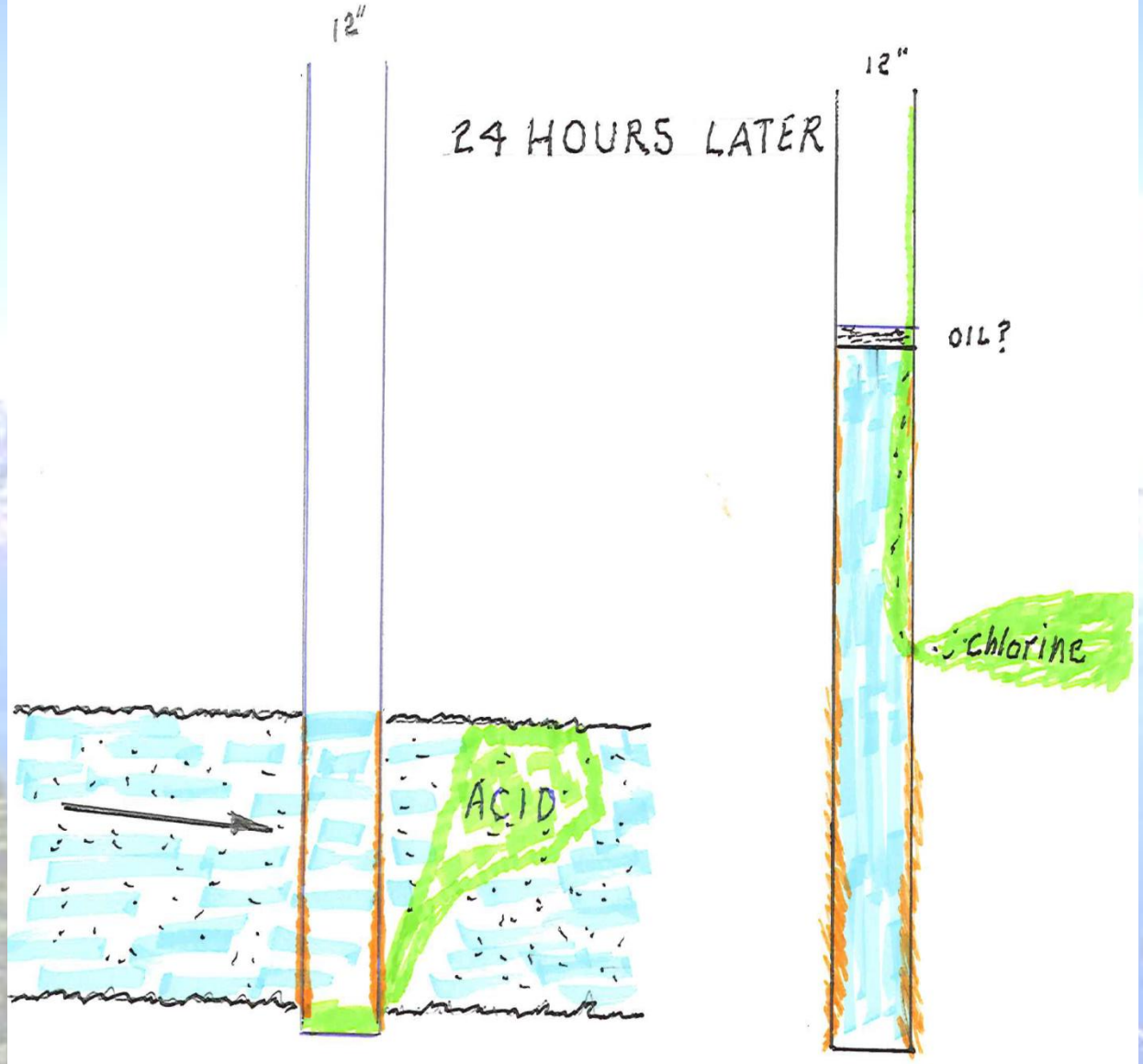
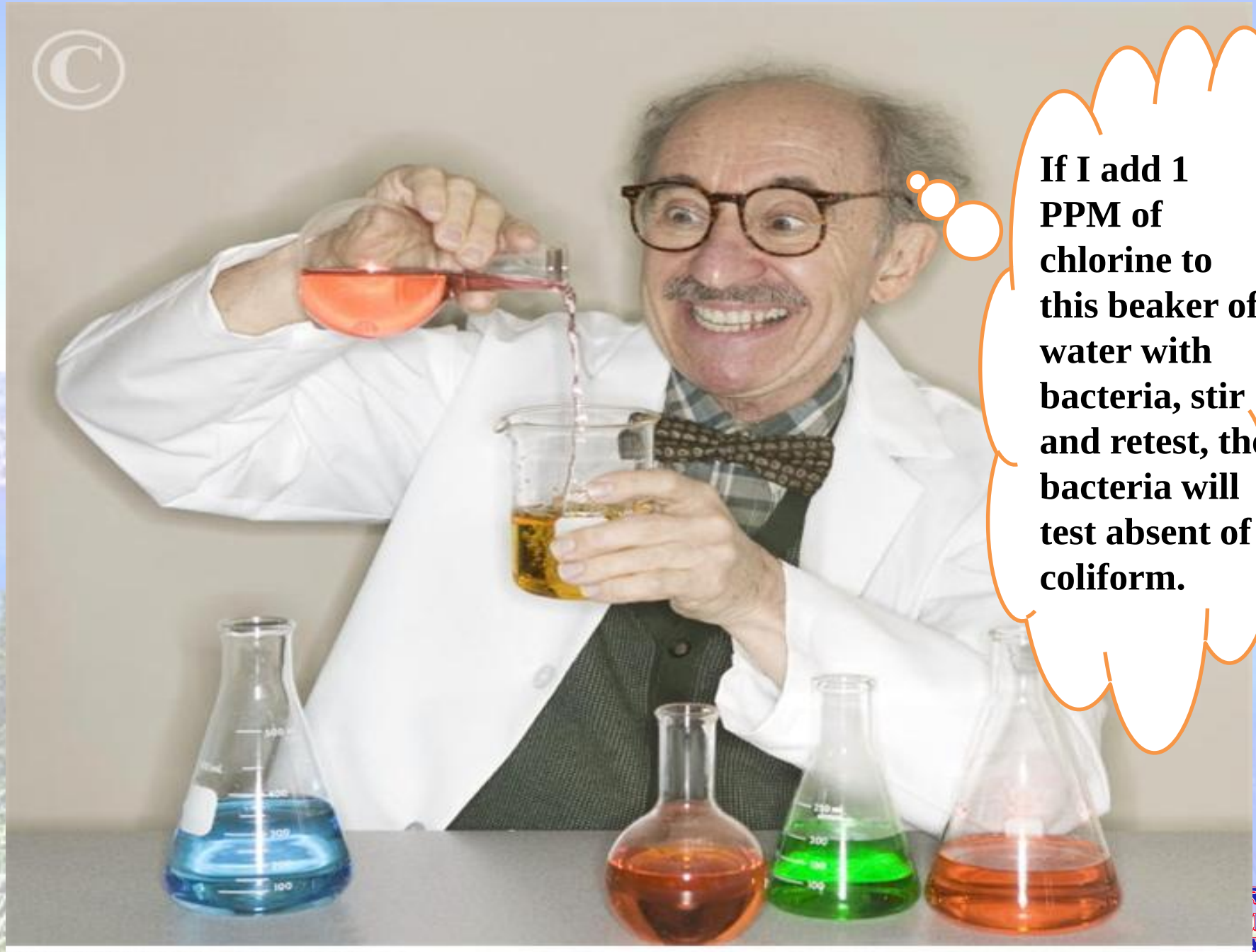
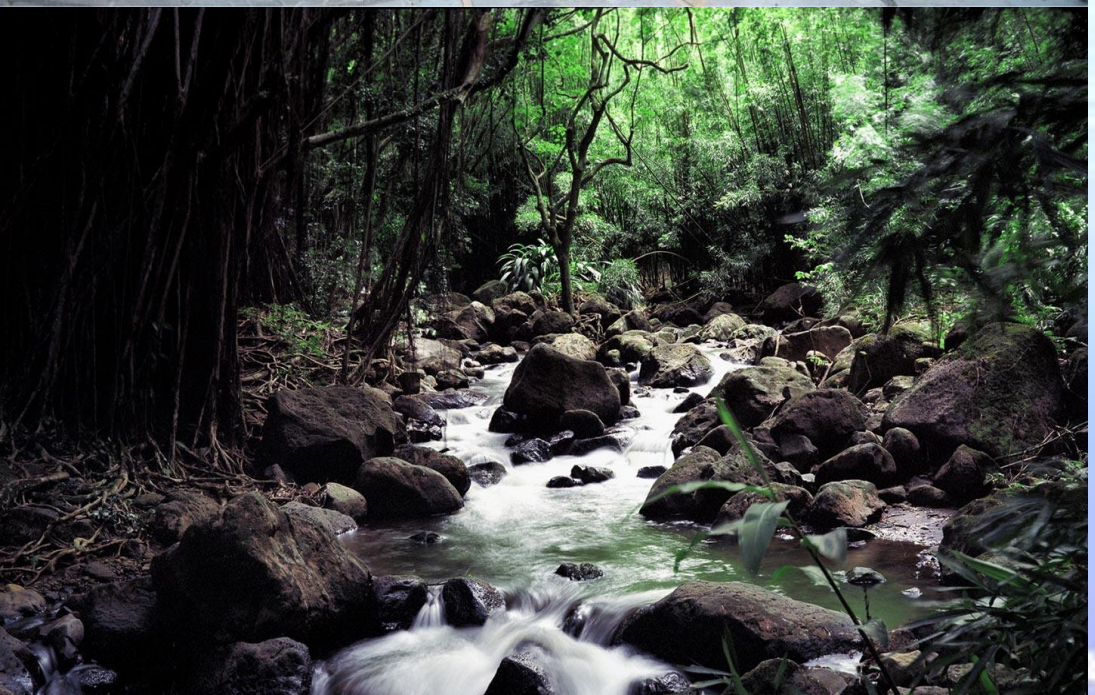


GENERAL PUMP COMPANY


If I add 1 PPM of chlorine to this beaker of water with bacteria, stir and retest, the bacteria will test absent of coliform.
CBR003298 [RF] © www.visualphotos.com



