Demonstration Project for

Huckleberry Mutual Water Company

Technical Assistance for Economically Disadvantaged Water and Wastewater Providers

North Coast Resource Partnership

California Department of Water Resources

December 2014

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Technical Assistance for Economically Disadvantaged Water and Wastewater Providers

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Huckleberry Mutual Water Company

December 2014

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Table of contents

Table index

Figure index

Appendices

1. Introduction

Huckleberry Municipal Water Company (MWC) is a small utility servicing 45 residents in 29 homes in rural Sonoma County, California. The homes are located along Cazadero Highway and Huckleberry Heights Road, approximately 4 miles south of the town of Cazadero, California. The community is situated parallel to Austin Creek, which is a tributary to the Russian River. Steep forested terrain surrounds the community (50-75% slopes), resulting in a seasonal creek, Consolli Gulch, that drains into Austin Creek. The MWC location and service boundaries are presented in Figure 1.

Currently the water company is served by a groundwater well with no treatment system. The utility is in need of installing a 4-log virus removal disinfection system to be in regulatory compliance with the State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW), formerly California Department of Public Health (CDPH). Additionally, the MWC is interested in installing water meters at the point of use. The utility does not have sufficient financial resources at present to pay for system upgrades of this type, and therefore a funding mechanism will have to be identified and secured in order to carry out the project. This project will demonstrate how resources in the Small Community Toolbox can be used in order to advance a project of this type.

1.1 Purpose of this report

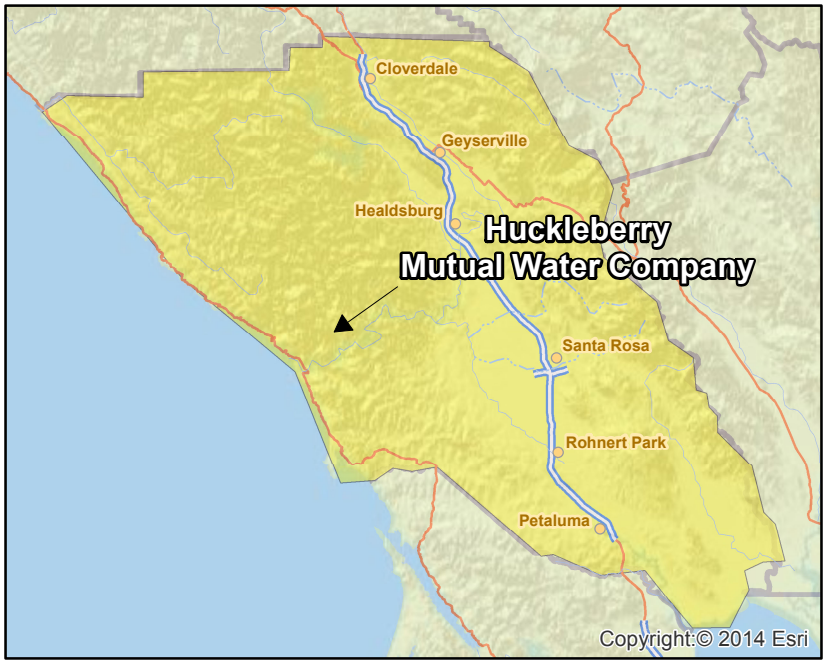
The purpose of this report is to identify and address the needs of Huckleberry MWC using tools from the Small Community Toolbox. The Small Community Toolbox is a source of compiled resources pertaining to all aspects of the Utility Management Cycle. Additionally, this report will serve as an example of how to use these tools to help further understanding for other water service providers facing similar issues. This report will result in a series of next steps which will serve as a guide for continuing the funded infrastructure project.

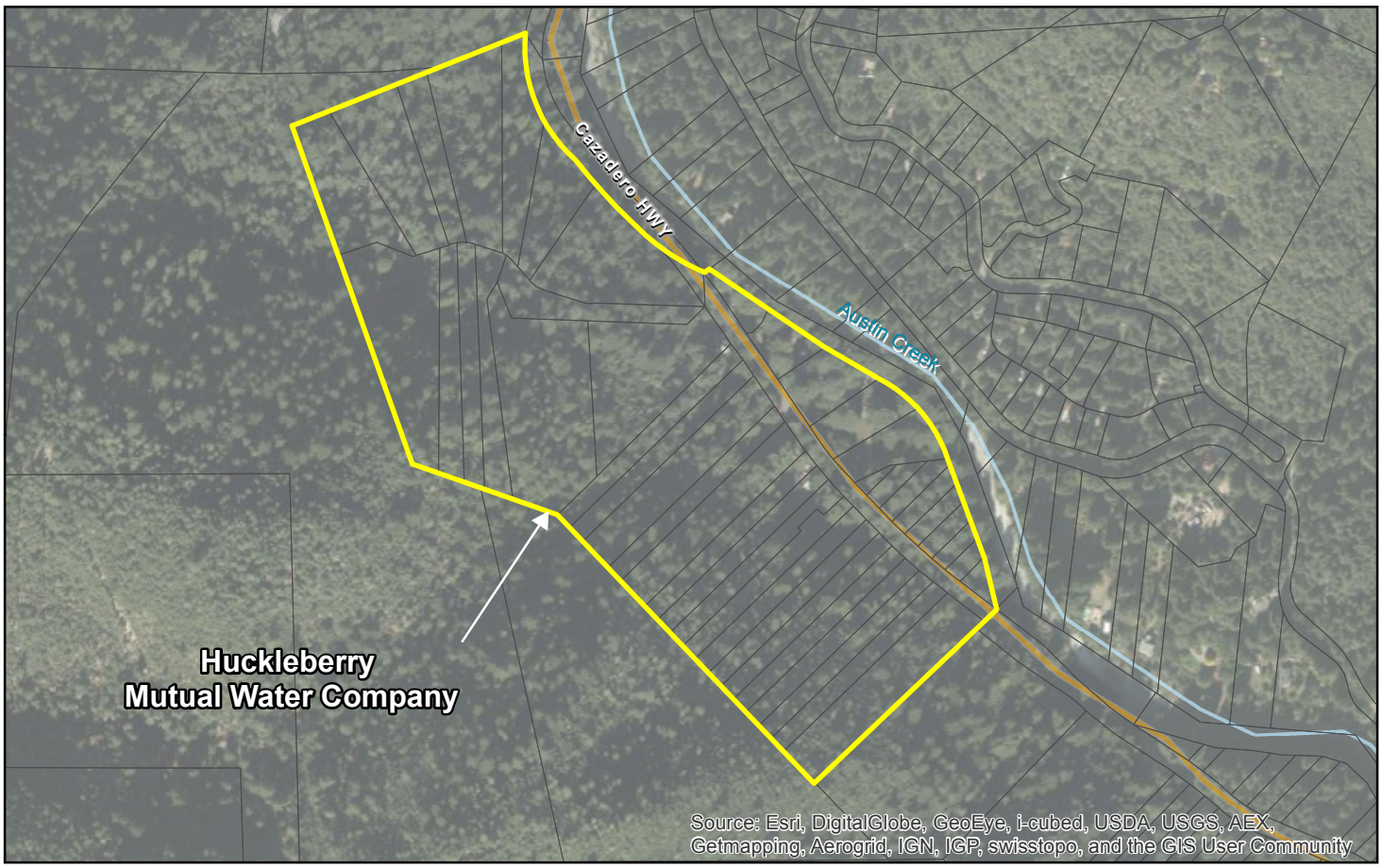
1.2 Scope and limitations

This report has been prepared by GHD and reviewed by GHD for the North Coast Resource Partnership. The Huckleberry MWC has signed a participation agreement relating to the demonstration project that is the subject of this report. It should be emphasized that report is to be used as an example of how tools and processes can be used to help further infrastructure improvement projects for a variety of communities throughout the North Coast region. Further planning, analysis, engineering and permitting may be required.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. This report has been prepared based on information provided by others, which has not been independently verified or checked.

Any cost estimates presented in this report or through related Toolbox elements are for conceptual purposes only. Actual prices, costs and other variables may be different at the time of an actual project and thus, project costs may change. Actual costs will depend on final project configuration and requirements. There is no warranty or guarantee that the project as currently conceived can or will be undertaken at a cost which is the same or less than costs that may be inferred from this report.





U.S. Highway

Major Road

Local Roads

Stream

Huckleberry Mutual Water Company Boundary

Paper Size 8.5" x 11" (ANSI A)

0 250 500 750 1,000

Feet

Map Projection: Mercator Auxiliary Sphere
Horizontal Datum: WGS 1984
Grid: WGS 1984 Web Mercator Auxiliary Sphere

N

GHD

Huckleberry Mutual Water Company
Technical Assistance

Job Number	8410996
Revision	A
Date	06 Nov 2014

Vicinity Map

Figure 1

718 Third Street Eureka CA 95501 USA T 707 443 8326 F 707 444 8330 E eureka@ghd.com W www.ghd.com

G:\Legacy\Projects\01081 HumboldtCounty DPW\8410996 NCRP Water-WW Assistance\08-GIS\Maps\Figures\GHD_Originals\F1_Vicinity_Huckleberry_MWC.mxd

Data source: ESRI Street Map; NAIP aerial 1m. Created by:emgutierrez

2. Use of the Small Community Toolbox

This Small Community Toolbox provides resources and references that allow small communities to approach the management of local water and wastewater infrastructure in a systematic fashion. The Toolbox is not a substitute for professional assistance with operations, management, engineering and legal issues. Rather it is intended to help small utilities develop a “first order” understanding of what their options are, how they should begin to budget, and how to get help.

The Small Community Toolbox is organized around the concept of the Utility Management Cycle illustrated in Figure 2.

Figure 2. Utility Management Cycle

The Utility Management Cycle is the general process a utility moves through during system operation. At the beginning of a project a utility begins in Step 1, then moves through each step systematically as different phases of the project develop. When a project is complete, the utility enters Step 6; Operate and Manage System, which persists until another project or issue comes along. Individual tools have been prepared for each element of the Utility Management Cycle which are summarized in Table 1 below. The tools used for this demonstration project are discussed throughout this report.

Table 1. Small Community Toolbox Elements

Utility Management Cycle Element	Toolbox Element	What it is and How it can be Used
Utility Management Cycle Element 1: ***Organize and Plan for Success***	**1.1:** Community Networking Directory:	A contacts list of water and wastewater providers who can be called upon.
	1.2: Governance Summaries:	An overview of options, benefits, and steps required to form various types of service entities
	1.3: GIS Maps:	Census, legislative, and other public data to help agencies access information needed for applications.
Utility Management Cycle Element 2: ***Match Needs to Economical Technologies***	**2.1:** Technology Overviews:	Overviews of common issues, technologies, and evaluation factors to help select alternatives
	2.2: General Cost Estimating Strategies:	Cost estimating charts to help develop order of magnitude estimates for various types and sizes of infrastructure to begin scoping overall funding strategies
Utility Management Cycle Element 3: ***Create Viable Financing Strategies***	**3.1:** Funding Program Summaries:	A one-stop information shop about funding programs suited to small community infrastructure projects
	3.2: Capital Recovery Tables:	Lookup tables to translate the portion of total project costs not paid by grant into annual debt service requirements met through a revenue mechanism
	3.3: Financing District Summaries:	Summary of strategy options for generating revenue to pay the annual debt service
	3.4: Cash Flow Considerations:	Assists entities in understanding the funds needed to move a project through planning, design, and construction
Utility Management Cycle Element 4: ***Prepare Preliminary Design, Studies, and Applications***	**4.1:** Consolidated Preliminary Engineering Report Template:	Consolidated report outline, with model tables that will meet the needs commonly used funding programs.
	4.2: CEQA/NEPA Exemptions and Checklists:	Summary of CEQA/NEPA exemptions and checklists to aid in meeting State and Federal environmental requirements and funding program requirements
	4.3: Common Permit Triggers:	Summary chart of typical project components that often trigger different types of permits
Utility Management Cycle Element 5: ***Complete Final Design and Construction***	**5.1:** Guidance for Hiring Professionals:	As a project moves from initial planning towards implementation, detailed, community-specific designs are required and communities will need to retain professional support
	5.2: Public Bidding Process Overview:	Understanding how the public bidding process works, how to set up a successful project bid, and how the low bid contractor is selected
Utility Management Cycle Element 6: ***Operate and Manage System***	**6.1:** Technical, Managerial, and Financial (TMF) Resources:	Tools to help agencies be organized and managed to improve overall operations and funding competitiveness
	6.2: Regulatory Resources:	Sources to provide information to the utility operator on various federal and state regulations
	6.3: Rate Setting Guidance:	Linking the costs of projects to the need to rate increases and methods to set and change rates
	6.4: Capital Improvement Planning Resources:	Part of the on-going Utility Management Cycle of planning for future system improvements

3. Project Description

3.1 Project Background

A study was conducted in 2013 by CDPH with the objective of determining if Huckleberry MWC's groundwater well was under direct influence of surface water. The report indicated that over the past 10 years of record the water company averaged two positive total coliform positives per year during routine and repeat sampling. Additionally, a site visit indicated that the well was approximately 6 feet from a seasonal stream, Consolli Gulch, a cause for further concern that the well could be influenced by surface water. The results of the study demonstrated that the well was not under the direct influence of surface water; however, installation of a minimum 4-log virus removal system was required.

To be in compliance with the DDW regulations, Huckleberry MWC must now plan and implement a 4-log virus removal disinfection system. In order to complete this project, a funding source will need to be secured to pay for the system upgrades.

To position themselves favorably to obtain state funding, Huckleberry MWC needs to complete a Preliminary Engineering Report (PER). A PER is a planning document that identifies the needs of the utility, alternatives for correcting system deficiencies, and a final alternative for implementation. Additionally, Huckleberry MWC will need to complete a pre application for funding to be considered by the SWRCB. Upon completion, Huckleberry MWC can apply for state funding that would allow them to begin implementation of the required system upgrades. Alternately, the MWC could explore direct funding options, such as a bank loan or billing surcharge. Both alternatives will be investigated in this analysis.

3.2 Existing System Conditions

The water for Huckleberry MWC is supplied by one well which was drilled in 1954. The well was drilled 60 feet below ground surface (BGS) with an 8" steel casing and does not have a sanitary seal. The soil type around the well is reported as being in the alluvial plain. The well terminates approximately 3 feet above ground surface, surrounded by a concrete pad. The well is housed in a wooden shed located approximately 20 feet from Cazadero Hwy. The static water level in the well is reported at 40 feet BGS (Department of Public Health, 1977).

A 2 horse power submersible pump is located in the well at 47 feet BGS (DHS, 2001). The pump is equipped with a pump saver device which prevents the pump from operating when the static water level falls below the pump. The operator believes that the pump currently operates at 7 gallons per minute (gpm), and gage readings indicate a pressure of 180 psi. The maximum pumping capacity for the system is 12 gpm. The pumps are believed to be replaced every 3-5 years. A master meter was installed on the well pump in 2012; currently there is no metering at the service connections.

There are three existing tanks in operation; the original 10,000 gallon redwood tank and two 5,000 gallon HDPE tanks, all operated in parallel. The redwood tank has a PVC liner that allows minor leakage to keep the redwood staves swollen. The two HDPE tanks, installed in 2007-08, were installed at approximately 3 feet lower elevation than the redwood tank. The tank float which activates the pump is located in one of the HDPE tanks, due to the lower installation elevation. The redwood tank is no longer operable at full capacity under this arrangement, and the cumulative storage volume of the system is less than 20,000 gallons.