Rate of Reaction is critical

Many treatments assume you have stagnant water similar to a swimming pool, but in reality water is moving underground like a slow moving stream (measured as feet per day)

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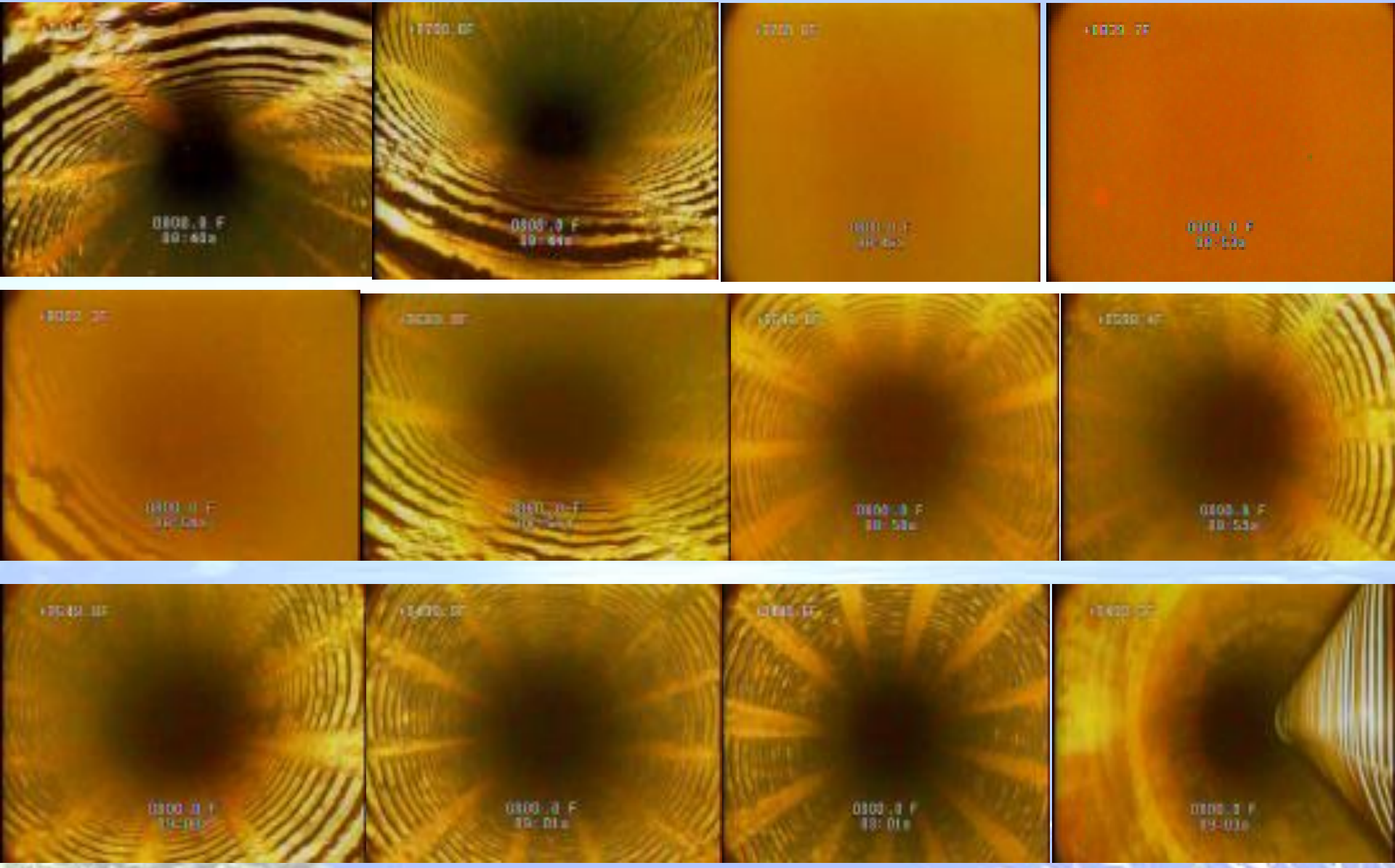

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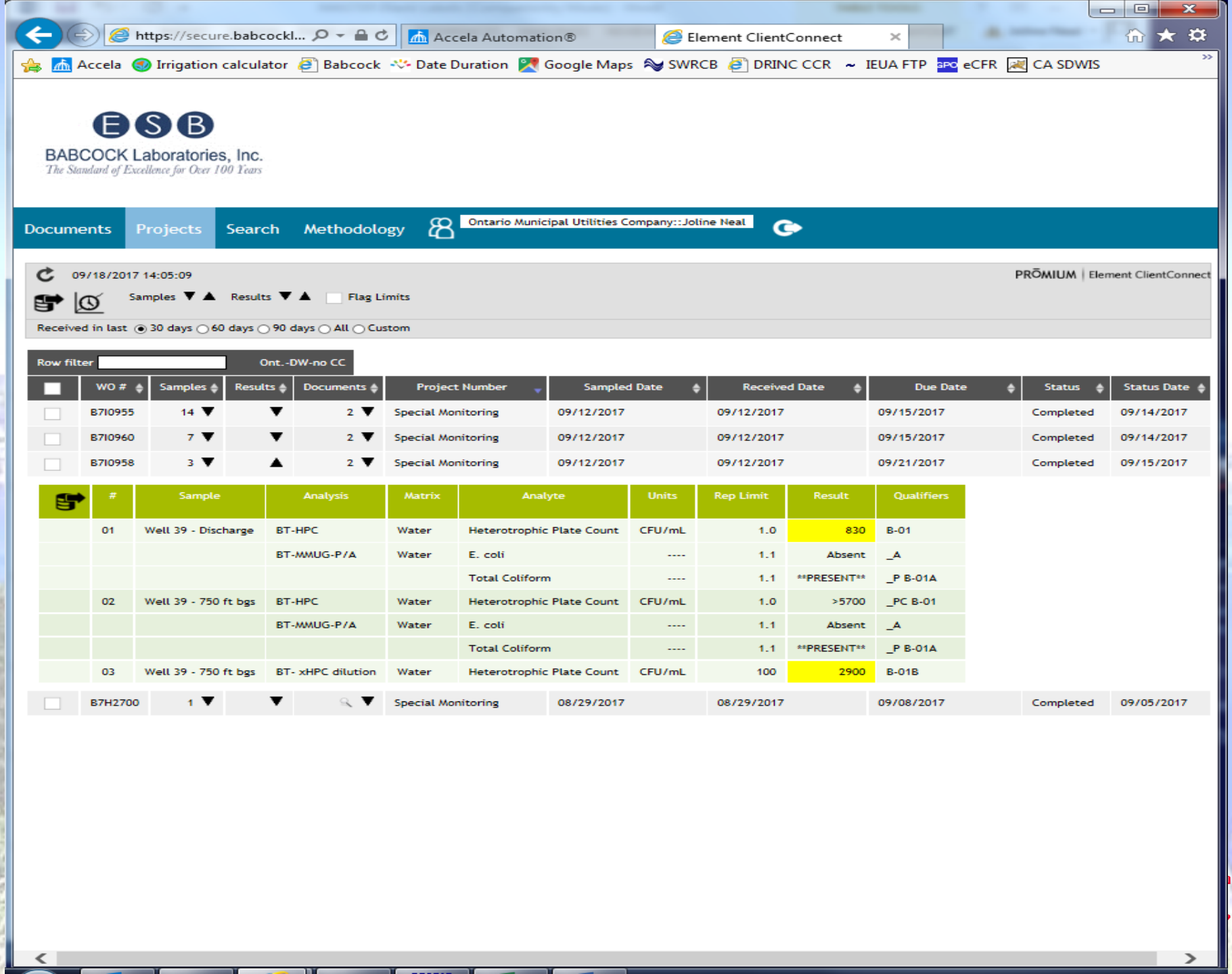

	WO #	Samples	Results	Documents	Project Number	Sampled Date	Received Date	Due Date	Status	Status Date
	B7I0955	14		2	Special Monitoring	09/12/2017	09/12/2017	09/15/2017	Completed	09/14/2017
	B7I0960	7		2	Special Monitoring	09/12/2017	09/12/2017	09/15/2017	Completed	09/14/2017
	B7I0958	3		2	Special Monitoring	09/12/2017	09/12/2017	09/21/2017	Completed	09/15/2017

#	Sample	Analysis	Matrix	Analyte	Units	Rep Limit	Result	Qualifiers
01	Well 39 - Discharge	BT-HPC	Water	Heterotrophic Plate Count	CFU/mL	1.0	830	B-01
		BT-MMUG-P/A	Water	E. coli	----	1.1	Absent	_A
				Total Coliform	----	1.1	**PRESENT**	_P B-01A
02	Well 39 - 750 ft bgs	BT-HPC	Water	Heterotrophic Plate Count	CFU/mL	1.0	>5700	_PC B-01
		BT-MMUG-P/A	Water	E. coli	----	1.1	Absent	_A
				Total Coliform	----	1.1	**PRESENT**	_P B-01A
03	Well 39 - 750 ft bgs	BT- xHPC dilution	Water	Heterotrophic Plate Count	CFU/mL	100	2900	B-01B

	B7H2700	1			Special Monitoring	08/29/2017	08/29/2017	09/08/2017	Completed	09/05/2017

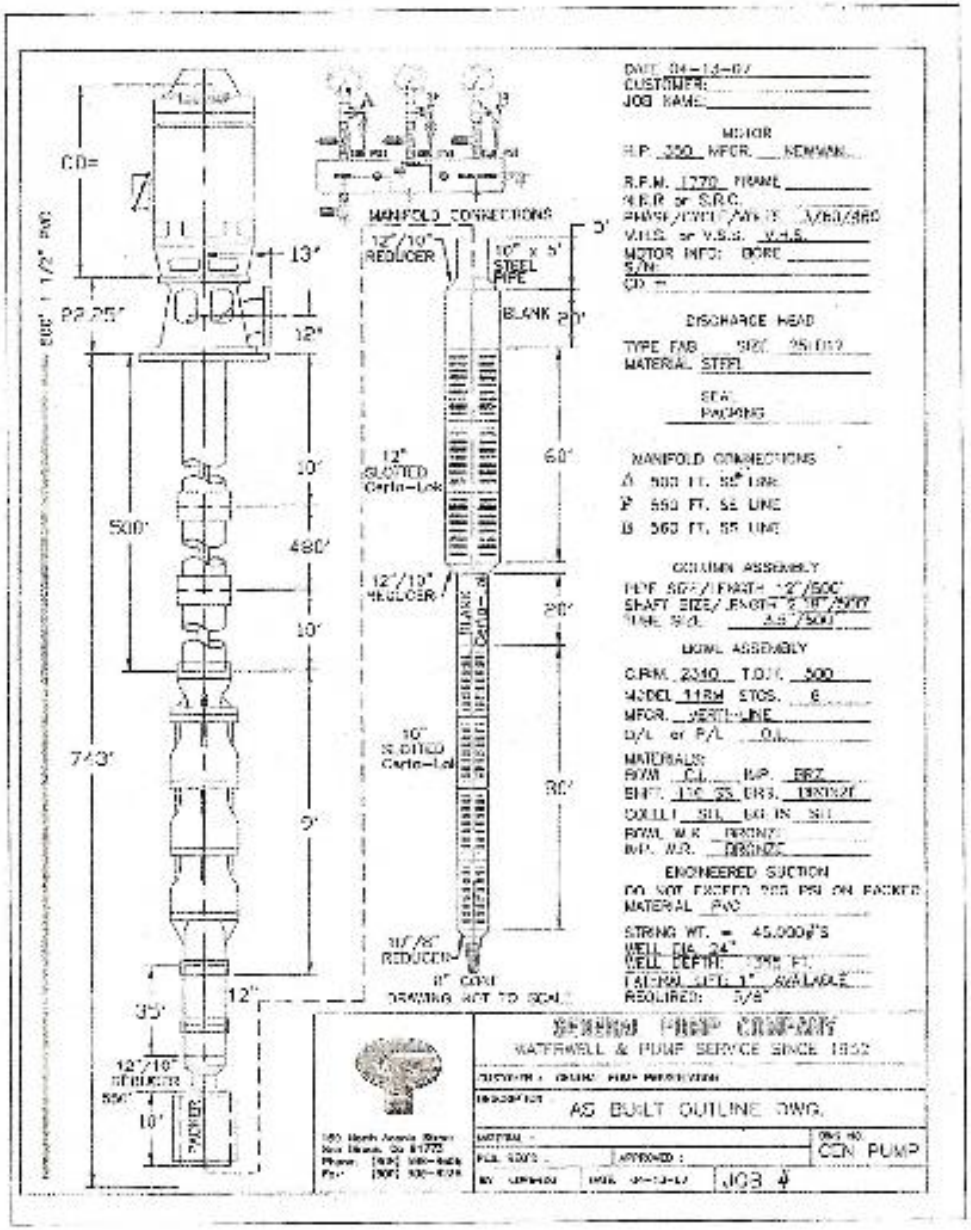

Figure 12.19. Engineered suction and pressurized packer assembly (General Pump Company of Los Angeles).

Startup & Testing

Startup of a pump with an inflatable packer requires a very strategic approach in order to avoid a catastrophic failure.

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Sorry, no Magic Pill !!

Questions?

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Speaker #7

How to Write the Perfect Well Redevelopment Specification

Michael Bodart

General Pump Company

mbodart@genpump.com

GENERAL PUMP COMPANY

How to Write the Perfect Well Redevelopment Specification

Seminar – June 28, 2018

Mike Bodart **1:15 p.m.**

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Learn How to Write the Perfect Water Well Redevelopment Specification that Can Be Used on All Wells.

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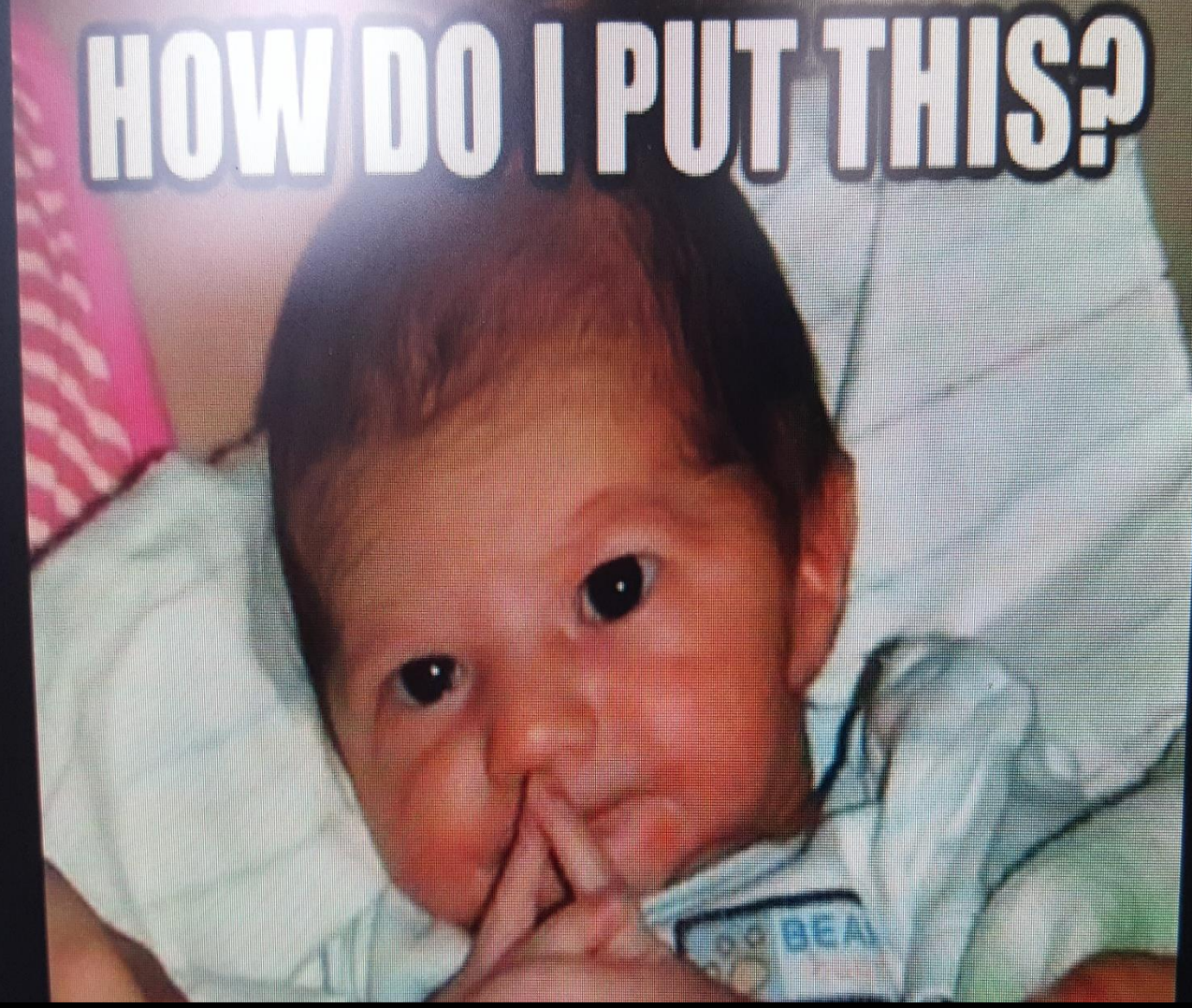

YOU THOUGHT YOU WOULD SAVE MONEY, BUT IN REALITY YOU SPENT WAY TOO MUCH, AND SCREWED UP YOUR MOST VALUABLE ASSET.

“All Redevelopment Tools and Processes” are a waste of Public Funds and are extremely dangerous to your most valued assets.

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Unless ……..

You follow the Step-By-Step Process.

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Bid **– Wire Brush, AirBurst®, Inject Biocide, Inject Acid, Dual Air Swab, Develop Pump, Test Pump 24-Hour Test, Chlorination.**

- **$200,000 Spent.**
- **Three (3) Months Down Time.**
- **Sanding Issues.**
- **Failed Coliform Test.**
- **Lost Well Efficiency.**

Evaluation shows that the well only needed to be brushed with a biocide for $10,000. Instead you spend another $200,000 trying to get back what you had!!!.

Good Luck

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Step I

- **Build your team of experts!**
- **Determine the issues that exist.**

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Build Your Team of Experts

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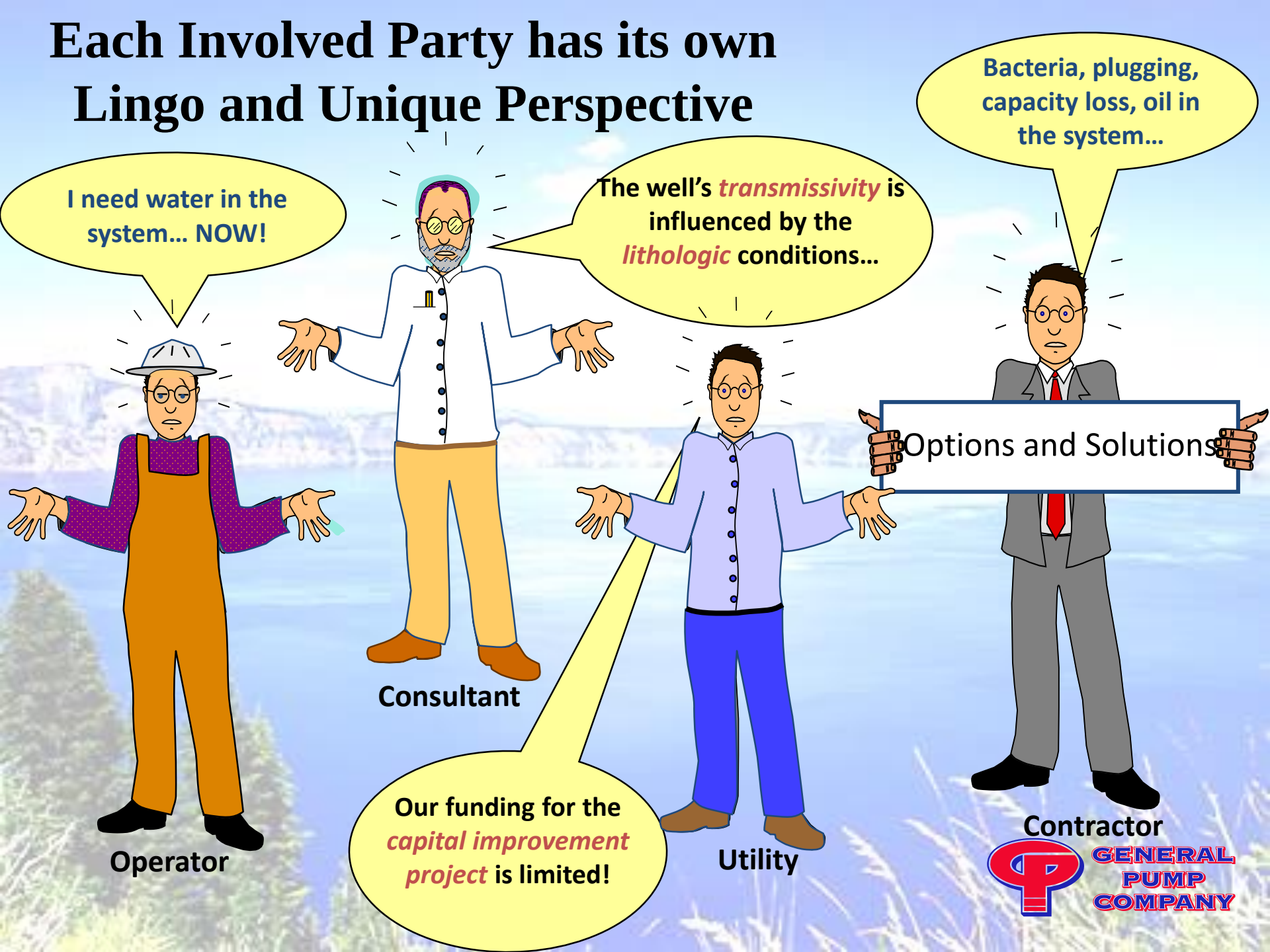
Each Involved Party has its own Lingo and Unique Perspective