Four main lines exist in the system, each 2-inch galvanized steel pipe of original construction. All lines originate at the well. Three lines service connections along Cazadero Highway and the final line services connections along Huckleberry Heights road before terminating at the storage tanks. All laterals to service connections are constructed of ¾" to 1" diameter pipes of various materials. The system is gravity fed, with the three lines along Cazadero Highway serviced through a pressure release valve at 60 psi. There is one home located at approximately the same elevation as the storage facility which utilizes a pump/pressure tank system, which is maintained and operated by the home owner. All other homes along Huckleberry Heights Road receive water at pressures between 30-60 psi. The water currently undergoes no treatment or filtration before delivery to the customer.

There are two 2-inch standpipes in the system, one located along Huckleberry Heights road and another along Cazadero Highway. The standpipes are used only to flush the system as there is not enough capacity in the system to use them for fire suppression.

4. Preliminary Engineering Report

4.1 Preliminary Engineering Report Contents

A PER is a planning document that is required by many state and federal agencies that provide funding for water related projects. Undertaking a PER can help a utility identify the needs of the project, and formulate alternatives for system design. For this analysis, a PER was developed using the CDPH Proposition 50 Technical Report Guidelines provided in Toolbox Element 4.1. This format covers items required for funding under the Safe Drinking Water State Revolving Fund (SDWSRF). The Prop 50 Technical Report addresses components of the project which include:

1. Problem Description
2. Location Maps
3. Evaluation of Alternatives
4. Consolidation Feasibility
5. Conceptual Project Design
6. Estimated Cost Breakdown
7. Environmental Considerations

4.2 PER Proposed Project

A Technical Report was developed for the projects of need for Huckleberry MWC (Appendix A). The estimated project cost included in this report is based on cost estimation strategies available in Toolbox Element 2.2.

Huckleberry MWC is currently proposing two projects, the installation of a UV disinfection system and end user water meters. UV is the preferred alternative because it offers a broad range of bacteria and virus protection, and would be the most compatible with the current water system, as the iron main lines are not cathodically protected. A system flow chart showing how the UV system would integrate into the current water system is shown below (Figure 3).

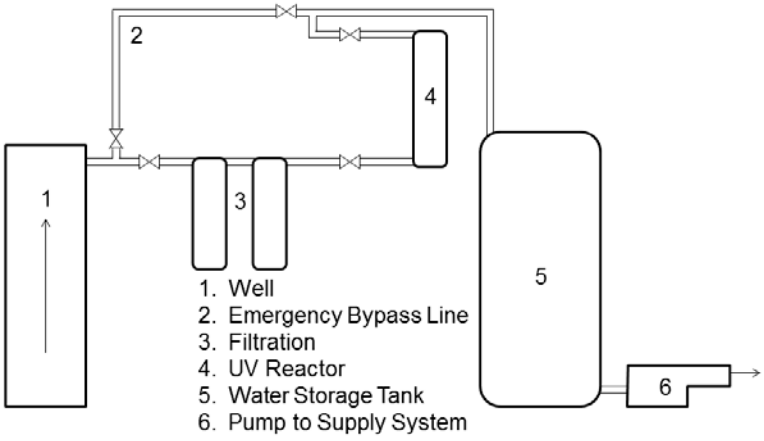


Figure 3. UV disinfection system process flow chart.

System components 2-6 above are the proposed new components of the treatment system. The filtration, UV system, storage tank, and pump would be housed in the same structure as the current

well. To do this, the current well-house will be deconstructed and a new, larger building would be constructed in place.

Cost estimates were developed for both the UV system and installation of new water meters. The cost of the new UV system is estimated at between $77,700 and $116,500. The cost for the new water meters is estimated at between $111,600 and $167,400. Cost breakdowns can be found within the PER in Appendix A.

It is important to note that the estimates above include costs for easement acquisition, legal fees, bidding, and prevailing wage. As a MWC, Huckleberry is not subject to the same regulations as a public entity. If non-state or non-federal funds are used some of the costs included above may not be necessary. An estimate of costs without state funds was developed and is included under the discussion of private funding. More information about cost estimation and engineering reports can be found in Toolbox Elements 2.2 and 4.1.

5. Project Funding

This section provides funding options and process information for Huckleberry MWC. This process began with identifying the project need and development of a PER. The following sections present the funding types available to Huckleberry MWC and the strategies for two funding options, state funding through the SWRCB Safe Drinking Water State Revolving Fund and direct funding.

5.1 Funding Options

The first step in determining what types of funding are available to a utility provider is to identify the governance structure. Huckleberry operates as a non-profit mutual water company. Using Toolbox Element 1.2, Governance Summaries, the organizations that provide funding to these types of systems are the SWRCB DDW, North Coast Resource Partnership (NCRP), United States Department of Agriculture (USDA), and Rural Community Assistance Corporation (RCAC),. Presented below is a summary of some of the funding programs offered through these agencies. Further information on funding programs can be found in Toolbox Section 3.1.

5.1.1 SWRCB Safe Drinking Water State Revolving Fund

The SWRCB Safe Drinking Water State Revolving Fund (SDWSRF) is designed to assist water utilities with project funding in a variety of issues including infrastructure replacement, water treatment, and watershed protection. Funding limits for this program are typically in the range of a maximum of $0.5 million for feasibility planning and a maximum of $20 million for project construction, including design, both of which are very comfortably within the limits of this project. Loan rates are one-half of the State's most recent general obligation bond rate, typically falling in the range of 2.5% for loan durations of 20 years. For some economically disadvantaged public water systems, including mutual water companies, loans can be zero-interest, and grants up to 100% can be provided. To initiate the funding process, an application is completed and submitted to the SWRCB. Further discussion on this funding source is presented in the subsequent sections.

5.1.2 North Coast Resource Partnership

The North Coast Resource Partnership is the regional agency that implements the State's Integrated Regional Water Management (IRWM) funds through Proposition 84. Prop 84 provides funding to agencies who are implementing projects beneficial to the State's water goals. This

program provides grants that are subject to periodic prioritization efforts by the organization. The loan program typically requires a 25% cost share, however, this can be waived for disadvantaged communities and those implementing a critical water supply project. The application for Round 3 Prop 84 grants are anticipated to be released in summer of 2015 with applications due in late summer or fall.

5.1.3 USDA

The USDA Rural Development Water and Environmental Program grant and loan program is a common source for funding water related projects. The loans in this program have a typical interest rate in between 2- and 4%, with a term life of 40 years. The application process begins with a request for assistance to the USDA, typically directed to an area specialist. After a pre-application meeting, USA will let the applicant know what documents are required which typically include the financial documents, a preliminary engineering report, project budget, and required statement and assurances forms. The USDA continues to work with the applicant throughout the planning, permitting, document preparation, and design process. The application process for this funding source is open and continuous. However, funds are typically appropriate in October of every year and may run out by the end of the Federal Fiscal year, so it is wise to get all requested information in by the beginning of the calendar year.

5.1.4 Rural Community Assistance Corporation

The Rural Community Assistance Program provides loans to small rural water utilities, including funds that cover feasibility studies and pre-development costs. The two loan programs offered by the RCAC are the Environmental Infrastructure Loans and Intermediate Environmental Loans. Environmental Infrastructure Loans are designed to be short term, 2-3 years, with typical interest rates of 5- to 5.25%. Environmental Infrastructure loans are often used to provide gap of bridge funding between when costs are incurred and repayment from another source is received.

Intermediate Environmental Loans are intended to be smaller loans (<$100k) with an interest rate of 5% and a variable repayment period of up to 15 years. In either case, the loan process begins with contacting the local RCAC loan officer to begin the application process. The RCAC will work with the utility throughout the process to ensure that the loan assistance package will work within the specific terms of a utilities infrastructure project.

5.1.5 Other Funding Options

Discussions with Huckleberry MWC included review of other possible programs. There are concerns about the effects of on-going and possibly continuing drought. The SWRCB manages the Public Water System Drought Emergency Response (PWSDER) Program, which can provide funds for hauled water or interim supplies in response to an imminent threat of a severe domestic water supply outage as a result of drought that requires immediate action to avoid or mitigate risk to public health and safety. Non-profit Mutual Water Companies are eligible for this funding (http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/drought/PWSDER%20Final%20Drought%20Fact%20Sheet%20SWRCB.pdf). There is no formal application process, the MWC should contact their SWRCB DDW representative, Janice Thomas at (707) 576-2145.

The SWRCB also manages funding through Interim Emergency Drinking Water Program. This funding source can also be used for emergency water deliveries, However, there must be a link to water quality related issues as well, which is not likely the case for Huckleberry MWC.

With the passage of Proposition 1 in the fall of 2014, there may be additional opportunities that become available. There may be programs to completely grant fund the installation of water meters through the Department of Water Resources, if additional funds are provided through programs such as the Urban Water Use Efficiency Program.

5.2 Funding Process

As shown through the funding options presented above, there are several common sources of funding for small water infrastructure projects. However, another option the Huckleberry MWC has is to fund the project themselves (direct funding). The sections below provide an example of the funding process and needs for both the SWRCB SDWSRF and direct funding.

5.2.1 SWRCB Safe Drinking Water State Revolving Fund

As mentioned previously, Huckleberry MWC is interested in both a UV disinfection project and an end user water metering project. For water providers with multiple needs the question arises if funding should be applied for under the same project or as separate projects. This type of question can be answered using Toolbox Element 1.1: Community Networking Directory. The Sonoma County DDW representative was contacted to offer guidance for this scenario. For a disinfection project, the project priority list (PPL) position is higher than for water metering; therefore, the disinfection portion of the project would likely be funded more rapidly as the sole project. It is important to note that both projects can still use the same PER, however; in this case it is recommended each have its own application for funding.

Currently, the state initiates the funding process through an application process. This process was recently updated when DDW moved under the SWRCB. The application package for planning design funds consists of the following:

- General Information Package: This package includes basic applicant and project information.
- Technical Package: This package consists of a scope of work including alternatives analysis (included in the PER) and volumetric pricing of water metering.
- Environmental Package: This includes providing information so the SWRCB can fulfill its responsibilities under eth California Environmental Quality Act (discussed below)
- Financial Package: This package includes audited financial statements, rate information, information on existing debt and outstanding loan obligations, and system reserves.

Environmental Considerations

Funded projects through the SWRCB are required to meet California Environmental Quality Act (CEQA) standards. Therefore, to implement this project the necessary CEQA documentation must be filed prior to the approval of a funding application. For small projects of this type a Class 2 Categorical Exemption often applies. A Class 2 Categorical Exemption is for projects that are replacing or reconstructing infrastructure on the same site, when negligible system expansion is proposed. It should be noted that although a successful Categorical Exemption results in the avoidance of further environmental documentation, the applicant may still be asked to provide documentation that confirms the absence of significant impacts.

Other State-Funded Project Considerations

There are several other components that must be considered when state funding is to be used to pay for a project. These considerations include prevailing wage, easement or right of way (ROW) acquisition, and the public bidding process. In a typical state funded project the utility must submit the project for bidding at the prevailing wage price and select the lowest bidder. This requirement can lead to added costs that must be covered by the funding provided for the project. Additionally, state funded projects prefer that the applicant either have ownership of the project site or legal easement/ROW rights. This helps to ensure the security of the water system moving forward if the property were to change ownership. In some cases easements or ROW can be acquired at minimal cost, in others easement or ROW must be purchased. In either case there can be added legal fees that must be paid for by the project funding. It should be noted that state funding will pay for easement or ROW acquisition; however, it will not pay for the purchase of property.

5.3 Huckleberry MWC Direct Funding

Another option to complete this project is for the MWC to seek direct funding. Because the water system operates as a MWC, they are not subject to public contract laws if state or federal funds are not used and therefore can be more flexible with how the project is implemented. As mentioned previously, funding this project through the SDWSRF brings about the issues of prevailing wage, easement acquisition, and public bidding. All of these components add to the cost of project implementation, and quickly lead to a project costing more than a utility provider can afford to borrow. If the MWC were to fund the project directly, they could avoid many of the additional cost considerations mentioned above. The estimated cost for the proposed UV system improvements assuming MWC labor is estimated at between $12,000 and $18,000. Additional costs may be incurred for an electrical subcontractor to adjust the system telemetry. The estimate cost for new meters is approximately $650 per meter. The installation of new meter could be done over time.

Direct funding could take place through a number of methods. The most common in this case would be funding from reserves, a private bank loan, or through a billing surcharge. If the MWC does not have the required amount in savings, a private bank loan or billing surcharge would be the recommended funding method. A private bank loan would allow project construction to proceed quicker. A billing surcharge would require that funds be built up to pay for the project.

6. Summary

Huckleberry Mutual Water Company is in need of installing a 4 log virus removal disinfection system to be in compliance with the SWRCB DDW. For a small utility two funding methods are common for these types of projects, SWRCB SDWSRF funding and direct funding. A cost estimate and PER was developed for an application for SWRCB SDWSRF funding with a total estimated cost of $116,500 to implement the disinfection system project. Conversely, the Company could seek direct funding. Project implementation through direct funding results in fewer costs as items such as acquiring an easement, prevailing wage, and public bidding are not necessarily required. The project cost for direct funding was estimated at between $12,000 and $18,000. For a small utility such as Huckleberry, project implementation through direct funding is a much more cost effective option, however all costs are paid directly by the MWC.

Moving forward, Huckleberry MWC could plan for future upgrades to the drinking water system through capital improvement planning. This planning method would typically involve the collection of an additional fee or surcharge from the water customer, and could be used at a later date to pay for

smaller infrastructure upgrades. An advantage of this method of infrastructure improvement planning is the ability to fix small problems that arise quickly. Further information on capital improvement planning can be found in Toolbox Element 6.4.

7. Implementation Strategy and Next Steps

Using Toolbox Elements form the Small Community Toolbox, a preliminary design for a UV disinfection system was developed. As a result of this analysis, two options for moving forward were identified depending on the funding source.

For funding through the SWRCB SDWSRF the following steps are recommended:

- Complete an application for SDWSRF funding per the SWRCB guidelines (http://www.waterboards.ca.gov/drinking_water/services/funding/SRF.shtml)
- Coordinate with the SWRCB on the application until a planning funding agreement is executed
- Hire an engineer and complete project planning, permitting, CEQA, and concept design for the UV disinfection system and end user water meters
- Coordinate with the SWRCB on a design/ construction funding package to prepare the final project plans, specifications, and cost estimate for the UV disinfection system and water meter installation
- Put the project out to bid and construct

For funding through a private lender the following steps are recommended:

- Contact several local and national banks in the area to determine their policies on funding community infrastructure projects and typical rates and terms.
- Hire an engineer and continue to develop to the project conceptual design using the private loan funds or reserves if possible.
- Finalize the terms and conditions of the private loan and complete to the final project plans, specifications, and cost estimate for the UV disinfection system and water meter installation
- Put the project out to bid and construct

As part of the final project the MWC should be sure to obtain all operation manuals and integrate the new components into a water system operations manual. The MWC should also complete a CIP to start building reserves for potential future project including pipeline replacements.

8. References

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Appendices

Appendix A – Preliminary Engineering Report

This appendix contains the Preliminary Engineering Report developed for this report.