What issues do you have?

Nitrates? TCE? Arsenic? Colored Water?
Sanding? Air? Perchlorates? Iron? Manganese?
Bacteria? Low Specific Capacity? Loss Capacity?
Gravel Pumping? Oil in Water?

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If you're not careful, you will hire the "Step Brothers" to work on your $2,000,000 water well.

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Interview / Visit / Question

- Interview P.M., Production, Application Engineer, Foreman
- Knowledge – Local & Specific to Current and Future Projects
- Visit Shop, Capabilities, Experience
- Review Equipment / Capabilities
- Review Rehabilitation Processes
- Safety, Practices and Procedures

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Your Consultant and Contractor Should Not Compete

Everyone Loses!

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Example: **Customer has lost capacity in their well and they <u>think</u> it is due to well plugging.**

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Step II

- **Review all of the historical records.**

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Deteriorating Well Performance

Well performance deteriorates through a combination of factors

Mineral Encrustation

- Iron, manganese and calcium
- pH > 7.5
- Physical plugging
- Silts, clay and fine sands (velocity)

Biological Fouling

- Iron related bacteria (IRB)*
- Sulfate reducing bacteria (SRB)
- Slime forming bacteria

Corrosion

- pH < 7.5, DO > 2 ppm
- H_2S >1 ppm, TDS > 1000 ppm
- CO2 > 50 ppm , Chloride > 300 ppm

Structural Change

- Weak or failed casing
- Age of structure
- Aggressive or encrusting waters
- Sand production
- Change in operation, over pumping
- Well liner – wrong design for application

Maintenance

- Years between redevelopment
- Aggressive mechanical and/or chemical
- Coliform bacterial – excessive chlorine
- Run to fail

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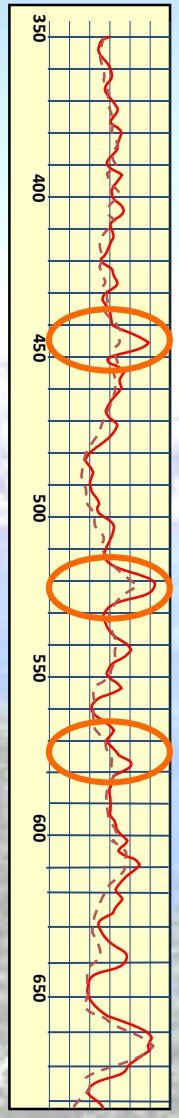
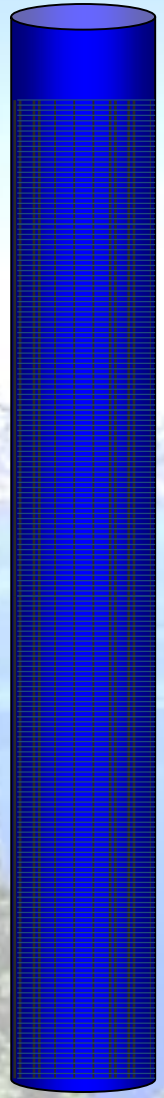
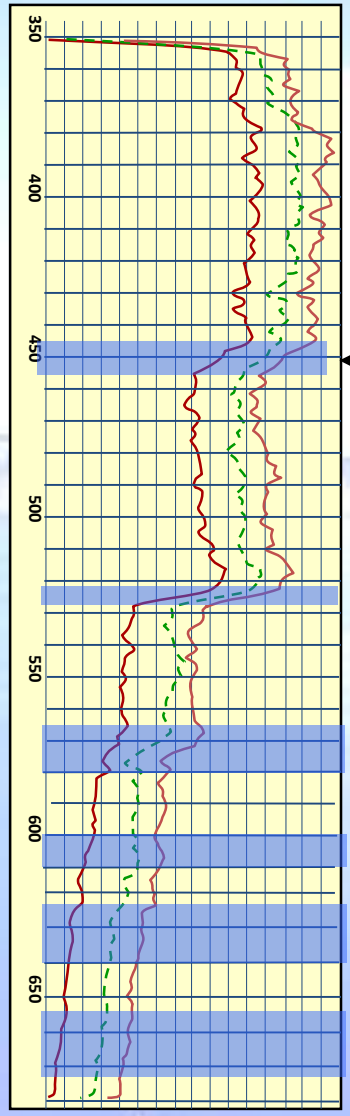
Geophysical Logs and Spinner Logs Provide Different Information







Well pumped at 1,700 gpm during spinner logging of a 300-foot screen interval

26% of flow from a 10-foot sand

35% of flow from a 5-foot sand

19% of flow from a 15-foot sand

7% of flow from a 10-foot sand

6% of flow from a 20-foot sand

7% of flow from a 20-foot sand

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80% of the water production is from only 30 feet (10%) of the screen

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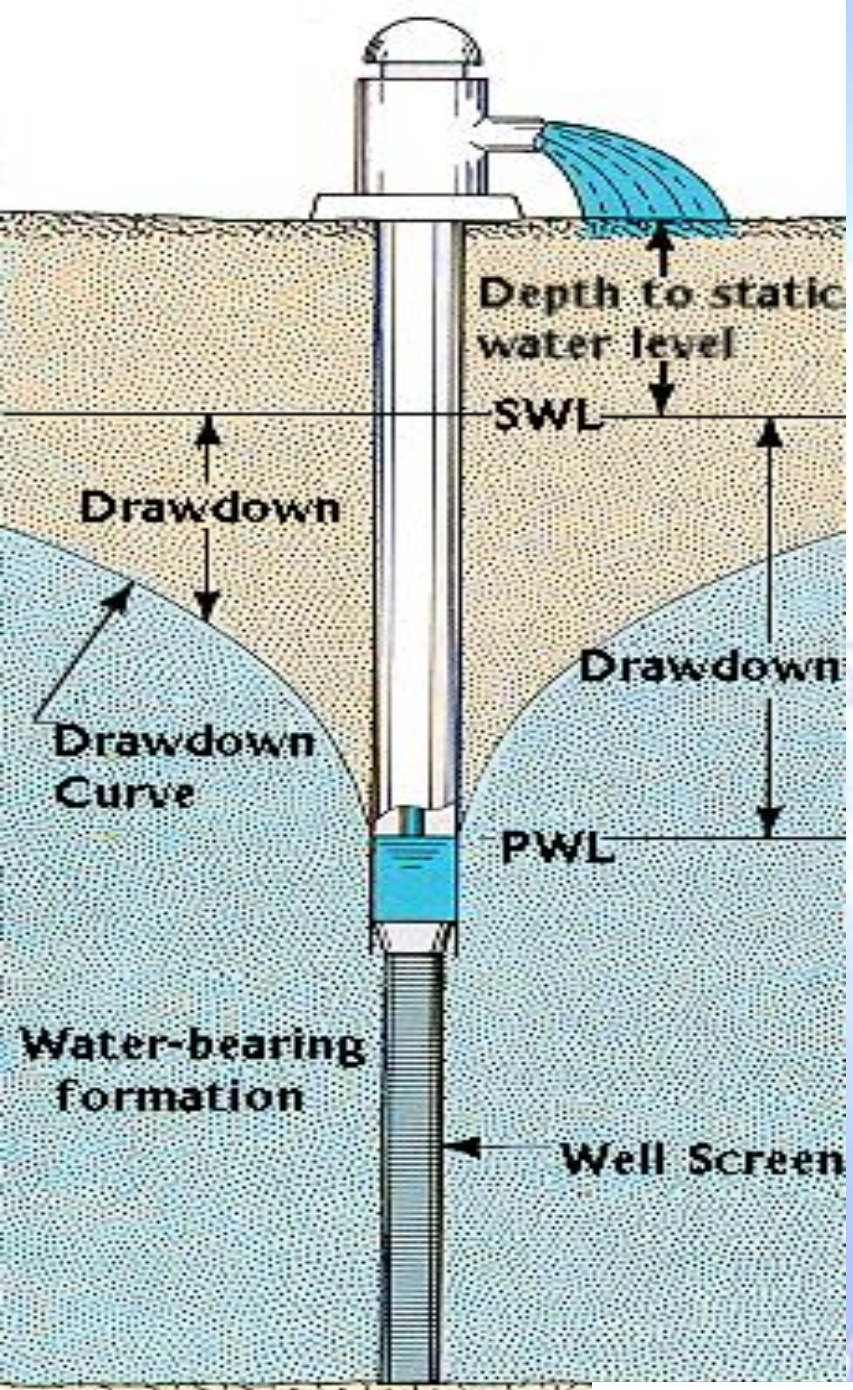

Modified from Driscoll, 1986

Definition of Terms

Static Water Level (feet bgs)

Pumping Water level (feet bgs)