Preliminary Engineering Report

Huckleberry Mutual Water Company
Disinfection and Metering Project

December 2014

Preliminary Engineering Report

Huckleberry Mutual Water Company

Disinfection and Metering Project

December 2014

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Table of Contents

Appendices

1. Project Location

Huckleberry Mutual Water Company (MWC) is a small utility servicing 45 residents in 29 homes in rural Sonoma County, California. The homes are located along Cazadero Highway and along Huckleberry Heights Road. The community is situated parallel to Austin Creek, which is a tributary to the Russian River. Steep forested terrain surrounds the community (50-75% slopes), resulting in a seasonal creek, Consolli Gulch, which drains to Austin Creek. Reported soil composition within the service area of Huckleberry MWC is gravelly loam and alluvial land (Web Soil Survey, 2014).

2. Problem Description

A study was conducted in 2013 by the California Department of Public Health (CDPH) Division of Drinking Water (DDW) with the objective of determining if Huckleberry MWC's well was under direct influence of surface water. The report indicates that over the past 10 years of record the water company has averaged two positive total coliform positives per year during routine and repeat sampling (Wong, 2013). Additionally, a site visit indicated that the well was approximately 6 feet from a seasonal stream, a cause for further concern that the well could be influenced by surface water. The results of the study indicated that the well was not under the direct influence of surface water; however, installation of a minimum 4-log virus removal system was required.

The Huckleberry MWC also does not meter water use at individual connections. Providing customers data on their water use promotes conservation and allows for billing by actual use instead of by a flat rate. Also, many funding programs require water metering for funding eligibility.

3. Description of Proposed Project

To remain in compliance with the CDPH, Huckleberry MWC is now planning a 4-log virus inactivation system. This system will directly address coliform bacteria and other viruses that could be present in the groundwater.

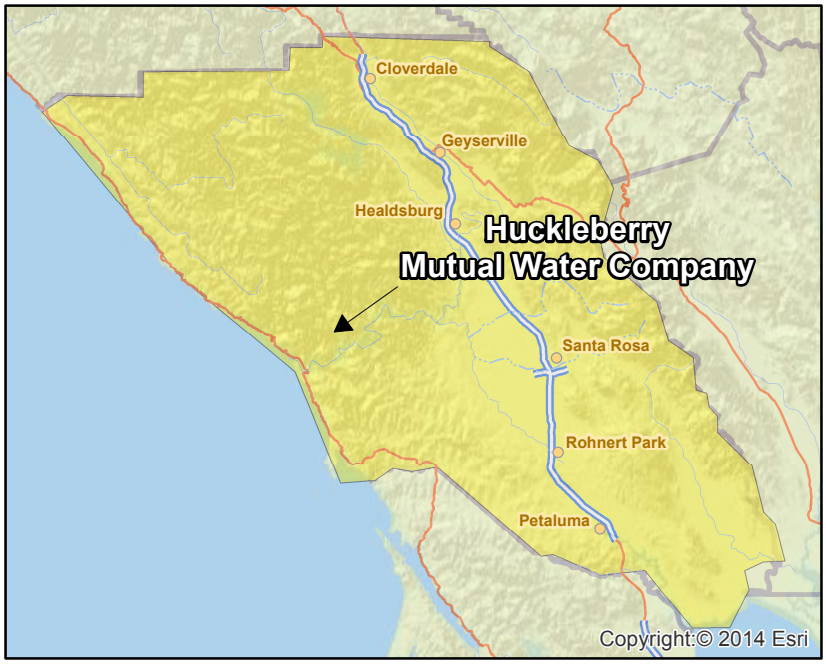
This project will address the issue of possible bacterial and viral contamination in Huckleberry MWC's groundwater source. This will be accomplished through the installation of a new filtration and disinfection system with 4-log virus inactivation. The new system will be installed at the existing location of the well. The existing well building is old and in need of service; therefore, the structure will be replaced by one large enough to house the components of the new disinfection system. Water will be pumped from the well through filtration, disinfection, into a small storage tank. A small pump will supply water from the tank to the conveyance system and the storage tanks uphill. In addition to the disinfection equipment, a new electric service panel and a telemetry system for the small storage tank will be installed.

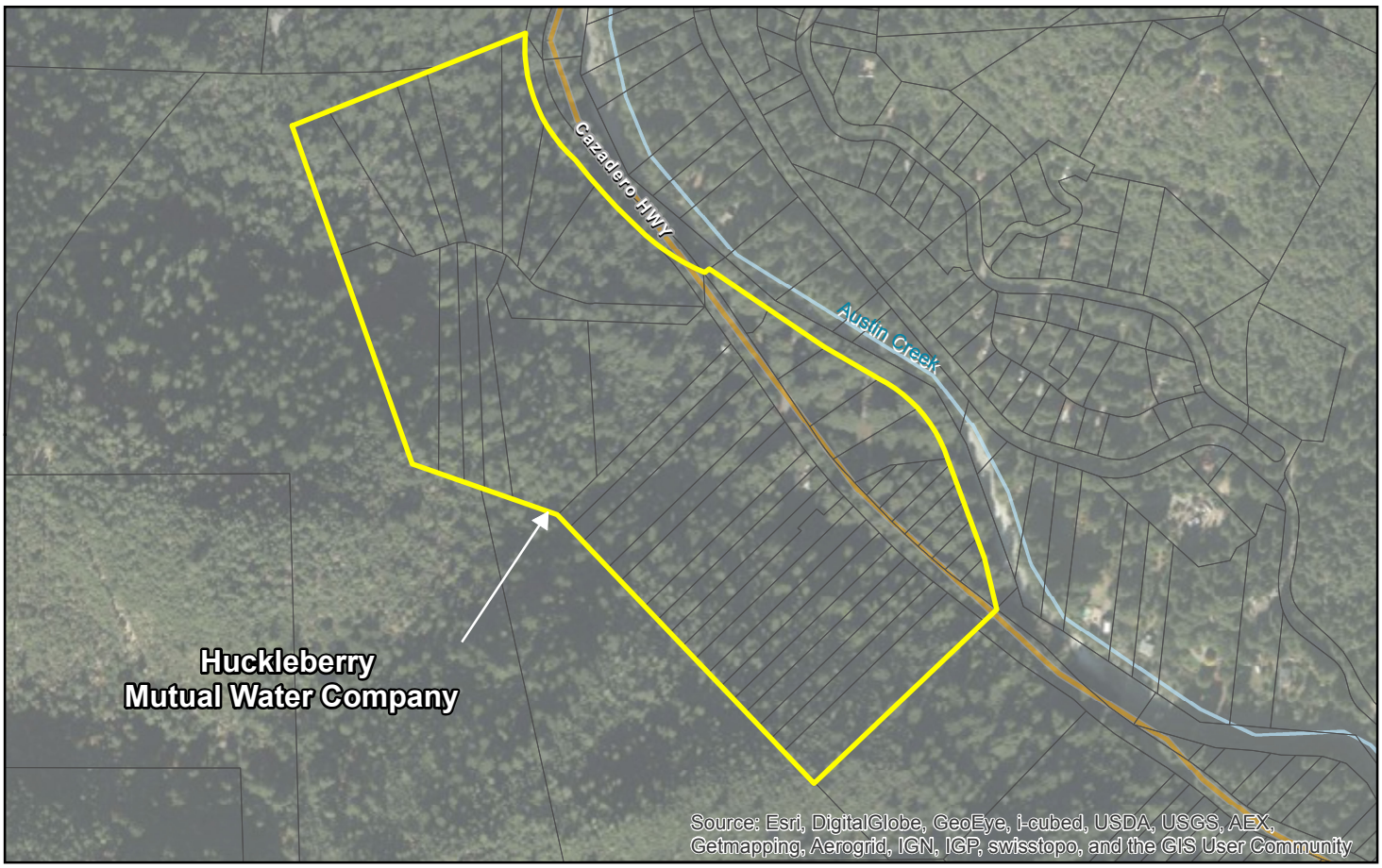
The MWC currently does not own or have an easement to the existing groundwater well site. The owner of the site is cooperative with the MWC and has stated they would provide additional land if necessary for the improvements. To obtain funding through the State, a legal easement would be needed. This is also good practice as the land could change hands and having legal rights to the land upon which the system is constructed would be important.

To address water metering, 29 residential meters would be installed.

4. Map of Existing Service Area and Project Location

A map of the project location and existing service area is shown in Figure 1.





U.S. Highway

Major Road

Local Roads

Stream

Huckleberry Mutual Water Company Boundary

Paper Size 8.5" x 11" (ANSI A)

0 250 500 750 1,000

Feet

Map Projection: Mercator Auxiliary Sphere
Horizontal Datum: WGS 1984
Grid: WGS 1984 Web Mercator Auxiliary Sphere

N

GHD

Huckleberry Mutual Water Company
Technical Assistance

Job Number	8410996
Revision	A
Date	06 Nov 2014

Vicinity Map

Figure 1

718 Third Street Eureka CA 95501 USA T 707 443 8326 F 707 444 8330 E eureka@ghd.com W www.ghd.com

G:\Legacy\Projects\01081 HumboldtCounty DPW\8410996 NCRP Water-WW Assistance\08-GIS\Maps\Figures\GHD_Originals\F1_Vicinity_Huckleberry_MWC.mxd

Data source: ESRI Street Map; NAIP aerial 1m. Created by:emgutierrez

5. Existing Population and Service Connections

Huckleberry MWC currently services 45 residents in 29 active single family residences. The population served was determined using the values reported on the MWC's 2013 Annual report to the Drinking Water Program. All service connections within the water system are currently unmetered.

6. Water Rights Information

The Huckleberry MWC's water source is groundwater, for which a water right is not required. This project does not change the quantity used or location of the water source under question. Completion of this project is intended to address the issue of water quality at the water source.

7. Evaluation of Alternatives

The two most common alternatives for the disinfection of residential water on this scale are UV and chlorine, both of which may include filtration. For this evaluation of alternatives, an LMI chemical feed pump and a Trojan PRO 20 disinfection system were compared. The disinfection effectiveness, costs and compatibility are compared below in order to determine a preferred alternative disinfection system type. An evaluation of water meters alternatives is not provided, as the specification of a specific type of meter would be completed during design.

7.1 Effectiveness

Both chlorine and UV disinfection offer protection against a wide range of bacteria. However, UV disinfection offers protection against Giardia and Cryptosporidium, two pathogens that can be resistant to sodium hypochlorite (NaOCl) disinfection. The main disadvantage of UV disinfection is the lack of residual that chemical disinfection provides. However, small water systems such as Huckleberry cycle water more rapidly, making disinfection residual less of an issue.

7.2 Compatibility

The main lines in the water system are currently constructed of the original galvanized iron pipes from the installation of the water system. These pipes do not have cathodic protection, which would result in potential corrosion issues with the use of chlorine disinfection. The use of a UV disinfection system would not result in additional corrosion of the water system main lines, making UV the preferred disinfection method for the current water distribution system composition.

7.3 Costs

The cost of the disinfection system is important in the decision process, especially for a small utility provider. UV technology is typically associated with large capital costs and lower operational and maintenance (O&M) costs. Conversely, chlorine disinfection has lower capital costs but can have higher O&M costs. Table 1 below summarizes the estimated costs for each system. A 20-year lifecycle cost is also presented.

Table 1. Cost comparison for UV versus chlorine disinfection.

Disinfection Technology	Estimated Capital Cost	20-Year Lifecycle Cost
UV (Trojan PRO 20 plus filters)	$2,500	$6,000
Chlorine (LMI Chemical Pump, 12.5% NaOCL)	$700	$9,300

The costs shown in Table 1 above do not include additional infrastructure, permitting, and labor costs that would be common for both projects. This example is meant to show the difference between the costs of just the disinfection technology. The cost to operate the UV lamp is based on an energy price of $0.12 per kilowatt hour. The lifecycle cost for UV also includes replacement of the bulb, filter bags, and lamp sleeve every two years. The cost of chlorine disinfection is based on a dosing rate of 2.5 mg/L, and a daily average water demand of 4,000 gallons. The costs in Table 1 do not include the extra labor costs that would be required with chlorine disinfection, including regular monitoring of chlorine residuals and chlorine solution replacement. Additionally, due to the lack of cathodic protection in the main lines as mentioned above, corrosion due to chlorine use could result in additional pipeline replacement costs. Given the cost estimates shown above, the use of UV disinfection could have a reasonably short payback period.

7.4 Environmental Impacts

UV disinfection systems typically have fewer environmental impacts associated with their use. Although they do require larger energy inputs for operation, they do not produce disinfection by-products that are associated with chlorine. Chlorine disinfection can result in the formation of trihalomethanes and haloacetic acids, substances that are possible human carcinogens. Additionally, chlorine is toxic to aquatic life, which is a cause for concern with how close the proposed disinfection system is to a creek (6 feet). The use of UV disinfection in this case would result in fewer overall environmental impacts.

7.5 Preferred Alternative

In this application, the preferred alternative for achieving 4-log virus inactivation is through UV disinfection. For this community, UV would offer an alternative that is well suited to the composition of the current distribution system and come without the potential for disinfection by-products or odor of chlorine disinfected water. The high capital costs of UV disinfection could be recovered in a reasonably small payback period in comparison to chlorine disinfection. The preferred project is described further below.

8. Feasibility of Consolidation

Another private water company operates near Huckleberry MWC, Magic Mountain MWC. Although consolidation of the two water systems has been discussed in the past, as of present there are circumstances which prohibit consolidation. Magic Mountain MWC has recently received funding approval for system upgrades, which at this point would not include the ability to consolidate with Huckleberry MWC. Therefore, system consolidation is not a feasible alternative for this project.

9. Anticipated Benefits of Proposed Project

The use of a UV disinfection system would result in several benefits to the community serviced by Huckleberry MWC. Installation of the proposed UV disinfection system would resolve the primary issue facing Huckleberry MWC, which is compliance with the SWRCB DDW regulations. The system would result in an overall improvement in water quality, and should eliminate the occurrence of positive coliform test results and provide a better overall service to the community. The disinfection system would also produce water with less potential health risks, and no effect on odor or taste. Lastly, the UV system could result in a net cost savings over the lifetime of the system as compared to chlorine disinfection.

10. Conceptual Project Design

The proposed disinfection system is to be installed in the same location as the well. To make room for the disinfection system, a new building will be built around the well to house all system components. The current proposed building type is a prefabricated structure such as a Tuff Shed® with a building footprint less than 120 square feet (no required building permit). The proposed system schematic in the new structure is shown below (Figure 2).

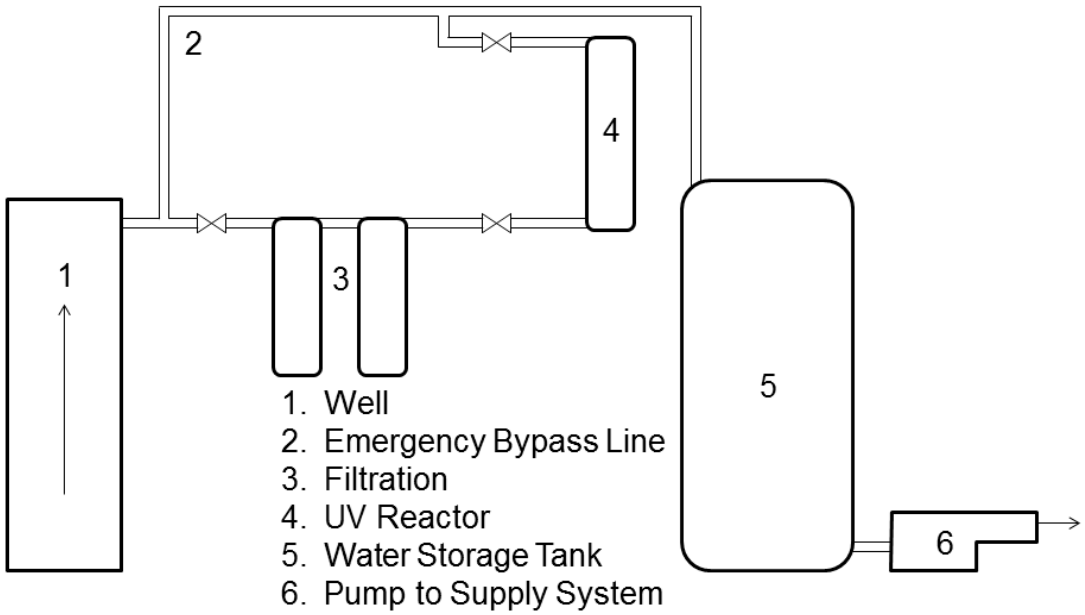


Figure 2. Proposed system schematic inside well-house structure.

Water would travel from the well into the UV pre-filtration step, which would help to remove solids that reduce UV effectiveness. Water would then travel through the UV reactor where disinfection occurs, then into the small storage tank inside the building. This tank would be outfitted with some form of telemetry, which would operate the submersible pump in the well. The telemetry in the storage tanks uphill would activate the pump connected to the small storage tank. The UV system capacity would be based on the maximum flow rate from the submersible pump in the groundwater well, approximately 12 gallons per minute (gpm).

11. Analysis of Projected Growth

Growth in the water system is limited by the terrain surrounding the water company. The terrain is steep, forested, and is currently composed of large parcels, all of which inhibit the available space for residential expansion within the service area. Additionally, the operator of the system noted that soil percolation conditions within the service area are restrictive for new septic systems that would be required with more residential connections. Currently, it is believed that the service area could only increase by as much as two additional residential parcels, which could be served by the existing system without expansion.

12. Ineligible Project Components

The UV disinfection project contains no elements which are considered ineligible under DDW guidelines. For the installation of water meters the cost to connect the meter to the existing service line are likely ineligible costs. These costs are separated out in the estimates provided below.

13. Cost Breakdown of Proposed Project

The estimated costs for this project presented below include all major components for the UV disinfection system, labor, permitting, administrative costs, and engineering costs. Table 2 below summarizes the estimated costs. For this cost estimate, it was assumed that state or federal funding would be obtained. This resulted in the inclusion of the development of a set of project plans and specifications, project bidding, and prevailing wage labor rates paid during construction, all of which increase project costs.

Table 2. UV Disinfection System Cost

Cost Category	Total
Project Construction	$39,700
Planning, Design, Permitting, Construction Management	$28,000
Agency Costs	$2,000
Contingency	$8,000
Total estimated project costs	$77,700
Initial funding application estimate (Includes additional 50% contingency for unknowns)	$116,500

A detailed listing of all components associated with this cost estimate for the UV disinfection presented in Table 2 can be found in Appendix A. The estimated project cost in 2014 dollars is $77,700. However, it may be several years before the project is constructed. For funding application purposes, it is recommended that MWC add an additional 50% to the project costs, for a total of

$116,500. The cost for new water meters is presented in Table 3, with back up support in Appendix A.

Table 3. Water Meter System Cost

Cost Category	Total
Project Construction	$79,600
Planning, Design, Permitting, Construction Management	$18,000
Agency Costs	$2,000
Contingency	$12,000
Total estimated project costs	$111,600
Initial funding application estimate (Includes additional 50% contingency for unknowns)	$167,400

The water company currently charges a flat rate for water service, which covers the cost of system operation and allows for some to be added to a contingency fund. In order to complete this project, a funding source will need to be secured to pay for the system upgrades.

14. Proposed Design and Construction Schedule

The project schedule is dependent on funding. It is assumed that if planning funds can be obtained by the SWRCB DDW, that planning, permitting, and design, could be completed within 4 months and bidding and construction could be completed within another 5 months.

15. Environmental Information

To complete this project the necessary CEQA documentation will need to be filed. This project would qualify for a Class 2 Categorical Exemption, which deal with projects that are replacing or reconstructing infrastructure on the original site with minimal system expansion. There are no other anticipated environmental regulations or considerations that would be associated with the implementation of this project.

16. References

Wong, W. (2013). *Determination of Groundwater Source Under the Direct Influence of Surface Water.* California Department of Public Health. Santa Rosa, CA.

Appendices

Appendix A – Opinion of Probable Cost

This appendix contains the opinion of probable costs developed for the UV Disinfection Project and the Water Meter Project

Table A1. Cost Estimate Summary for Huckleberry UV Disinfection System.

Huckleberry MWC Disinfection Improvement Project

Major Equipment and Construction Items

Unit Items	Quantity	Unit	Unit Cost	Total	Typical Ranges
UV System	1	LS	$ 2,500.00	$2,500	*Includes costs for purchase, tax, shipping, and installation. Inplace cost is typically 150-300% of purchase price.*
shut off valve kit	1	LS	$ 500.00	$500	
Filters	1	LS	$ 300.00	$300	
New GW pump	1	LS	$ 600.00	$600	
Holding Tank (150 gal)	1	LS	$ 500.00	$500	
Treated Water Pump	1	LS	$ 800.00	$800	
Site Piping and Appurtenances	1	LS	$ 1,500.00	$1,500	
Building & pad	1	LS	$ 3,000.00	$3,000	
Construction Labor (150% of purchase costs)	1	LS	$ 15,000.00	$15,000	
Subtotal 1				**$24,700**	

Other Construction Items	Cost Estimate		Total	Typical Ranges
Electrical	20%	of subtotal 1	$5,000	*5-125% of subtotal 1*
Instrumentation	10%	of subtotal 1	$2,000	*3-15% of subtotal 1*
Site Work	15%	of subtotal 1	$4,000	*5-15% of subtotal 1*
Mobilization/ Demolition	8%	of subtotal 1	$2,000	*5-20% of subtotal 1*
Survey	10%	of subtotal 1	$2,000	*Variable*
Subtotal 2	63%	of subtotal 1	**$15,000**	

Non Construction Implementation Costs (Soft Costs)

Permitting/CEQA/NEPA	5%	of (subtotal 1 + 2)		$2,000	*5-20% of (subtotal 1 + 2)*
Engineering	20%	of (subtotal 1 + 2)		$8,000	*10-20% of (subtotal 1 + 2)*
Construction Management	20%	of (subtotal 1 + 2)		$8,000	*5-15% of (subtotal 1 + 2)*
Agency Costs	5%	of (subtotal 1 + 2)		$2,000	*1-5% of (subtotal 1 + 2)*
Land/ROW Acquisition	1	LS	$ 10,000	$10,000	*Variable*
Other Soft Costs	0%	of (subtotal 1 + 2)		$0	*Variable*
Contingency	20%	of (subtotal 1 + 2)		$8,000	*20-50% of (subtotal 1 + 2)*
Subtotal 3	70%	of (subtotal 1 + 2)		**$38,000**	

Cost Summary

Total Construction Estimate (w/o Contingency)	100%	of subtotal 1+2	**$39,700**	*90-140% of subtotal 2*
Total Estimated Project Costs	100%	of (subtotal 1 + 2 + 3)	**$77,700**	*70-150% of (subtotal 1 + 2 + 3)*
For Initial Funding Application	150%	of Total Estimated Project Costs	**$116,550**	*150-300% of (subtotal 1 + 2 + 3)*

Table A2. Cost Estimate Summary for Huckleberry Residential Water Meters

Huckleberry MWC Disinfection Improvement Project

Major Equipment and Construction Items

Unit Items	Quantity	Unit	Unit Cost	Total	Typical Ranges
Water Service Connection from Mainline to Private Property	29	EA	$ 1,500.00	$43,500	*Includes costs for purchase, tax, shipping, and installation. Inplace cost is typically 150-300% of purchase price.*
Water Meter and Box	29	EA	$ 700.00	$20,300	
Connection to existing service line to home	29	EA	$ 200.00	$5,800	
		LS		$0	
		LS		$0	
		LS		$0	
		LS		$0	
		LS		$0	
		LS		$0	
Subtotal 1				**$69,600**	

Other Construction Items	Cost Estimate		Total	Typical Ranges
Electrical	0%	of subtotal 1	$0	*5-125% of subtotal 1*
Instrumentation	0%	of subtotal 1	$0	*3-15% of subtotal 1*
Site Work	5%	of subtotal 1	$3,000	*5-15% of subtotal 1*
Mobilization/ Demolition	8%	of subtotal 1	$6,000	*5-20% of subtotal 1*
Survey Staking	2%	of subtotal 1	$1,000	*Variable*
Subtotal 2	15%	of subtotal 1	**$10,000**	

Non Construction Implementation Costs (Soft Costs)

Permitting/CEQA/NEPA	3%	of (subtotal 1 + 2)	$2,000	*5-20% of (subtotal 1 + 2)*
Engineering	10%	of (subtotal 1 + 2)	$8,000	*10-20% of (subtotal 1 + 2)*
Construction Management	10%	of (subtotal 1 + 2)	$8,000	*5-15% of (subtotal 1 + 2)*
Agency Costs	3%	of (subtotal 1 + 2)	$2,000	*1-5% of (subtotal 1 + 2)*
Land/ROW Acquisition	1 LS			*Variable*
Other Soft Costs	0%	of (subtotal 1 + 2)	$0	*Variable*
Contingency	15%	of (subtotal 1 + 2)	$12,000	*20-50% of (subtotal 1 + 2)*
Subtotal 3	41%	of (subtotal 1 + 2)	**$32,000**	

Cost Summary

Total Construction Estimate (w/o Contingency)	100%	of subtotal 1+2	**$79,600**	*90-140% of subtotal 2*
Total Estimated Project Costs	100%	of (subtotal 1 + 2 + 3)	**$111,600**	*70-150% of (subtotal 1 + 2 + 3)*
For Initial Funding Application	150%	of Total Estimated Project Costs	**$167,400**	*150-300% of (subtotal 1 + 2 + 3)*

Appendix B – Material reviewed from Sonoma County branch CDPH.

This appendix contains material obtained from the Sonoma County branch of the CDPH.

DEPARTMENT OF HEALTH SERVICES
DRINKING WATER FIELD OPERATIONS BRANCH
50 D STREET, SUITE 200
SANTA ROSA, CALIFORNIA 95404
(707) 576-2145 FAX (707) 576-2722

October 3, 2001

System No. 4900634

Ana K. Wilson
Huckleberry Mutual Water Company
P.O. Box 95
Monte Rio, CA 95462

WATER PERMIT NO. 02-18-01P-4900634

The Department of Health Services (Department), Drinking Water Field Operations Branch has completed a review of the Huckleberry Mutual Water Company (Company) water system. The Company is operating without a domestic water supply permit issued by this Department that accurately describes the current water system. The review of the system was performed in preparation of issuing a permit to Huckleberry Mutual Water Company.

In support of the permit, the Drinking Water Field Operations Branch has prepared an Engineering Report, dated September 2001. A copy of that report is attached.

It is the Finding of the State Department of Health Services that Sections 116270 through 116750 of the California Health and Safety Code can be met by the Huckleberry Mutual Water Company water system following system improvements described in the attached Engineering Report. A new domestic water supply permit is hereby granted to Huckleberry Mutual Water Company to supply domestic water to consumers at Huckleberry Heights, subject to the following six provisions:

1. Huckleberry Mutual Water Company shall comply with all state laws applicable to public water systems, including, but not limited to, the California Safe Drinking Water Act as contained in Division 104 of the California Health and Safety Code, and any regulations, standards, or orders adopted thereunder.

2. The following source of supply and treatment is approved for use in the water system:

Source	Status	Station Number	Treatment
Well 01	Active	07N/11W-03A02 M	None

Huckleberry Mutual Water Company must obtain prior permit approval from the Department before utilizing any other source of water in the domestic water system or before making any addition and/or change to the treatment processes listed in this report.

3. The Huckleberry Mutual Water Company must test Well 01 at least twice for the unregulated inorganic chemicals boron and vanadium by December 31, 2003 and chromium VI by December 31, 2002. The Company may test the well for total chromium down to a detection limit of 1 microgram per liter (ug/L). If total chromium is not detected above 1ug/L, the Company is not required to test for chromium VI.

4. The Company must submit an updated Bacteriological Sampling Plan (BSP) that lists a specific routine sample site, specific repeat sites, and five routine sites for increased monitoring in the month following a positive sample. The BSP must include a map of the distribution system, including all appurtenances.

5. The Company must submit an updated Water Quality Emergency Notification Plan to the Department that includes the specific means used to notify the customers served by the water system. If notification is by phone, the plan must include a provision for notifying people who are not at home at the time of the initial notification (e.g. post a notice on the door of the residence). ✓ 11/01

6. The Company must install a flow meter on Well 01, and record and maintain at least weekly well production records from June through September and monthly well production records the remainder of the year.

This permit supersedes all domestic water supply permits previously granted for this system and is non-transferable. If you have any questions regarding this permit, please contact the Sonoma District Office at (707) 576-2145. Please provide the Department with a written response addressing the accuracy of the attached engineering report and your willingness to comply with all permit provisions by October 31, 2001.

Sincerely,

Robert C. Brownwood

Robert C. Brownwood, P.E.
Sonoma District Engineer
Drinking Water Field Operations Branch

Enclosures: Water Quality Emergency Notification Plan;
Bacteriological Site Sampling Plan;
Source Chemical Monitoring Requirements

cc: Sonoma County Environmental Health Department;

4900634/Permit
010808per.ltr/mtb

ENGINEERING REPORT

For Consideration of a Permit for the
Huckleberry Mutual Water Company
Sonoma County
September 2001

DEPARTMENT OF HEALTH SERVICES
Division of Drinking Water and Environmental Management
Sonoma District Office
Michael T. Burgess
Project Engineer

INTRODUCTION

A. Purpose of Report

The purpose of this report is to document the Huckleberry Mutual Water Company (Company) water supply system as it currently exists and to make a recommendation regarding the issuance of a domestic water supply permit to the Huckleberry Mutual Water Company.

B. Brief Description of System

The Company utilizes one active well, Well 01, to meet all system demands. Water from Well 01 supplies 30 active connections and two inactive connections through four separate water mains. Water is supplied to ten connections located on the hillside above the well through a 2-inch galvanized main. Water is supplied through a pressure reducing valve at the well site to the other 22 connections, which all lie along Cazadero Highway at approximately the same elevation as the well. A single PVC lined 10,000-gallon redwood storage tank supplies all system storage. The storage tank floats on the pressure in the distribution system.