Drawdown (feet)

Well Yield (Production – gpm)

Specific Capacity (gpm/foot of Drawdown)

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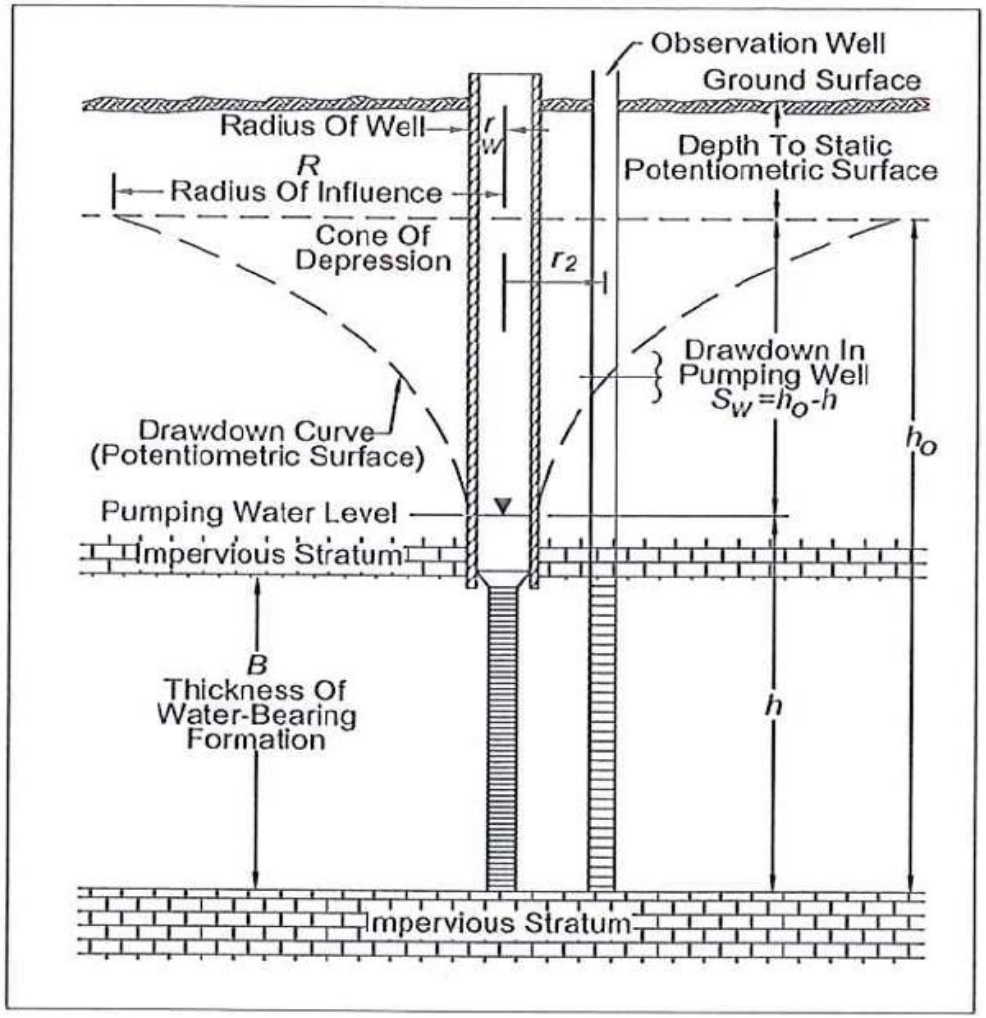

Figure 6.10. Diagram showing parameters for the Thiem equation.

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The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

Owner

Well Completion Report

State of California

Refer to Instructions Completed

No. e063967

Page 1 of 2

Owner's Well Number 43

Date Work Began 06/01/2007 Date Work Ended 10/24/2007

Local Permit Agency Co. of San Be/Dendino Dept. of Public Health

Permit Number 20070070649 Permit Date 7/17/07

DWR Use Only – Do Not Fill In

State Well Number/Site Number

Latitude N Longitude W

APN/TRS/Other

Geologic Log

Orientation ◉ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Forward Rotary Drilling Fluid Polymer

Depth from Surface Feet	to Feet	Description (Describe material, grain size, color, etc.)
0	20	Sand , Gravel
20	30	Sand
30	40	Clayey Sand
40	60	Sand
60	100	Sand with Silt
100	120	Sand
120	130	Sand with Silt
130	160	Sand
160	190	Sand with Silt
190	200	Sand with Silt
200	210	Silty Sand
210	220	Sand with Silt
220	270	Sand
270	280	Sand with Silt
280	290	Sand
290	310	Sand with Silt
310	350	Sand
350	380	Sand with Silt
380	410	Sand
410	420	Sand with Silt
420	450	Sand
450	460	Sand with Silt
460	630	Sand
630	640	Sand with Clay
640	720	Sand with Silt
720	730	Silty Sand
730	770	Sand
770	780	Sand with Clay
780	880	Sand
880	906	Silty Sand

Total Depth of Boring 906 Feet

Total Depth of Completed Well 886 Feet

Well Owner

Name City of Ontario

Mailing Address 1425 S. Bon View Ave.

City Ontario State Ca Zip 91761

Well Location

Address S.W. Co. of Airport Dr & Carnegie Ave.

City Ontario County San Bernardino

Latitude 34 Deg 3 Min 40 Sec N or Longitude 117 Deg 34 Min 13 Sec W

Datum Decimal Lat Decimal Long

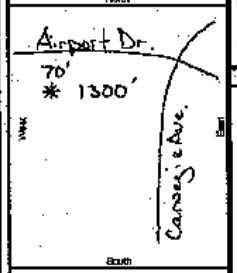
APN Book 0211 Page 222 Parcel 55

Township 1S Range 7W Section 25

Location Sketch

(Sketch must be drawn by hand after form is printed.)

North



Activity

◉ New Well
○ Modification/Repair
○ Deepen
○ Other
○ Destroy

Planned Uses

◉ Water Supply
☐ Domestic ☑ Public
☐ Irrigation ☐ Industrial
○ Cathodic Protection
○ Dewatering
○ Heat Exchange
○ Injection
○ Monitoring
○ Remediation
○ Sparging
○ Test Well
○ Vapor Extraction
○ Other

Water Level and Yield of Completed Well

Depth to first water 318 (Feet below surface)

Depth to Static

Water Level 318 (Feet) Date Measured 10/18/2007

Estimated Yield * 3,300 (GPM) Test Type Constant Rate

Test Length 24.0 (Hours) Total Drawdown 72 (Feet)

*May not be representative of a well's long term yield.

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (inches)	Type	Material	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size If Any (inches)
0	50	48	Conductor	ASTM A139 Grd. B	3/8	36		
0	360	34	Blank	304 Stainless Steel	3/8	20 3/4		
360	430	30	Blank	304 Stainless Steel	3/8	20 5/8		
430	490	30	Screen	304 Stainless Steel	5/16	20 5/8	Louver	0.094
490	510	30	Blank	304 Stainless Steel	5/16	20 5/8		
510	886	30	Screen	304 Stainless Steel	5/16	20 5/8	Louver	0.094

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	340	Cement	10.3 Sack Slurry
340	343	Fill	Fine Sand
343	906	Filter Pack	1/4 X 16 Custom

Attachments

☐ Geologic Log
☐ Well Construction Diagram
☐ Geophysical Log(s)
☐ Soil/Water Chemical Analyses
☐ Other

Attach additional information, if exists.

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name Bakersfield Well & Pump Co.

Person, Firm or Organization

7212 Enos Lane Bakersfield CA 93308

Address City State Zip

Signed C-57 Licensed Water Well Contractor 11-2-2007 Date Signed 440537 C-57 License Number

OWR 188 REV 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

PACIFIC SURVEYS

Job No. 10511

Location:

Sec. 1335 HOLT AVE.

Permanent Datum

Log Measured Fro

Drilling Measured F

Date

Run Number

Depth Driller

Depth Logger

Bottom Logged Int

Top Log Interval

Casing Driller

Casing Logger

Bit Size

Type Fluid in Hole

Density / Viscosity

pH / Fluid Loss

Source of Sample

Rm @ Meas. Tem

Rmf @ Meas. Tem

Rmc @ Meas. Tem

Source of Rmf / R

Rm @ BHT

Time Circulation St

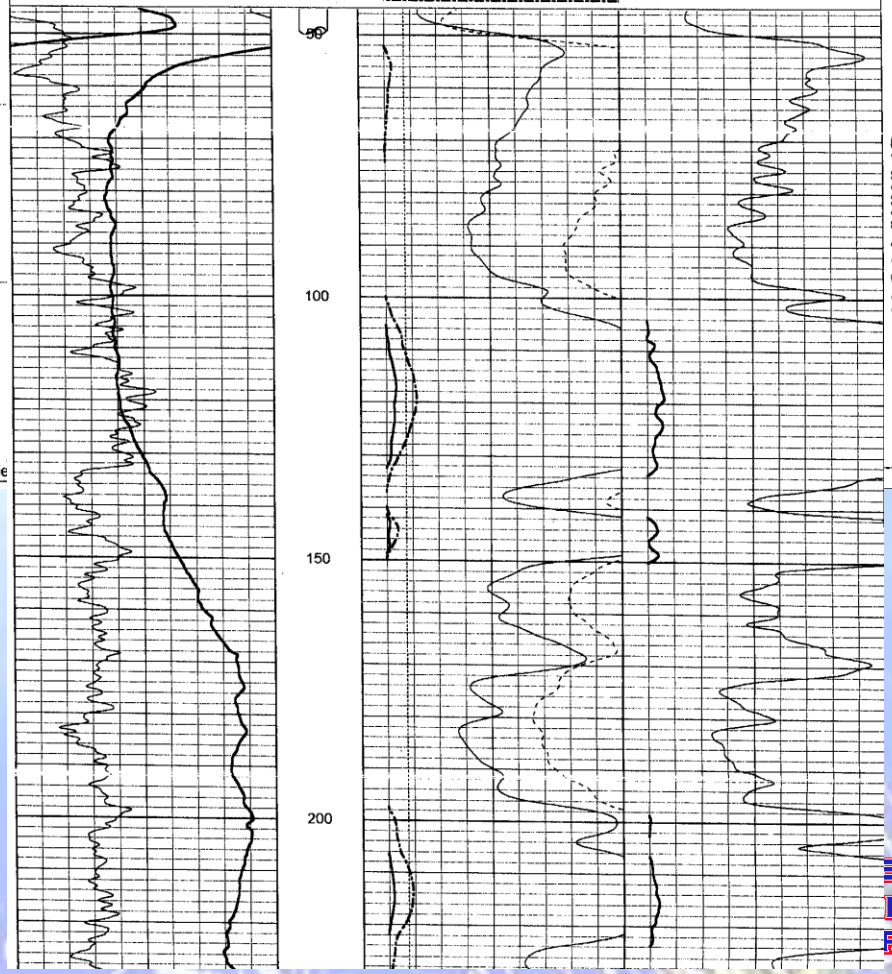
Time Logger on Bc

Max. Recorded Temperature

Database File: 10511.db
Dataset Pathname: Beylik/ont40/run1/Elog.1
Presentation Format: elog
Dataset Creation: Tue Nov 12 11:02:32 2002 by Calc 6.2_B4
Charted by: Depth in Feet scaled 1:240