C. Area Served and Water Production

The Company is a community water system located along Cazadero Highway and Huckleberry Heights approximately two miles north of Highway 116 near Cazadero. The Company serves approximately 41 year round residents through 19 connections as well as 11 vacation homes, which are only infrequently occupied. All connections are unmetered. There are no accurate usage records as the well is also unmetered. Based on the local landscaping and occupancy the estimated annual average water usage is 7,200 gallons per day (gpd). Assuming complete occupancy on peak usage days, the estimated peak day usage is 10,500 gallons. Each house in the subdivision is served by an individual septic system. All homes are built on one acre or larger lots. Currently, there are no plans for expansion of the system beyond the current 32 total connections, nor has there been any new home construction in the past 20 years. It does not seem likely that there will be any future expansion due to the local topography.

The Company began operation in 1954. Each connection is billed a flat rate fee on a quarterly basis. The quarterly fee is based on the expenses incurred during the previous quarter plus a small amount for a contingency fund. If the Company has insufficient funds to meet a repair cost a special assessment is placed on the homeowners to meet this need. The Company is a privately owned community water system.

D. Source of Information

Information used to prepare this report was gathered from the files of the Drinking Water Field Operations Branch, Sonoma District Office, and from a field inspection of the water system conducted on August 8, 2001. The investigation, analyses, and preparation of this report was undertaken primarily by Michael Burgess, Sanitary Engineer of the Sonoma District, Drinking Water Field Operations Branch, California Department of Health Services.

INVESTIGATIONS AND FINDINGS

A. Source of Supply

The Company is supplied by one active well, Well 01. Very little information was available regarding Well 01. It was drilled prior to 1954 to a depth of 60 feet. The well is cased to a depth of 60 feet with an 8-inch steel casing that terminates 1½ feet above grade. The well is surrounded by a 4 foot by 4 foot concrete pad and is housed in a locked wooden shed. It is unknown if the well was constructed with a sanitary seal. The static water level in the well is 40 feet below grade. The well is located on an unfenced lot approximately 20 feet southwest of Cazadero Highway and 300 feet southwest of the banks of Austin Creek, at the base of a hill where ten of the 32 connections served by the Company are located. A small seasonal stream, Consolli Gulch, flows approximately five feet northwest of the well. The location is heavily forested with a variety of trees, mostly redwoods. The exact location of the septic systems serving the surrounding homes is unknown, but the well appears to be at least 50 feet from the nearest septic system. The well is equipped with a 2 horsepower (hp) submersible pump set at a depth of 47 feet below grade, which is capable of supplying 12 gallons per minute (gpm) at the well head pressure of 200 psi. The pump is activated by a one foot drop in the level of water in the storage tank, which corresponds to a decrease in storage volume of 1,000 gallons. The well pump is equipped with a pump saver device that prevents the well pump from running if the water level in the well drops below the submersible pump. The pump cannot return to operation for at least 16 minutes after the pump saver is activated. Water produced by Well 01 meets all primary drinking water standards but exceeds the secondary standards for manganese and iron.

B. Treatment

The water system provides no treatment of the water supplied by Well 01.

C. Storage and Distribution

The Company's distribution system contains four water mains, all 2-inch galvanized pipe, that originate at the wellhead. The Westside main serves ten connections along the west side of Cazadero Highway. The Creekside main serves ten connections along the east side of Cazadero Highway. The Hill main serves ten connections along Huckleberry Heights located on the hill that rises up behind the well, and the fourth main serves two connections between the well and Huckleberry Heights. The laterals running from the mains to the houses consist of ¾ and 1-inch pipe of various materials. A single 10,000-gallon PVC lined redwood storage tank, Tank 01, supplies all the water storage for the system. Tank 01 is located at the top of the hill that rises northwest of the well. Water is supplied from the Hill main to the tank through a common inlet/outlet located at the bottom of the tank. The system pressure is supplied entirely by the submersible pump in Well 01. A single connection of the Hill main to a house at approximately the same elevation as the storage tank is supplied by 1/3 hp centrifugal pump through a 70-gallon pressure tank. The pump is capable of supplying 6 gpm at 60 psi. The pump and pressure tank are located on the customer side of the connection to the water main and are the sole responsibility of the customer that they serve. The pressure in the Westside Main, Creekside Main, and the main that supplies two connections along Cazadero Highway is maintained at 60 psi through a pressure reducing valve. The pressure in the Hill main varies from approximately 30 psi at the last connection before the storage tank to 200 psi at the wellhead.

Overall the storage tank was in good condition. There were no visible leaks, and the screening on the ventilation was in good condition. The tank is lined with a PVC liner that allows some water to bleed through keeping the redwood staves moist and in good condition. The roof of the storage tank and the hatch were made of corrugated tin. There were no visible holes. The hatch was not locked and a ladder was readily available. However, the area is not prone to vandalism, and there is little chance of tampering with the water supplied to the customers.

Well 01 should be able to produce 12 gpm at least 15 hours per day based on statements made by the water system's operator. This is sufficient to meet the Company's estimated peak day demand of 10,500 gallons. However it is not sufficient to meet the estimated peak hour demands of 15 gpm. It is recommended that a water system of this size and type have at least 10,000 gallons of storage to provide for average day demands and as equalizing storage for peak demand periods. The Company meets these storage requirements. It is also recommended that a system of this type have 30,000 gallons of additional storage to meet fire flow requirements of 250 gpm for 120 minutes. The distribution system contains one 2 ½-inch fire hydrant standpipe, but with the current storage and source capacity, the system would only be capable of supplying 250 gpm of fire flow for 40 minutes. Given the system's questionable and limited source capacity, the Company must install a meter on the well and record the water usage at least weekly from June through September and monthly the remainder of the year in order to establish current water usage amounts and patterns. The Company must provide evidence that sufficient water is available from the water source and distribution reservoir to supply adequately, dependably, and safely the total requirements of all users under maximum demand conditions.

D. Water Quality and Monitoring

Bacteriological

The Company is required to collect at least one bacteriological sample each month from the distribution system. The well is not sampled on a regular basis. The Company has had 13 routine samples test positive for total coliform since October 1993. Two of the positive routine samples were part of a set of three routine samples collected in July 1995. This resulted in a violation of the total coliform maximum contaminant level (MCL). A second citation was issued to the Company in July 1996 for failure to collect a complete repeat sample set following a routine sample testing positive for total coliform. No samples collected by the Company have ever tested positive for fecal coliform. The Department does not have a Bacteriological Sampling Plan (BSP) on file for the Company. The Company must provide the Department with a completed BSP including a map of the distribution system piping, including all appurtenances, and indicating the location of the routine sampling site and all repeat sampling sites.

Chemical

Mn 620 on 8/02

Well 01 was last sampled for all required primary inorganic chemicals and secondary standards on May 2, 1999. The water met all primary and secondary drinking water standards. However, the previous sample collected on March 15, 1996 contained 370 micrograms per liter (ug/L) iron and 710 ug/L manganese, which exceeds the secondary standards for iron and manganese of 300 ug/L and 50 ug/L, respectively. It is possible that the sample collected in 1999 was not a raw water sample collected directly from the well. There appears to be a general upward trend in the levels of iron and manganese from 1989 through 1996, and significant amounts of iron and manganese have precipitated out of solution in the well casing in the past, damaging the well's submersible pump. The Company must test the well for all primary inorganic chemicals and secondary standards at least once every three years. The Company has tested the well for nitrate six times over the past twelve years. No nitrate has ever been detected. The Company must test the well for nitrate at least once each year.

The Company tested the well for all the required volatile organic chemicals (VOCs) in April 1987, September 1993, and May 1999. The well was tested for MTBE in the May 1999 sample. The Company tested the well for the required synthetic organic chemicals (SOCs) in May 1999. There were no

detectable organic chemicals, including MTBE, in any of the samples. The Company must test the well for the required VOCs at least once every six years and for the required SOCs as indicated on the attached "Source Chemical Monitoring Requirements".

The Company must sample Well 01 at least twice for the unregulated inorganic chemicals, boron and vanadium, by December 31, 2003 and for chromium VI by December 31, 2002. The Company may test the well for total chromium down to a detection limit of 1 ug/L. If total chromium is not detected above 1 ug/L, the Company is not required to test for chromium VI. Since no organic chemicals have been detected in the well, it is not considered vulnerable to the unregulated organic chemicals, and the Company will not be required to test for them. However, the Company will need to submit a letter to the Department allowing the Department permission to sample the well for the unregulated organic chemicals.

The well was tested for asbestos in May 1999. There was no detectable asbestos in the well. Since the Company's distribution system does not contain any asbestos cement piping, the Company will not be required to test the distribution system for asbestos. The Company must test the well for asbestos at least once every nine years.

The Company last performed four consecutive quarters of radiological monitoring on the well from April 2000 through January 2001. The average level of gross alpha radiation detected was 0.6 picocuries per liter (pCi/L). This is well below the action level (AL) for gross alpha radiation of 5 pCi/L. The highest level of gross alpha radiation ever measured in the well was 2.14 pCi/L in June 1996, which is also well below the AL for gross alpha radiation. The Company must perform four consecutive quarters of radiological monitoring every four years. The next round of monitoring is due to begin in 2004.

The Company last collected a set of five tap samples from the distribution system for lead and copper monitoring in January 1999. The 90th percentile level of copper in the sample set was 0.44 milligrams per liter (mg/L), which is well below the AL for copper of 1.3 mg/L. The highest level of copper detected in any one sample was 0.48 mg/L, which is also well below the AL for copper. The Company has never measured any detectable lead in any sample collected from the distribution system. The Company is currently required to collect a set of five tap samples from the distribution system for lead and copper monitoring once every three years. The next set of five tap samples must be collected during June, July, August, or September 2002.

E. Operation and Maintenance

The Company's president, who is not a state certified water treatment operator, currently operates the water system. The president collects the monthly bacteriological samples and collects samples for chemical monitoring as needed. All repairs are contracted out. There is no cross-connection program in place. However, there are no private wells in use in the system, and there are no pools or hot tubs in the system. Since the system is located in a rural residential area, it is highly unlikely that any other possible cross-connections exist. The Company should perform a cross-connection survey to ensure that no potential cross-connections exist in the system. There is no valve exercising or regular maintenance program. The Company submitted an inadequate Consumer Confidence Report (CCR) for 2000. The Company must supply all its customers with a CCR for 2001 that meets all Department requirements. The Water Quality Emergency Notification Plan (ENP) supplied to the Department by the Company is insufficient. The Company must submit an updated ENP that provides for notification of customers that are not contacted by phone (i.e. posting a notice on the door of the residence).

The Huckleberry Mutual Water Company is classified as a Grade D1 distribution system, which requires a state certified Grade D1 or higher distribution system operator. Currently, the Company's president, who is not a state certified water system operator, operates the system. The Company must either apply for an interim distribution system operator's certificate on the behalf of the Company's president or contract for the services of a state certified Grade D1 or higher distribution system operator by December 31,

2001. Since the Company does not provide any type of water treatment, they are not required to designate a water treatment operator.

APPRAISAL OF SANITARY HAZARDS AND NECESSARY PUBLIC HEALTH SAFEGAURDS

Overall, the system is well maintained and operated. The Company is current on all chemical monitoring. The Company's sole source of water, Well 01, produces water which meets all primary drinking water standards but exceeds the secondary standards for manganese and iron of 50 ug/L and 300 ug/L, respectively. However, little is known about the construction features of Well 01, and it is unlikely that the well is constructed in accordance with all Department of Water Resources Well Standards. The Company has sufficient source capacity to meet peak day demands at current occupancy and use rates, based on estimated water usage. The Company must install a flow meter at the wellhead to determine actual peak day and annual water usage amounts. The Company must record the amount of water used at least once each week from June through September and at least once each month the remainder of the year. The Company must provide evidence that sufficient water is available from the water sources and distribution reservoirs to supply adequately, dependably, and safely the total requirements of all users under maximum demand conditions. The water system contains sufficient storage to provide for average day water use and as equalizing storage during peak demand periods. However, the Company may wish to add 30,000 gallons of storage to provide for 120 minutes of fire flow at 250 gpm. The Company's current ENP is not satisfactory. The Company must submit an updated ENP that includes a provision for notification of customers that are not reached by phone (i.e. posting a notice on the door of the residence). The Company must designate a state certified distribution system operator as the water system's chief operator.

RECOMMENDATIONS

It is the finding of the Division of Drinking Water and Environmental Management that the Huckleberry Mutual Water Company water supply system is capable of supplying wholesome and potable water to its customers as stipulated in this Engineering Report. Therefore, it is recommended that a domestic water supply permit be granted to the Huckleberry Mutual Water Company to continue to operate the existing water system as described in this report subject to the following conditions:

1. Huckleberry Mutual Water Company shall comply with all state laws applicable to public water systems, including, but not limited to, the California Safe Drinking Water Act as contained in Division 104 of the California Health and Safety Code, and any regulations, standards, or orders adopted thereunder.

2. The following source of supply is approved for use in the water system:

Source	Status	Station Number	Treatment
Well 01	Active	07N/11W-03A02 M	None

   Huckleberry Mutual Water Company must obtain prior permit approval from the Department before utilizing any other source of water in the domestic water system or before making any addition and/or change to the treatment processes listed in this report.

3. The Huckleberry Mutual Water Company must test Well 01 for the unregulated inorganic chemicals boron and vanadium by December 31, 2003 and chromium VI by December 31, 2002. The Company may test the well for total chromium down to a detection limit of 1 ug/L. If total chromium is not detected above 1 ug/L, the Company is not required to test for chromium VI.

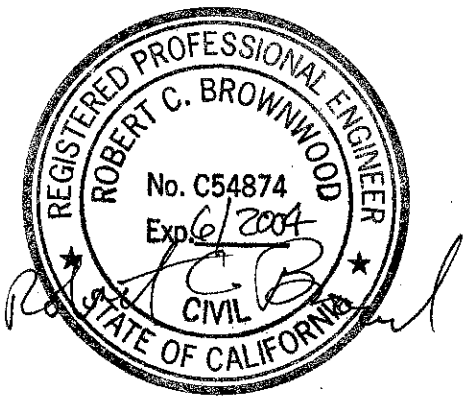
4. The Company must submit an updated Bacteriological Sampling Plan (BSP) that lists a specific routine sample site, specific repeat sites, and five routine sites for increased monitoring in the month following a positive sample. The BSP must include a map of the distribution system including all appurtenances.

5. The Company must submit an updated Water Quality Emergency Notification Plan to the Department that includes the specific means used to notify the customers served by the water system. If notification is by phone, the plan must include a provision for notifying people who are not at home at the time of the initial notification (e.g. post a notice on the door of the residence).

6. The Company must install a flow meter on Well 01 and record and maintain at least weekly well production records from June through September and monthly well production records the remainder of the year.