-100	SP (mV)	-30	0	RSN (Ohm-m)	150
20	GR (GAPI)	80	0	RLN (Ohm-m)	150
			0	RMF (Ohm-m)	150
			150	RSNx10 (Ohm-m)	1500
			150	RLNx10 (Ohm-m)	1500

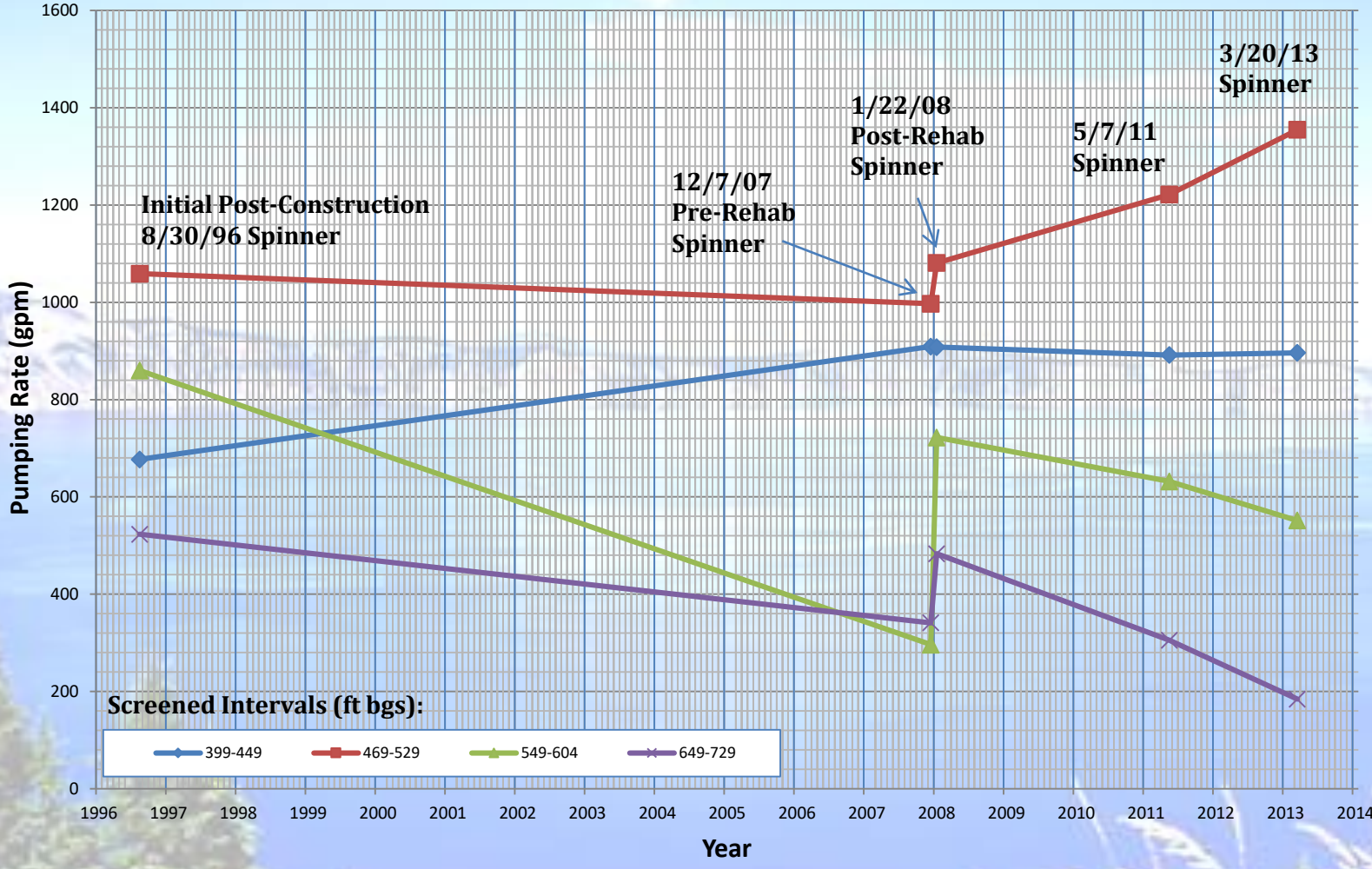
0	RLL3 (Ohm-m)	150
150	RLL3 back-up (Ohm-m)	1500



ELECTRIC LOG
LATEROLOG 3
GAMMA-RAY

ERAL
MP
PANY

Graph of Results (GPM)



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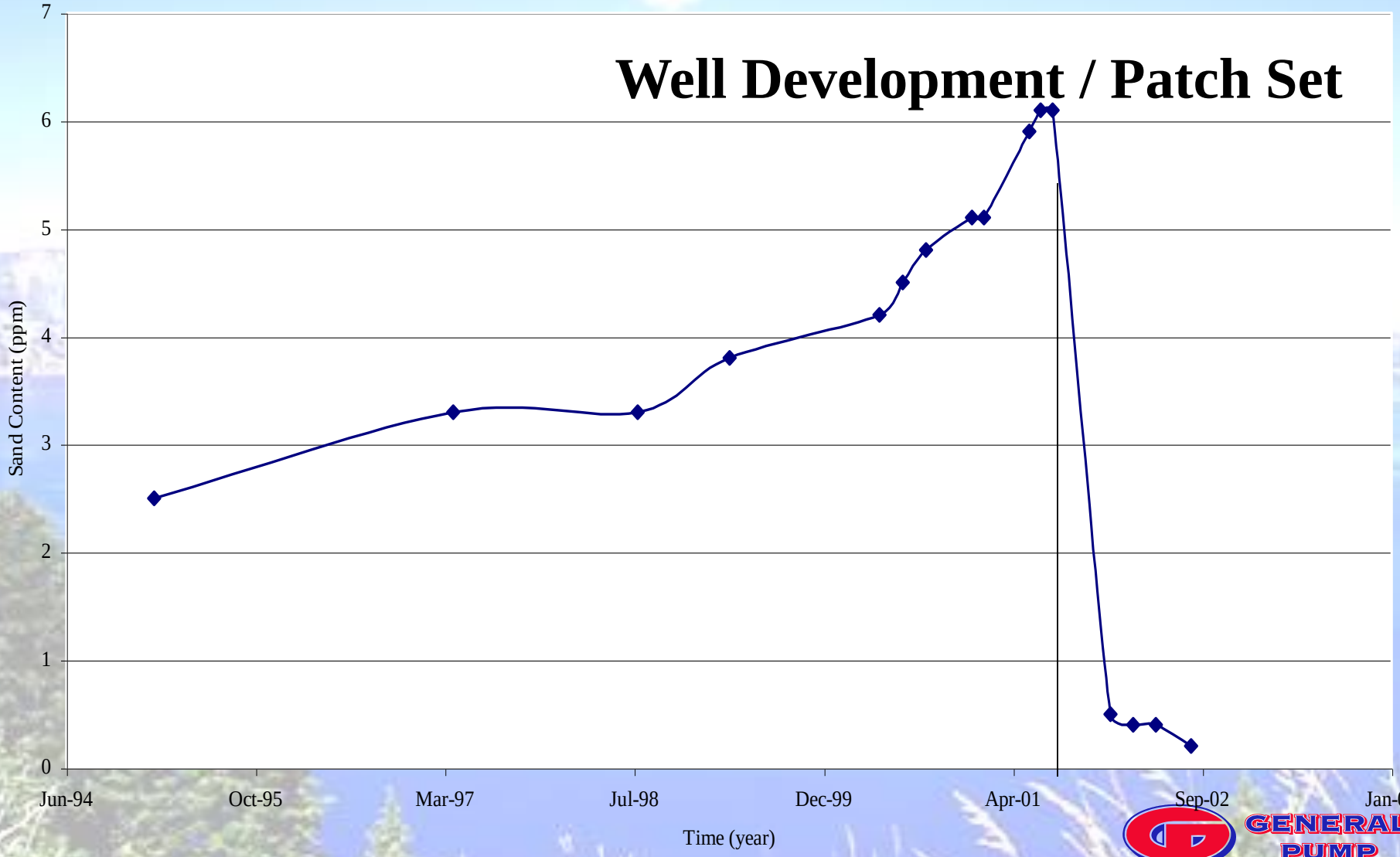
Sand Test Over Time



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Step III

- **Perform additional testing before you pull the pump.**
- **Change flow and/or conditions and monitor changes.**
- **Dynamic video logging**
- **Dynamic spinner logging**
- **Dye testing “Besst”**
- **Dynamic zone sampling.**