Report Prepared by:

Michael T. Burgess
Sanitary Engineer
Sonoma District
Drinking Water Field Operations Branch



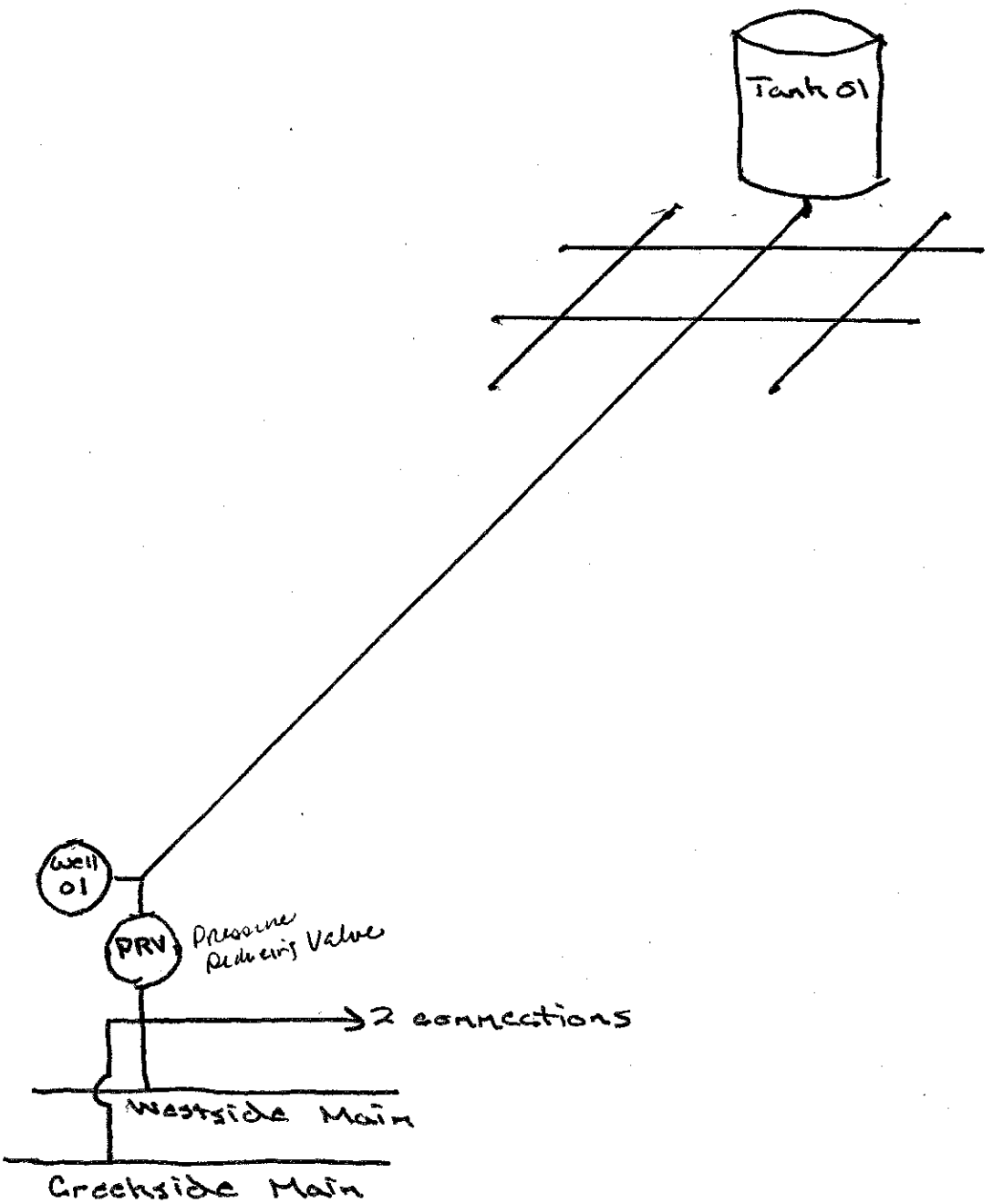
Report Reviewed by:

Robert C. Brownwood, P.E.
Sonoma District Engineer
Drinking Water Field Operations Branch

cc: Sonoma County Environmental Health Department

4900634/ Permit
010808Eng.rpt/ mtb

Huckleberry Mutual Water Company



Sour[illegible] Chemical Monitoring Requ[illegible]ements

Date of report: **8/14/2001**

System Name: **Huckleberry Mutual Water Company** System number: **4900634**

Source Name : **WELL 01** Source class: **CTGP**

Source Code : **07N/11W-03A02 M**

Chemical Group : 64432- Primary - Inorganics

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
Aluminum	< 50.00	ug/l	1000	5/2/1999	Once every three years	May 2002	
Antimony	< 6.00	ug/l	6	5/2/1999	Once every three years	May 2002	
Arsenic	< 2.00	ug/l	50	5/2/1999	Once every three years	May 2002	
Barium	< 100.00	ug/l	1000	5/2/1999	Once every three years	May 2002	
Beryllium	< 1.00	ug/l	4	5/2/1999	Once every three years	May 2002	
Cadmium	< 1.00	ug/l	5	5/2/1999	Once every three years	May 2002	
Chromium	< 10.00	ug/l	50	5/2/1999	Once every three years	May 2002	
Fluoride	0.13	mg/l	1.8	5/2/1999	Once every three years	May 2002	
Mercury	< 1.00	ug/l	2	5/2/1999	Once every three years	May 2002	
Nickel	< 10.00	ug/l	100	5/2/1999	Once every three years	May 2002	
Selenium	< 5.00	ug/l	50	5/2/1999	Once every three years	May 2002	
Thallium	< 1.00	ug/l	2	5/2/1999	Once every three years	May 2002	

Chemical Group : 64432- Primary - Asbestos

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
Asbestos	< 0.20	MFL	7 MFL	5/2/1999	Once every nine years	Apr 2008	

Chemical Group : 64432.1 -Nitrate/Nitrite

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
Nitrate (as NO3)	< 2.00	mg/l	45	8/2/2000	Once per year	Aug 2001	Due
Nitrite(as N)	< 10.00	ug/l	1000	5/2/1999	Once every three years	May 2002	

Chemical Group : 64449-A & B - Secondary Standards

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
Aggressive Index	11.00			5/2/1999	Once every three years	May 2002	
Bicarbonate	150.00	mg/l		5/2/1999	Once every three years	May 2002	
Calcium	31.00	mg/l		5/2/1999	Once every three years	May 2002	
Carbonate	< 1.00	mg/l		5/2/1999	Once every three years	May 2002	
Chloride	6.70	mg/l	500	5/2/1999	Once every three years	May 2002	
Color	< 3.00	UNIT	15	5/2/1999	Once every three years	May 2002	
Copper	< 50.00	ug/l	1000	5/2/1999	Once every three years	May 2002	
Foaming Agents (MBAS)	< 0.05	mg/l	0.50	5/2/1999	Once every three years	May 2002	
Hydroxide	< 1.00	mg/l		5/2/1999	Once every three years	May 2002	
Iron	< 100.00	ug/l	300	5/2/1999	Once every three years	May 2002	
MTBE (Secondary)	< 3.00	ug/l	5	5/2/1999	Once every three years	May 2002	
Magnesium	9.20	mg/l		5/2/1999	Once every three years	May 2002	
Manganese	< 20.00	ug/l	50	5/2/1999	Once every three years	May 2002	
Odor	< 1.00	unit	3	5/2/1999	Once every three years	May 2002	
Silver	< 10.00	ug/l	100	5/2/1999	Once every three years	May 2002	
Sodium	11.00	mg/l		5/2/1999	Once every three years	May 2002	
Specific Conductance	290.00	uMho	1600	5/2/1999	Once every three years	May 2002	
Sulfate	8.50	mg/l	500	5/2/1999	Once every three years	May 2002	
TDS	150.00	mg/l	1000	5/2/1999	Once every three years	May 2002	
Total Alkalinity	120.00	mg/l		5/2/1999	Once every three years	May 2002	
Total Hardness	115.00	mg/l		5/2/1999	Once every three years	May 2002	
Turbidity	0.66	NTU	5	5/2/1999	Once every three years	May 2002	
Zinc	< 50.00	ug/l	5000	5/2/1999	Once every three years	May 2002	
pH	7.20			5/2/1999	Once every three years	May 2002	

System Name: **Huckleberry .utual Water Company** System number: **4900634**

Source Name : **WELL 01** Source class: **CTGP**

Source Code : **07N/11W-03A02 M**

Chemical Group : Section 64441-Radioactivity

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
Gross Alpha	0.13	PC/L	15	1/16/2001	4 consecutive quarterly samples every 4th year	Jan 2005	

Chemical Group : TABLE 64444-A - Volatile Organic Chemicals

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
1,1,1-Trichloroethane	0.00	ug/l	200	5/2/1999	Once every five years	May 2004	
1,1,2,2-Tetrachloroethane	0.00	ug/l	1	5/2/1999	Once every five years	May 2004	
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.00	ug/l	1200	5/2/1999	Once every five years	May 2004	
1,1,2-Trichloroethane	0.00	ug/l	5	5/2/1999	Once every five years	May 2004	
1,1-Dichloroethane	0.00	ug/l	5	5/2/1999	Once every five years	May 2004	
1,1-Dichloroethylene	0.00	ug/l	6	5/2/1999	Once every five years	May 2004	
1,2,4-Trichlorobenzene	0.00	ug/l	70	5/2/1999	Once every five years	May 2004	
1,2-Dichlorobenzene	0.00	ug/l	600	5/2/1999	Once every five years	May 2004	
1,2-Dichloroethane	0.00	ug/l	.5	5/2/1999	Once every five years	May 2004	
1,2-Dichloropropane	0.00	ug/l	5	5/2/1999	Once every five years	May 2004	
1,3-Dichloropropene	0.00	ug/l	.5	5/2/1999	Once every five years	May 2004	
1,4-Dichlorobenzene	0.00	ug/l	5	5/2/1999	Once every five years	May 2004	
Benzene	0.00	ug/l	1	5/2/1999	Once every five years	May 2004	
Carbon Tetrachloride	0.00	ug/l	.5	5/2/1999	Once every five years	May 2004	
Dichloromethane	0.00	ug/l	5	5/2/1999	Once every five years	May 2004	
Ethylbenzene	0.00	ug/l	700	5/2/1999	Once every five years	May 2004	
MTBE (Primary)	< 3.00	ug/l	13	5/2/1999	Once every five years	May 2004	
Monochlorobenzene	0.00	ug/l	70	5/2/1999	Once every five years	May 2004	
Styrene	0.00	ug/l	100	5/2/1999	Once every five years	May 2004	
Tetrachloroethylene	0.00	ug/l	5	5/2/1999	Once every five years	May 2004	
Toluene	0.00	ug/l	150	5/2/1999	Once every five years	May 2004	
Trichloroethylene	0.00	ug/l	5	5/2/1999	Once every five years	May 2004	
Trichlorofluoromethane	0.00	ug/l	150	5/2/1999	Once every five years	May 2004	
Vinyl Chloride	0.00	ug/l	.5	5/2/1999	Once every five years	May 2004	
Xylenes (total)	0.00	ug/l	1750	5/2/1999	Once every five years	May 2004	
cis-1,2-Dichloroethylene	0.00	ug/l	6	5/2/1999	Once every five years	May 2004	
trans-1,2-Dichloroethylene	0.00	ug/l	10	5/2/1999	Once every five years	May 2004	

Chemical Group : TABLE 64444-B - Synthetic Organic Chemicals

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
2,4,5-TP (Silvex)	< 0.50	ug/l	50	5/2/1999	One time sample required		Completed
2,4-D	< 2.50	ug/l	70	5/2/1999	One time sample required		Completed
Atrazine	< 0.10	ug/l	3	5/2/1999	Once every three years	May 2002	
Dalapon	< 2.50	ug/l	200	5/2/1999	One time sample required		Completed
Simazine	< 0.07	ug/l	4	5/2/1999	Once every three years	May 2002	

Chemical Group : 64450-Unregulated Chemical Requiring Monitoring (UCMR)

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
1,2,3-Trichloropropane	0.00	ug/l		5/2/1999	Once every five years	May 2004	
Dichlorodifluoromethane	0.00	ug/l		5/2/1999	Once every five years	May 2004	

Assessment Summar

District Name DHS Sonoma District **District No.** 18 **County** Sonoma

System Name Huckleberry Mutual Water Company **System No.** 4900634

Source Name WELL 01 **Source No.** 001 **PS Code** 07N/11W-03A02 M

Completed by Michael Burgess **Date** September, 2001

Description of System and Source

The Company is a community water system located in a hevily forested rural residential area along Cazadero Highway and Huckleberry Heights approximately two miles north of Highway 116 near Cazadero. The Company serves approximately 41 year round residents through 19 connections as well as 11 vacation homes, which are only infrequently occupied.

The Company utilizes one active well, Well 01, to meet all system demands.

Assessment Procedures

The assessment of the source WELL 01 was conducted by DHS District office. The following sources of information were used in the assessment: DHS files, county files, water system files, and a site inspection.

Procedures used to conduct the assessment include: GPS survey, site inspection, DHS system file review, Mapping Tool Report.

Contents of this Assessment

Yes ☒	No ☐	**Assessment Summary**
Yes ☒	No ☐	**Vulnerability Summary**
Yes ☐	No ☒	**Source Location Form**
Yes ☒	No ☐	**Delineation of Ground Water Protection Zones**
Yes ☒	No ☐	**Physical Barrier Effectiveness Checklist**
Yes ☒	No ☐	**Well Data Sheet**
Yes ☒	No ☐	**Inventory of Possible Contaminating Activities**
Yes ☒	No ☐	**Vulnerability Ranking**
Yes ☒	No ☐	**Assessment Map**

Drinking Water Source Assessment and Protection (DWSAP) Program

Vulnerability Summary

District Name DHS Sonoma District **District No.** 18 **County** Sonoma

System Name Huckleberry Mutual Water Company **System No.** 4900634

Source Name WELL 01 **Source No.** 001 **PS Code** 07N/11W-03A02 M

Completed by Michael Burgess **Date** September, 2001

THE FOLLOWING INFORMATION MUST BE INCLUDED IN THE SYSTEM CONSUMER CONFIDENCE REPORT

A source water assessment was conducted for the **WELL 01**

of the **Huckleberry Mutual Water Company** water system in **September, 2001**

The source is considered most vulnerable to the following activities not associated with any detected contaminants:

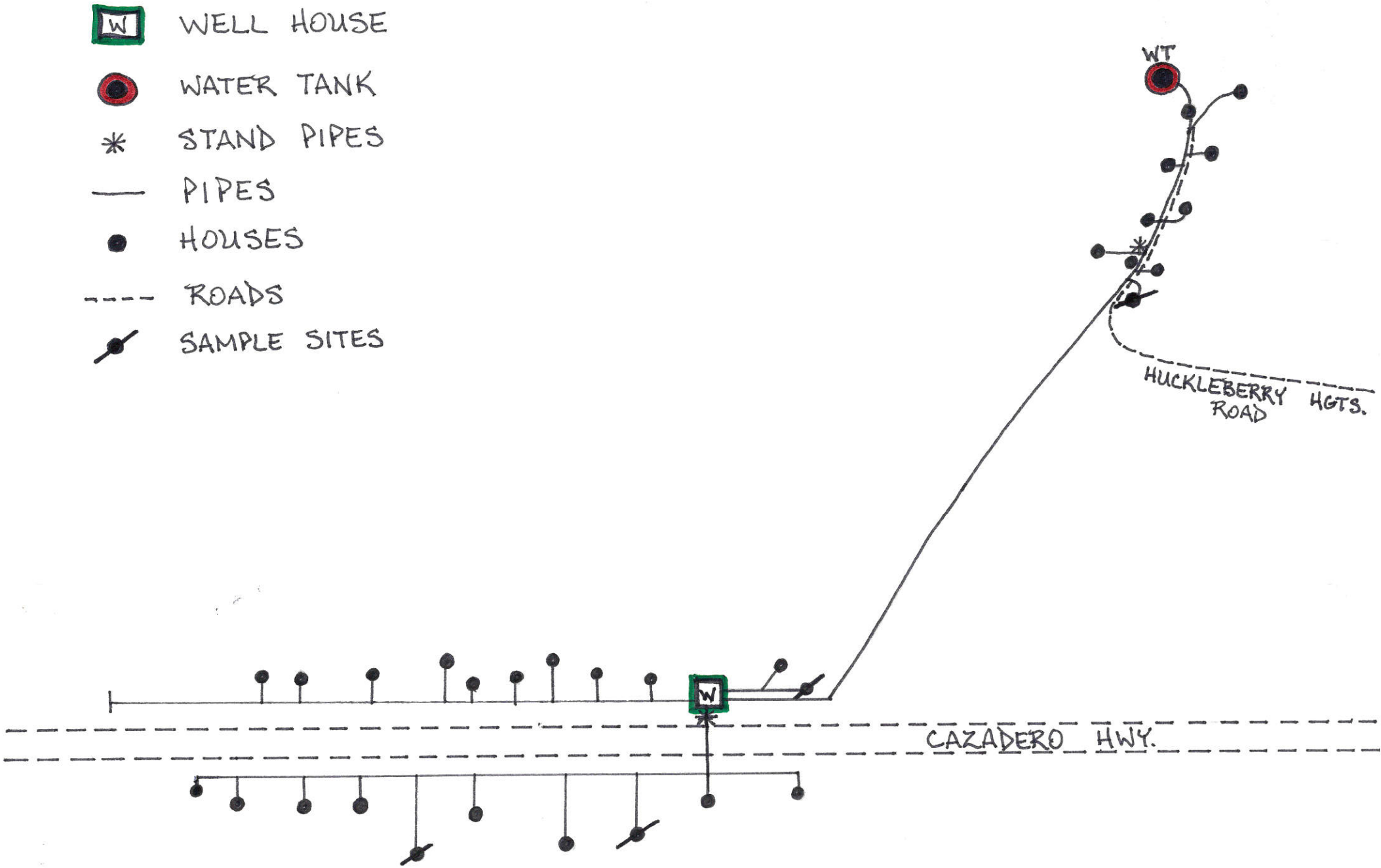
Septic systems - low density

A copy of the complete assessment may be viewed at:

Drinking Water Field Operations Branch
50 D Street, Suite 200
Santa Rosa, CA 95404

You may request a summary of the assessment be sent to you by contacting:

Office Representative
(707) 576-2145
(707) 576-2722 (fax)


W
WELL HOUSE
WATER TANK
STAND PIPES
PIPES
HOUSES
ROADS
SAMPLE SITES
WT
HUCKLEBERRY HGTS. ROAD
W
CAZADERO HWY.

SANITARY SURVEY FORM VENTORY

PWSID 4900634 | SYSTEM NAME Huckleberry MWC

DATE OF SURVEY 8-29-11 | COUNTY Sonoma | ENGINEER - WWW

(SYSTEM REPRESENTATIVE) John McCray - Goldsmith | (OTHER REPRESENTATIVE) Ed Griggs

SYSTEM ADDRESS

Addressee (Primary Address) 8 Huckleberry Heights
Street
City Cazadero State CA Zip 95421
System Phone (917) 744-5515 Fax None

SYSTEM OWNER

Addressee (Owners Address)
Street
City State Zip
Owner Phone Fax

LOCATION OF SYSTEM

Nearest City Santa Rosa or Cazadero Description or Physical Address River Road West, Right on Caz Highway, Left on Hht sign

OPERATOR OF SYSTEM

Name None Paid Position? ☐ Yes ☐ No

Certified Operator? ☐ Yes ☐ No ☐ Not required

Treatment Certification Level _____ Distribution Certification Level _____

Treatment Certification date _____ Distribution Certification date _____

Treatment Certification # Distribution Certification #

Other ☐ _____ Copy of Certificate(s)? Other ☐ _____ ☐ Yes ☐ No

Phone

Number of Employees _____ Full Time _____ Part Time

Treatment Certification Needed for WS: Distribution Certification Needed for WS: D1

Total Service Connections: Residential / Non-Transient: Transient: 29

Total Active Connections: Residential / Non-Transient: Transient: 29

Service Connections Metered? ☐ Yes ☒ No

Percent Metered %

Collection Rate % Flat $30.00-60.00

Rates and Rate Structure

Resident Population 45
(Number of permanent residents utilizing PWS daily)

Non-Transient Population
(Number of non-transient persons utilizing PWS daily)

Transient Population
(Number of transient persons served by PWS daily)

MDD from Annual Report: ~2500 (estimate) 10K?

SYSTEM CLASS

☒ C = Community ☐ NTNC = Non-Transient Non-Community
☐ TNC = Transient Non-Community

OWNER TYPE

☐ 1 Federal Government
☒ 2 Private Subdivision, Investor, Trust, Cooperative, Water Association, etc.
☐ 3 State Government
☐ 4 Local Government Authority, Commission, District, Municipality, City, etc.
☐ 5 Mixed Public/Private

SERVICE AREA CHARACTERISTICS LIST

☐ BR Bar
☐ DC Day Care Center
☐ DI Dispenser
☐ HS Head Start
☐ HA Homeowners Assoc.
☐ HM Hotel/Motel
☐ HR Highway Rest Area
☐ IA Industrial/Agricultural
☐ IC Interstate Carrier
☐ IN Institution
☐ MF Medical Facility
☐ MH Mobile Home Park
☐ MU Municipality
☐ OA Other Area
☐ ON Other Non-Transient Area (_____Average Daily Visitors TNC)
☐ OR Other Residential Area
☐ OT Other Transient Area

☐ PA Recreation Areas
☒ RA Residential Area
☐ RE Retail Employees
☐ RS Restaurant
☐ RV RV Park
☐ SC School
☐ SI Sanitary Improvement District
☐ SK Summer Camp
☐ SR Secondary Residences
☐ SS Service Station
☐ SU Subdivision
☐ WB Water Bottler
☐ WH Wholesaler (Sells Water)

Service Category Description

Comments/D:
+Update ENP (check)
- certified operator (D1)
- JDYPW on call

- Meter (check) e-mail

- Overflows

well @ 1505 Caz highway

PWSID 4900634 SYSTEM NAME

SANITARY SURVEY FORM – WATER SYSTEM FACILITIES

Water System Facilities (WSF) numbers are WSF Type Codes plus an assigned number. (i.e. source facility numbering starts with 001 and all non-source facilities also start with 001). See instruction sheet for a list of WSF Type Codes. When a source is operational it is considered **A**ctive, this includes systems that are seasonal. **I**nactive sources are those which are shut down but can return to active status, such as a system out of business. **P**roposed sources are those that have been identified through the Plan Review process, but are not connected to the water system.

*A **water source facility** is a well, spring, intake, infiltration gallery or consecutive connections from which a system draws or purchases water:*	Total Number of Source Facilities

WATER SYSTEM FACILITIES SUMMARY (WSF)

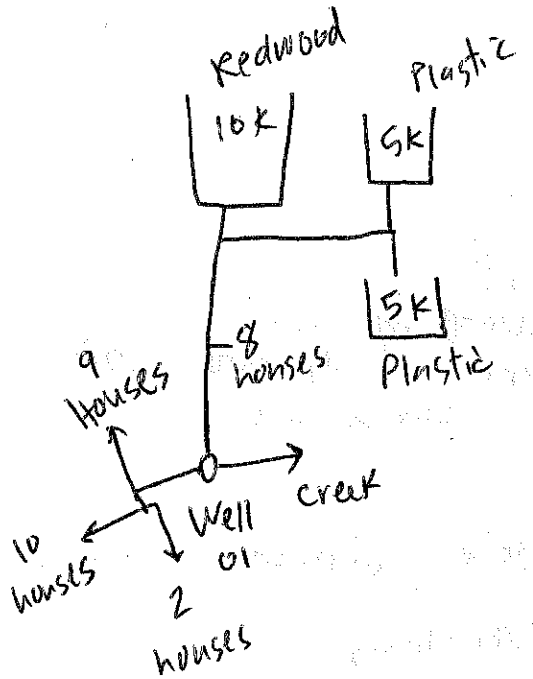
SYSTEM_NO	PSCODE	SOURCENAME	SOURCE_CLA	SOURCE_TYP
4900634	4900634-001	WELL 01	CTGP	Source

Description of Water System Facility flow:

Example: Well 1(GW001) is pumped into pumphouse where chlorine is applied (TP001) and from there to the storage tank (ST001). The treated water flows by gravity to the distribution system (DS001) .

SYSTEM SCHEMATIC

Describe points of chemical application.



PWSID 4900694 SYSTEM NAME

SANITARY SURVEY FORM – WELLS & WELL PUMPS

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE **STATUS OF SOURCE** ☒ (A)ctive ☐ (I)nactive ☐ (P)roposed

PS CODE 001
These are State assigned identification numbers

Source Name Well 01
Name of Source – Example: Well 1 or South well, etc.

Available ☒ Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _____ to _____

GWUDISW PA Completed ☐ Yes ☒ No ☐ Unk ☐ N/A

Well Yield _____ Date of Pump Test: _____
pump tested in gallons per minute

Yield influenced by other wells? ☐ Yes ☐ No ☒ Unk ☐ N/A

Well Metered? ☐ Yes ☒ No ☐ Unk ☐ N/A

Log Available? ☐ Yes ☒ No

Average Production _____ indicate units

Maximum Production indicate units

Date Drilled 1954 if well. . date drilled

Casing Size 8" size of casing installed in well

Case Depth UNKNOWN depth of casing installed in well

Well Depth 60' depth of well expressed in feet

Annular Seal Depth UNK depth of grout used to seal well walls

Log SWL 40' *(static) expressed in feet below ground elevation*

Log PWL N/A *(pumping) expressed in feet below ground elevation*

Pump Capacity *capacity of pump installed expressed in gallons per min*

Screened Interval *expressed in feet below ground elevation*
UNKNOWN

(Check Well Data Sheet)

WELLS

	Yes	No	Unk	N/A
Is well site protected from flooding? (p. 4-17)	☐	☒	☐	☐
Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)?	☐	☒	☐	☐
If no . . explain				
Does casing extend at least 18 inches above finished floor inside well house	☒	☐	☐	☐
(Check for appropriate distance)				
Proper Sanitary Seal (2' each direction, 4 inches thick)?	☐	☒	☐	☐
Proper well cap w/o holes? (p. 4-12)	☒	☐	☐	☐
Is well vented?	☐	☒	☐	☐
Is well vent properly screened and terminated in a downward position?	☐	☐	☐	☒
Does well have suitable sampling tap (p. 4-7)? Raw Water	☐	☒	☐	☐
Treated	☒	☐	☐	☐
Is the sampling tap threaded?	☒	☐	☐	☐
Are check valves, blow-off valves and water meters maintained and operating properly?	☐	☐	☐	☒
Well in pit?	☐	☒	☐	☐
Is Source Water Assessment Accurate?	☒	☐	☐	☐
History of sand or caving?	☐	☒	☐	☐
Production reduced from first install?	☐	☐	☒	☐

SWAP Completion Date: 8/2001

Soil Type (from SWAP): Alluvial

PUMPS

Type (p. 4-7) (example: 30 hp line shaft turbine) 2hp Sub

Rated Capacity

	Yes	No	Unk	N/A
Are pumps operable?	☒	☐	☐	☐
How frequently are pump(s) replaced? 3-5 yr				
Are backup pumps/motors provided?	☐	☒	☐	☐
Are controls functioning properly and adequately protected?	☒	☐	☐	☐
Do underground compartments have a drain?	☐	☐	☐	☒
Is the facility properly protected against trespassing and vandalism?	☒	☐	☐	☐
Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?	☒	☐	☐	☐
Is a preventive maintenance program in operation? JDYPW	☐	☒	☐	☐
Are recommended spare parts on hand?	☐	☒	☐	☐
Cross connections eliminated?	☒	☐	☐	☐

Top PCAs to which the source is vulnerable to (listed in the vulnerability summary):

- Septic
- Storage Tanks (above)
- Roads
- Surface water

Is the list in the vulnerability summary still accurate? ☒ ☐ ☐ ☐

Have there been any detections in the source that indicate increased monitoring for a certain PCA is warranted? ☐ ☒ ☐ ☐

Comments: (Such as, detailed information on any items with identified deficiencies)

Drainage to creek from well head

Explain Controls:

Comments: (Such as, detailed information on any items with identified deficiencies)

PWSID 4900634 SYSTEM NAME

SANITARY SURVEY FORM - TREATMENT

Treatment Objective

B = Disinfection Byproduct Control
C = Corrosion Control
D = Disinfection
E = Dechlorination
F = Iron Removal
I = Inorganics Removal
M = Manganese Removal
N = *No Treatment at Source*
O = Organics Removal
P = Particulate Removal
R = Radionuclides Removal
S = Softening (Hardness Removal)
T = Taste / Odor Control
Z = Other _____

Treatment Codes

(See separate sheet of Treatment Codes)

WATER TREATMENT FACILITIES

WSF ID Treatment Plant Name Treatment Objective and Code

PRINT OUT FROM PARADOX (SDWIS)
ATTACHED

NO TREATMENT

FOR SYSTEMS EMPLOYING FULL-TIME DISINFECTION

	Yes	No	Unk	N/A
What disinfectant is used?				
Is the disinfectant used NSF approved?	☐	☐	☐	☐
Is the amount of disinfectant used recorded?	☐	☐	☐	☐
If Yes, amount used: _____lbs/day _____ ppm _____ other (give units)				
Is the amount of disinfectant used compared to water pumped to verify concentration?	☐	☐	☐	☐
Is chemical storage adequate and safe?	☐	☐	☐	☐
If No, explain				
Is disinfectant residual being monitored daily?	☐	☐	☐	☐
Are residual reports submitted monthly?	☐	☐	☐	☐
Is the disinfection equipment being operated and maintained properly?	☐	☐	☐	☐
Is operational standby equipment provided?	☐	☐	☐	☐
If not, are critical spare parts on hand?	☐	☐	☐	☐
Has disinfection system been free from failure during the past year – no interruption?	☐	☐	☐	☐

If No, give dates of interruptions _____

CT available _____minutes _____mg/L _____mg/min/L

Residual ☐ Free ☐Combined

Describe provisions for providing contact time between disinfection point and the first point of use:

At least a trace of chlorine in the distant points of distribution system?

GENERAL TREATMENT

	Yes	No	Unk	N/A
Can the raw water transmission line bypass treatment?	☐	☐	☐	☐
All Chemicals NSF/ANSI Certified?	☐	☐	☐	☐
Chem feeders ≤20% feed range?	☐	☐	☐	☐
Anti siphon installed? (Chemical feed lines)	☐	☐	☐	☐

Condition of the feed equipment: (circle one) Excel / Good / Fair / Poor

GRANULAR ACTIVATED CARBON

	Yes	No	Unk	N/A
What chemicals are being removed by GAC?				
What is the depth of the GAC media in feet?				
What is the empty bed contact time (EBCT)?				
Is the treated water effluent sampled monthly?	☐	☐	☐	☐
Is media replaced before breakthrough?	☐	☐	☐	☐
Are ports before final effluent sampled?	☐	☐	☐	☐
Is spent media replaced instead of regenerated?	☐	☐	☐	☐
How often are units backwashed?				
Is there at least a 30-day supply of media at all times?	☐	☐	☐	☐

ION EXCHANGE

What type of design is the unit? Single / Parallel / Series

Anionic Resin / Cationic Resin

	Yes	No	Unk	N/A
Are pipes / materials resistant to aggressiveness of salt?	☐	☐	☐	☐
Is finished water sampling conducted monthly?	☐	☐	☐	☐

How often is the condition of the resin checked?