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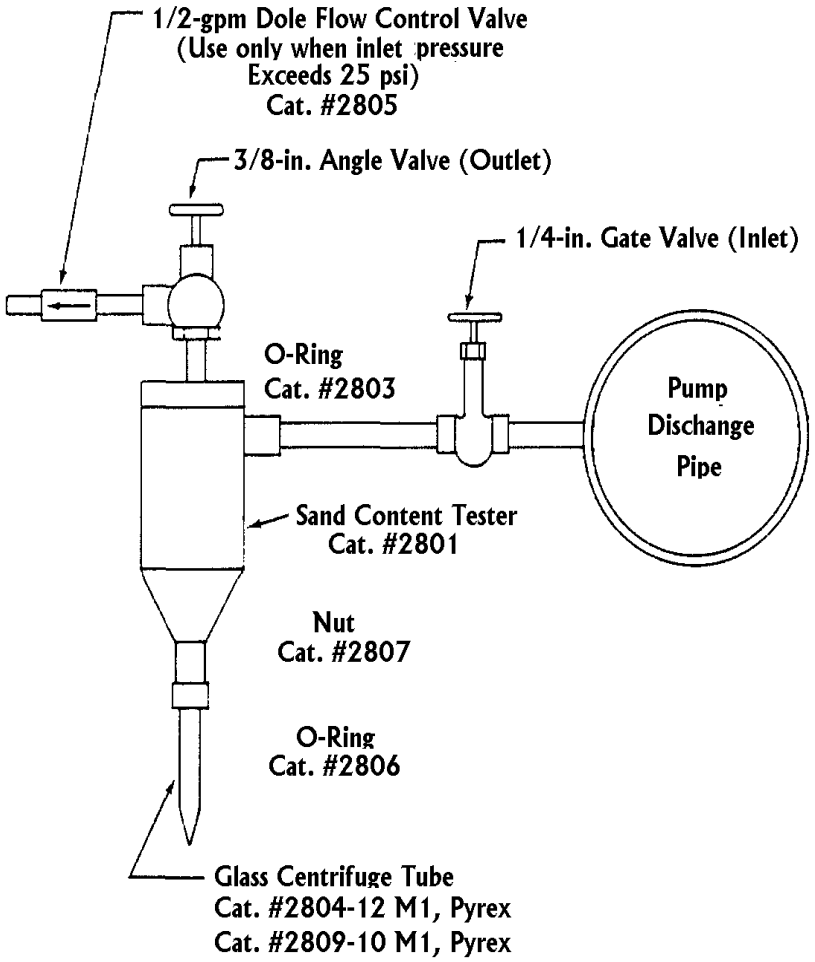
Sand Content Measurement



The sample line shall be tapped as close to the pump head as possible to ensure that turbulence is high enough to keep the sand uniformly distributed in the water stream

Rossum Centrifugal Sand Tester

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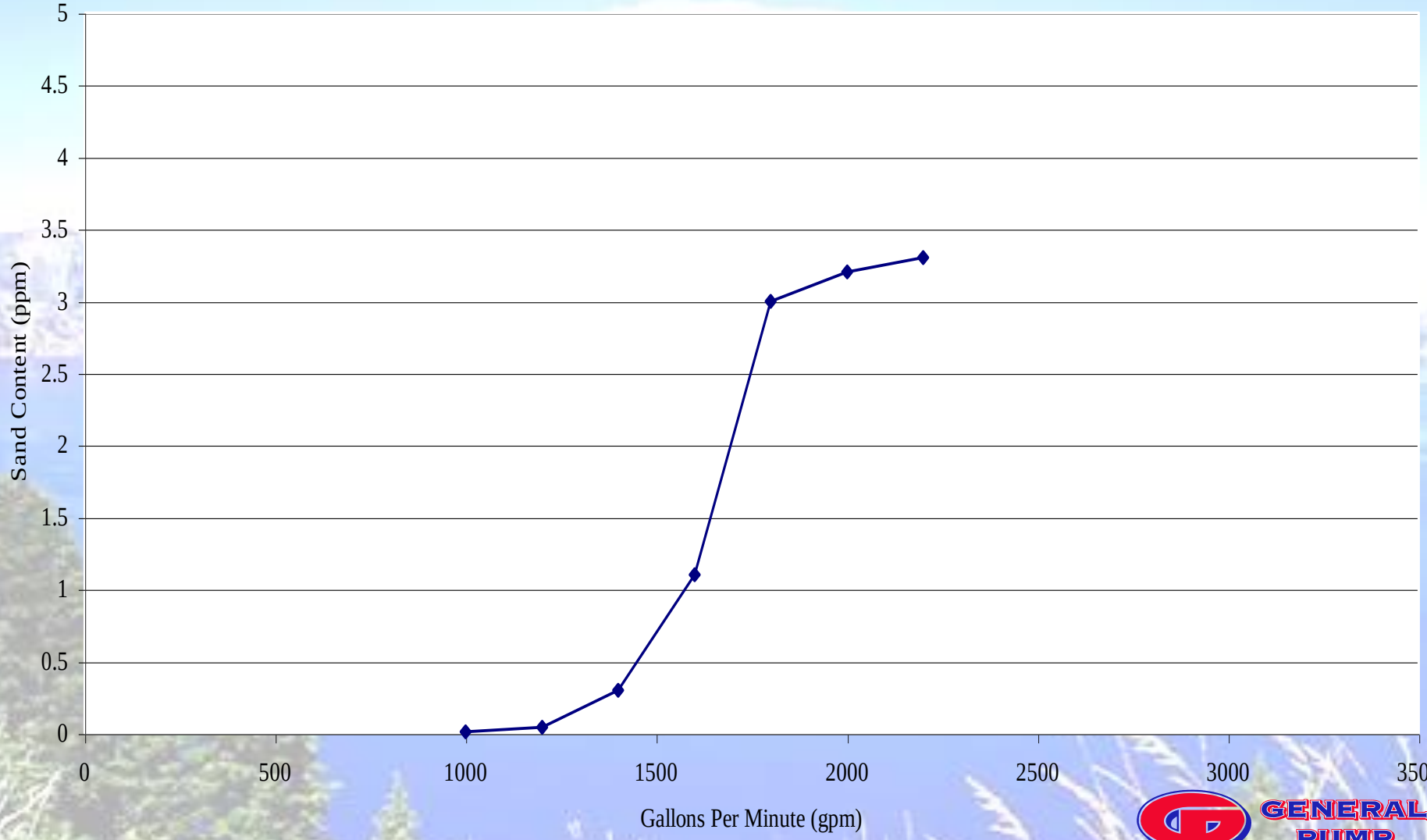
Sand Test at Various Flow Rates



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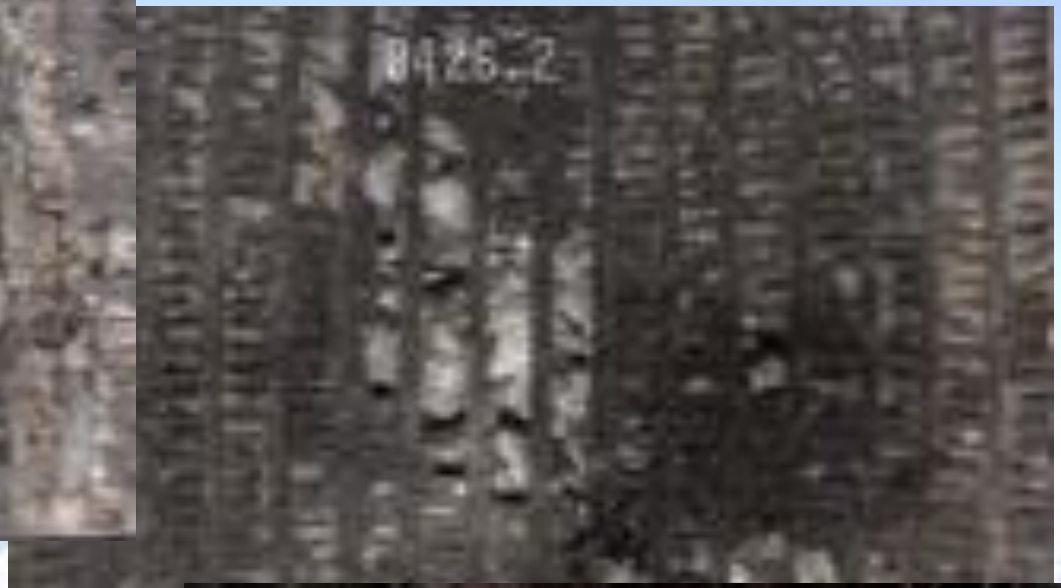
0426.2


0903.7

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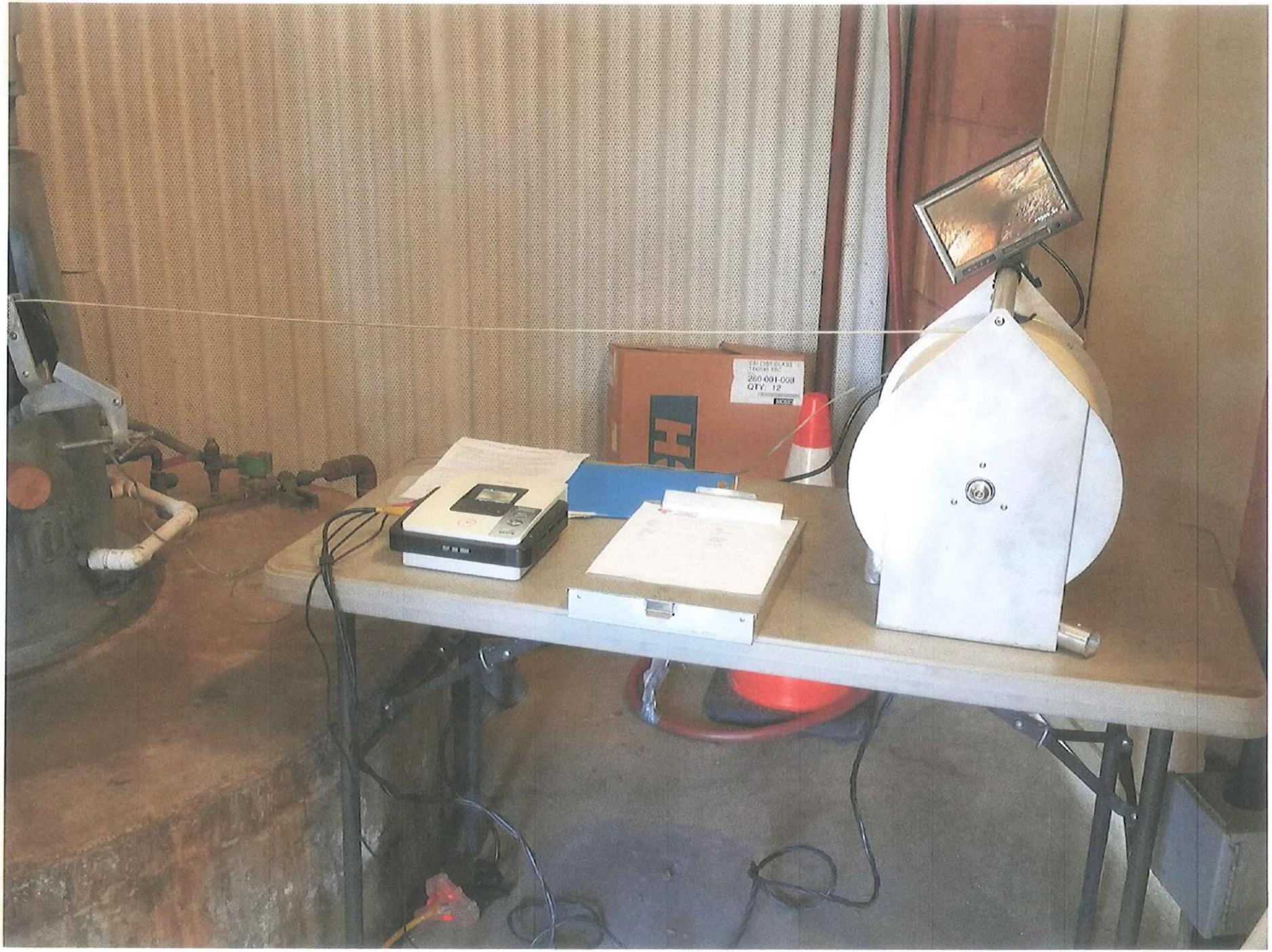
260-001-008
QTY: 12


+1022.4F
MICRO-VISION
+1022.4F

Step IV

- **Evaluate the new data along with the historical records to determine the next step.**

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Step V

- **Pull the pump.**
- **Video log.**
- **Static spinner?**
- **Zone sample?**

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Step VI

- **Determine the first process.**

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Sit down with Contractor's *experienced* engineer or geologist, the customer's staff and discuss the *options*.

The rehabilitation you choose needs to be based on your complete understanding of risk, benefits, and cost. It's our job to make sure we give you the information and a clear understanding of risk, benefits and cost.

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- **Maintenance Agreements**
- **Partnership with Consultants and Water Purveyors.**
- **Best safety record in the industry.**
- **Protect our reputation in the biggest market (Southern California) in the US**
- **Being #1 in this market requires a constant investment in talent and equipment.**

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#1

I know more than everyone else. Your opinions or ideas are not needed.

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When you evaluate your rehabilitation options, remember there is risk of doing nothing

1. **Corrode your casing and screen**
2. **Well collapse**
3. **Sanding**
4. **Jetting**
5. **Higher pump cost**
6. **Lower yield**

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#1 – Build your team of experts.

#2 – Evaluate the well.

#3 – Evaluate options.

#4 – Evaluate the amount of risk with each option.

#5 – Evaluate the cost.

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Develop my chemical treatment based on a water sample

I sent to the lab.

What about the 95% of data that is really needed?

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Questions And Comments?

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Speaker #8

Well Construction and Rehabilitation Loan Program

Eshter Valle Rojas

Water Replenishment District

erojas@wrd.org

WELL CONSTRUCTION AND REHABILITATION LOAN PROGRAM

Esther Valle Rojas
Sr. Water Resources Planner

June 28, 2018

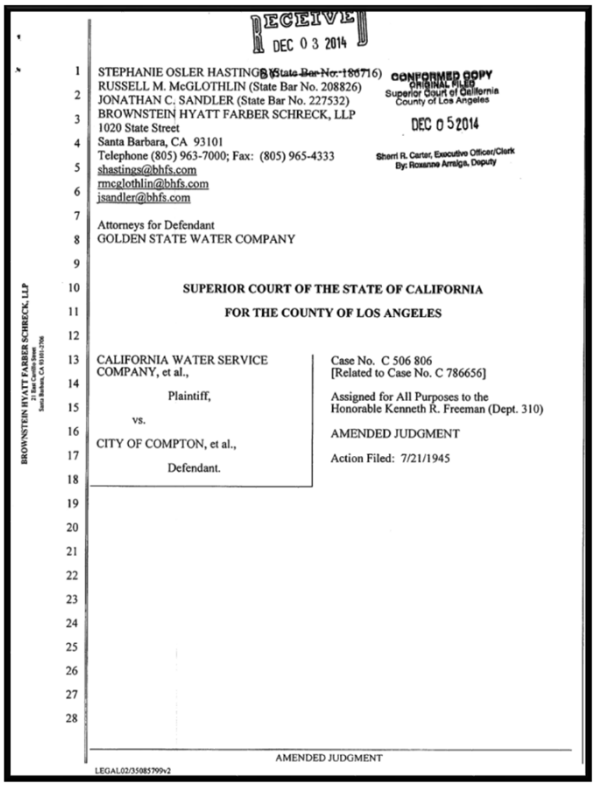
WRD
WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

Overview

- Background
- What is the Well Construction and Rehabilitation Loan Program (Program)?
- Program Policy & Application

WRD
WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

Background



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STEPHANIE OSLER HASTINGS (State Bar No. 196716)
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Superior Court of California
County of Los Angeles
DEC 05 2014
Sherri R. Carter, Executive Officer/Clerk
By: Roxanne Arriaga, Deputy

Attorneys for Defendant
GOLDEN STATE WATER COMPANY

SUPERIOR COURT OF THE STATE OF CALIFORNIA
FOR THE COUNTY OF LOS ANGELES

CALIFORNIA WATER SERVICE COMPANY, et al.,
Plaintiff,
vs.
CITY OF COMPTON, et al.,
Defendant.

Case No. C 506 806
[Related to Case No. C 786656]
Assigned for All Purposes to the Honorable Kenneth R. Freeman (Dept. 310)
AMENDED JUDGMENT
Action Filed: 7/21/1945

AMENDED JUDGMENT

LEGAL02/35085799v2

- Limitations by adjudicated pumping rights in the Central and West Coast Basin
- In 2016-17, 25% of allowable water rights were left unpumped
- Reasons why water rights were unpumped:
  - Declining Well Capacity
  - Aging/Failing Wells
  - Clogged Perforations
  - Collapsed Casing
  - Sand Intrusion
  - Poor Water Quality

WRD
WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

Background

- District programs that help groundwater producers remedy their well problems:
  - Safe Drinking Water Program: promotes cleanup of groundwater resources
    - Removal of VOCs by offering financial assistance for the design, equipment and installation of wellhead treatment facilities at existing production wells
    - Provides zero-interest loans for secondary constituents for a specific production well
  - Well Profiling: evaluates the flow and water quality across the well screens
  - NEW! Well Construction and Rehabilitation Loan Program

About the Program

- WRD Board of Directors recently approved the development of the Program
- The Program can improve a producer's ability to optimize their groundwater rights
- The Program's purpose is to assist with:
  - Drilling and installing of new wells
  - Repairing existing wells
  - Rehabilitating existing wells

WRD
WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

Program Policy

- Eligibility
  - Must be an entity within the WRD Service Area
  - Must be a Party to the Central Basin Judgment or the West Coast Basin Judgment
  - Applicant must demonstrate that the new well construction or well rehabilitation will increase their annual extraction beyond their most recent 5-year extraction average by at least 10%

Program Policy

- The District will provide 10 year, no interest loans for well construction and well rehabilitation projects. Loan may cover:
  - Design and construction
  - Well pump, meters, piping and connections to distribution system, if authorized by WRD Board

- Groundwater Producer will be the lead agency responsible for managing all aspects of the project. WRD can provide assistance if requested with expenses added to the loan amount.

- The District will be an Agent of the groundwater producer for the duration of the project, authorized to participate and comment on all aspects.
  - The District must agree with the selection of any hired consultant/contractor

Program Policy

- Rehabilitation Projects: District will consider rehabilitation projects that are unable to produce water due to:
  - Collapsed or corroded casing or screen
  - Clogged perforations
  - Sediment infilling
  - Other reasons will be considered for a well losing partial or full capacity

WRD
WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

Program Policy

- The groundwater producer will be the owner of the new well
- The groundwater producer is responsible for the full Program Loan repayment whether or not the completed well produces the anticipated groundwater yield
- Approved projects must commence within 90 days of approval and be completed within 18 months of approval
- WRD will not pay the consultant/contractor directly. WRD will reimburse the groundwater producer for WRD-approved invoices within 60 days of payment

General Program Requirements & Conditions

- Groundwater producers may not request funds to construct new wells if they have existing wells that are inactive due to water quality problems. They will be referred to the Safe Drinking Water Program instead.

- CEQA: activities funded under the Program regardless of the funding source must be in CEQA compliance. WRD may assist with CEQA compliance

- Funding limits shall be subject to the Program budget established by the WRD Board of Directors

WRD
WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

General Program Requirements & Conditions

- Contractual Agreements
  - A completed application and resolution adopted by the applicant's governing body authorizing the entity to apply for funding is required
- Repayment of Loan: an initial payment is due within one month after project completion, then quarterly thereafter.
- Audit: WRD retains the right to audit the performance of the project to ensure the project increased the applicant's annual extraction beyond their most recent 5-year extraction average by at least 10%

WRD
WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

Program Application

- Prioritization
  - Application date: “first applied, first considered”
  - Projects located in a Disadvantaged Community: defined as a community with an annual Median Household Income (MHI) that is 80% of the statewide MHI
  - Type of agency: Not-for-profit public or government agencies, mutual water companies, or private citizen who are rights holders (i.e. cities, county, mutual water companies, individuals) receive higher priority over for-profit entities

Program Application

- Applications are available at www.wrd.org
- All sections must be completed
- Submit via mail or email to:

  Water Replenishment District of Southern California
  Attn: Ted Johnson, Chief Hydrogeologist
  4040 Paramount Blvd
  Lakewood, CA 90712
  tjohnson@wrd.org

Water Replenishment District of Southern California

APPLICATION FOR
WELL CONSTRUCTION AND REHABILITATION
LOAN PROGRAM

WRD
WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

LOAN PROGRAM PROCESS

Projects for the Program will be approved based on the review of completed applications, eligibility and prioritization criteria established by the District. Groundwater producers with completed applications will be placed on a candidate list for loan consideration. Projects shall remain on the candidate list unless the project receives other funding, is otherwise completed or the applicant submits written request to be removed.

Eligibility

Thank you!

Questions or inquiries, contact:

Esther Valle Rojas
erojas@wrd.org

www.wrd.org
(562)-921-5521

WATER REPLENISHMENT DISTRICT
OF SOUTHERN CALIFORNIA


WRD
For more information visit www.wrd.org