FOR LIQUID HYPOCHLORINATION

Pump model:
Settings: Stroke
Speed
Vat Size:
Solution Strength: %

Comments:

CALCITE FILTERS

Purpose of the filter:
Is there more than one filter?
What is the configuration? Parallel / Series
What is the depth of the media (feet):

Describe the backwash rate and time:

What is the average and maximum filtration rate (gpm):

How often are the filters cleaned?

Are head loss gauges used to determine when a filter is to be cleaned? Yes / No

PWSID 4900634 SYSTEM NAME

SANITARY SURVEY FORM - STORAGE

COMPLETE ONE SECTION FOR EACH STORAGE FACILITY

How much treated storage is provided? 20,000 gallons

MDD Supply? ☒ Yes ☐ No ☐ Unk ☐ N/A
Comments:

STORAGE FACILITY

Name:
Material: Redwood
Storage Volume? 10,000 gallons
Dimensions:
Year constructed: 1950s

	Yes	No	Unk	N/A
Does surface runoff and underground drainage drain away?	☒	☐	☐	☐
Is the site protected against flooding?	☒	☐	☐	☐
Is the site protected against trespass/vandalism?	☐	☒	☐	☐
Is tank inspected every 5 years?	☐	☒	☐	☐

Date of last inspection ____ By whom ____

Date of last cleaning: ____

What is cleaning frequency for tanks? ~5 years or so

Condition: ☐ Good ☒ Fair ☐ Poor

Comments: ____

Ladders caged and locked?	☐	☐	☐	☒
Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface?	☒	☐	☐	☐
Is access hatch sealed properly and locked?	☐	☒	☐	☐
Is hatch lid a "shoebox" type?	☐	☒	☐	☐
Are surface coatings in contact with water ANSI / NSF approved? Liner	☒	☐	☐	☐
Is tank protected against corrosion?	☐	☐	☐	☒
Can tank be isolated from system?	☒	☐	☐	☐
Are tanks disinfected after repairs are made?	☒	☐	☐	☐
Are there cross connections?	☐	☒	☐	☐
Leaks, cracks, holes? If yes, describe in comments.	☐	☒	☐	☐
Hydropneumatic tanks? (p. 4-44)	☐	☐	☐	☒

When was the tank last drained? ____

Comments:

STORAGE FACILITY

Name: Plastic x2
Material:
Storage Volume? 5,000 each gallons
Dimensions:
Year constructed: 2007/8

	Yes	No	Unk	N/A
Does surface runoff and underground drainage drain away?	☒	☐	☐	☐
Is the site protected against flooding?	☒	☐	☐	☐
Is the site protected against trespass/vandalism?	☐	☒	☐	☐
Is tank inspected every 5 years?	☐	☒	☐	☐

Date of last inspection ____ By whom ____

Date of last cleaning: ____

What is cleaning frequency for tanks? Unknown

Condition: ☒ Good ☐ Fair ☐ Poor

Comments: ____

Ladders caged and locked?	☐	☐	☐	☒
Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface?	☐	☒	☐	☐
Is access hatch sealed properly and locked?	☐	☒	☐	☐
Is hatch lid a "shoebox" type?	☐	☒	☐	☐
Are surface coatings in contact with water ANSI / NSF approved?	☒	☐	☐	☐
Is tank protected against corrosion?	☐	☐	☐	☒
Can tank be isolated from system?	☒	☐	☐	☐
Are tanks disinfected after repairs are made?	☒	☐	☐	☐
Are there cross connections?	☐	☒	☐	☐
Leaks, cracks, holes? If yes, describe in comments.	☐	☒	☐	☐
Hydropneumatic tanks? (p. 4-44)	☐	☐	☐	☒

When was the tank last drained? ____

Comments:

PWSID 4900634 SYSTEM NAME

SANITARY SURVEY FORM - PUMPING FACILITIES (Other than Well Pumps)

Pump Station Name
These are State assigned identification numbers

Number of Pumps

Type: _____
(example: "3 line shaft turbines")

Capacity

Controlled by:

	Yes	No	Unk	N/A
Are pumps operable?	☐	☐	☐	☐
Is redundancy provided?	☐	☐	☐	☐
Protected against trespass/vandalism?	☐	☐	☐	☐
Records maintained?	☐	☐	☐	☐
Property maintained?	☐	☐	☐	☐
Metered?	☐	☐	☐	☐
Cross Connections eliminated?	☐	☐	☐	☐

Comments:

For booster stations:

Does each pump have standard P-gage on discharge side?	☐	☐	☐	☐
Does each pump have compound gage on suction side?	☐	☐	☐	☐
For boosters on suction lines directly connected to storage reservoirs, is there automatic cutoff for suction pressure ≤ 2.5 psi?	☐	☐	☐	☐

EMERGENCY POWER

Does the system have emergency power? ☐ Yes ☒ No
If yes, what type: _____ Frequency of testing: _____

Record of primary power failures: _____ in last year Switchover: ☐ Automatic ☐ Manual

CHEMICAL MONITORING

Does the system have any chemicals of concern/over the MCL? ☐ Yes ☒ No
If yes, list: Frequency of testing: _____

What is the system doing to mitigate the problem contaminants?

PWSID 4900634 SYSTEM NAME

SANITARY SURVEY FORM - MISCELLANEOUS

DISTRIBUTION SYSTEM EVALUATION

System description

	Yes	No	Unk	N/A
System drawings available?	X			
As-built drawings?		X		
Date:				
Drawing on-site?		X		
Lines adequately sized, ≥ 4 inch Φ for communities?		X		
Adequate pressure maintained, ≥ 40 psi?	X			
Distribution system free of leaks?	X			
Leaks reported in Annual Report?	X			
Leak detection program?		X		
Repairs and new mains disinfected?	X			
Fire hydrants?	X			
Dead end lines eliminated or blow offs?		X		
Flushing program?	X			
Valves exercised?	X			
Isolation valves used in response to leaks?	X			
Is there Asbestos Cement Pipe in the distribution system?		X		
Pressure reducing stations? Number:		X		
Booster stations? Number:		X		
Connections to other PWSs?		X		

If Yes, please describe:

Check one: ☐ No cross-connections were observed.

☒ Cross-connections were observed. Describe below.

Comments: wells

MONITORING, PLANS, CERTIFICATION

	Yes	No	Unk	N/A
Bacti monitoring satisfactory?	X			
Bacti Sample Site Plan submitted?	X			
Bacti monitoring plan updated with GWR form?	X			
Familiar with repeat sampling? (Ask Operator)	X			
Stage 1 DBP Monitoring plan?				X
Chemical monitoring satisfactory?		X		
In compliance with Lead and Copper Rule?	X			
Are operators properly certified?				X
Is an emergency plan available and workable?		X		
Is there an O&M manual?	X			
Is it current?				X
Is a copy on-site?		X		
O&M log maintained? JDYPW	X			

Did Surveyor take a **bacteriological** sample? ☐ ☒

If Yes, Location _____

Date of Sample: _____ Time of Sample: _____

Result: Total coliform: _____ *E. coli* _____

Did Surveyor take a **chlorine residual** sample? ☐ ☒

If Yes, Location _____

Date of Sample: _____ Time of Sample: _____ Result: : _____

Comments:

MONITORING AND RECORDKEEPING EVALUATION

	Yes	No	Unk	N/A
Records kept appropriately? (5 years)	X			

Other Records

Disinfection Profile (if required)?	☐ N/A	☐ Yes	☐ No
Sanitary surveys?		☐ Yes	☐ No
Other?		☐ Yes	☐ No

	Yes	No	Unk	N/A
Records maintained? (10 years)	X			

How are complaints handled?

John or Ed

	Yes	No	Unk	N/A
Complaint log kept on site?		X		

Comments:

MANAGEMENT

Administrative Board – Describe

Mutual

Training provided – Describe

	Yes	No	Unk	N/A
By-laws or articles of incorporation?	X			
Year of enactment: 1950s				
Are copies available?	X			
Budget:				
Exists?	X			
Adequate?			X	
Are personnel adequately trained?				X
Are there sufficient personnel?	X			
Are abandoned wells present?		X		
Do abandoned wells appear to be properly abandoned?				X
Is operator aware of procedures regarding well abandonment?				X
Does the system have a current Monitoring Schedule?	X			

Comments:

For Community Systems: Does the System have an Outstanding Performance Record? ☐ Yes ☒ No ☐ Unk ☐ N/A

Must be able to answer yes to all below over the last five years:

- o No MCL violations?
- o No M&R violations?
- o Certified Operator?
- o No Significant Deficiencies identified?

California Department of Public Health

Drinking Water Field Operations Branch – **SONOMA DISTRICT #18**

36a

Small Water System Bacteriological Sampling Plan and Groundwater Rule Sampling Plan

I. System Information:

System or Facility Name: **Huckleberry Heights Mutual Water Company**

Service connections: **28**
(Number of residences and/or buildings served by the system)

Population: 61
(Number of individuals served each day by system during busiest month)

Source(s): Well 01
(List all water supply sources wells, springs, lakes, etc).

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MAY 14 2013
Drinking Water Program
Santa Rosa Office

II. Routine Sampling Frequency

The water system must collect __1___routine sample at a frequency of once every _Month_____.

III. Routine and Repeat Sampling Sites

***Routine sample site No. 1: 1505 Cazadero Highway**_____
*This site must be representative of the distribution system and shall not be designated as a water source (ie. well, etc.).

If this routine sample contains coliform bacteria, the water system must collect a set of repeat samples within 24 hours of being notified of the result. (If your routine sampling frequency is equal to or less than one sample per month, the repeat sample set must consist of **4** samples. If your routine sampling frequency is greater than one sample per month, the repeat sample set need only consist of **3** samples.)

DEPT. OF HEALTH SERVICES
APPROVED
DATE 5-14-13 BY www

Repeat Sample Set (No. 1)

Repeat sample site No. 1: 1505 Cazadero Highway _____
(Collect one sample at the original routine sample site)

Repeat sample site No. 2: 8 Huckleberry Heights Road_____
(Collect one sample within five connections upstream)

Repeat sample site No. 3: 1480 Cazadero Highway_____
(Collect one sample within five connections downstream)

Repeat sample site No. 4: 1585 Cazadero Highway_____
(Collect one additional sample in the distribution system)

Ground water Triggered Source Sample(s)[4]: Well 01_____ (Identify Sources)
(Collect one sample for *E. coli* from each ground water source on line at the time of the routine total coliform-positive sample result)

If you purchase water from another water system, you must contact the water system from which you purchase water within 24 hours of being notified of a routine total coliform positive sample result.
Name of wholesaler contact:_____.

Phone number of wholesaler contact:_____

* A routine sample site must be designated for each pressure zone or separate area served by the water system. The routine sample sites must be rotated such that they are all sampled on a regular basis. If this water system must designate more than one routine sample site, please do so on the following page.

Check one of the following:

☒ Only one routine sample site is necessary to adequately represent the system. Additional routine and repeat sample sites *are not* attached.

[4] Systems with ground water sources must take "triggered source samples" in response to positive routine total coliform sample results in the distribution system.

IV. Sampling During The Month Following A Positive Sample

If one or more samples are positive for total coliform in a month, the water system is required to collect five routine samples during the following month. These five samples can be collected over the course of the month or all on the same day. Please list the locations from which these extra samples would be collected:

1. 1505 Cazadero Highway 2. 1480 Cazadero Highway 3. 8 Huckleberry Heights

4. 1525 Cazadero Highway 5. 1585 Cazadero Highway

V. Map or Diagram

Attach an 8.5" x 11" map or diagram showing the location of routine and repeat sample sites and the entry point of water into the distribution system.

VI. Personnel and Laboratory Notification

Sampler: Fred Luna
(Sample collection must be performed by a person trained in sample collection. Provide name of sampler.)

Laboratory: Brelje and Race Labs 707-544-8807
(Provide the name and phone number of the certified lab doing your water analysis. Arrangement must be made for weekend and holiday analysis if needed.)

Notification: Laboratory to notify persons designated below within 24 hours whenever a sample is found to contain coliform bacteria:

	(Name)	(Daytime Phone #)	(Evening Phone #)
1.	Fred Luna	707-632-5797	707-632-5797
2.	Ed Griggs	707-632-5725	707-632-5725

VII. Notification of the Department

The water system will notify the State Department of Public Health, Drinking Water Program, Sonoma District Office, within 24 hours whenever a sample contains fecal coliform or *E. coli* bacteria or whenever a follow-up sample is positive.

Sonoma District Office:	576-2145 (day or night, leave message)
Janice Thomas, Sonoma District Engineer:	576-2006 (evening: 533-4510)

Submitted by: Fred Luna Date 5/13/2013

KEEP A COPY OF THIS FORM FOR YOUR REFERENCE AND USE

ADDITIONAL INFORMATION

When responding to a laboratory report of bacterial contamination, keep in mind the following:

1. Coliform bacteria should not be present in drinking water and the presence of coliform indicates a potentially serious problem. Appropriate investigation should be performed immediately.
2. Check water system components such as water sources, filtration and/or chlorination equipment and storage tanks for indications of unusual conditions or problems.
3. Correct problems immediately. Do not wait for results of follow-up samples to take action.
4. **If a triggered source sample result is E. coli-positive, the system must conduct Tier 1 notification and collect five (5) additional source samples within 24 hours of being notified of the *E. coli*-positive sample result.**

Source Chemical Monitoring Requirements

Note: well sources must be operated at least 15 minutes before samples are collected. If well pump cannot be operated continuously for 15 minutes, collect samples toward end of well cycle. All samples must be collected before treatment.

Date of report: **3/19/2014**

System Name: **HUCKLEBERRY MUTUAL WATER COMPANY** System number: **4900634**

Source Name : **WELL 01** Source class: **CTGP**

Source Code : **4900634-001**

Nine-Year Waiver for IOCs except Arsenic and Perchlorate

Chemical Group : 64432- Primary - Inorganics

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
Aluminum	< 50.00	ug/l	1000	3/18/2012	Once every nine years	Mar 2021	
Antimony	< 6.00	ug/l	6	3/18/2012	Once every nine years	Mar 2021	
Arsenic	< 2.00	ug/l	10	3/18/2012	Once every three years	Mar 2015	
Barium	< 100.00	ug/l	1000	3/18/2012	Once every nine years	Mar 2021	
Beryllium	< 1.00	ug/l	4	3/18/2012	Once every nine years	Mar 2021	
Cadmium	< 1.00	ug/l	5	3/18/2012	Once every nine years	Mar 2021	
Chromium	< 1.00	ug/l	50	3/18/2012	Once every nine years	Mar 2021	
Fluoride	0.24	mg/l	2	3/18/2012	Once every nine years	Mar 2021	
Mercury	< 1.00	ug/l	2	3/18/2012	Once every nine years	Mar 2021	
Nickel	< 10.00	ug/l	100	3/18/2012	Once every nine years	Mar 2021	
Perchlorate	< 4.00	ug/l	6	3/18/2012	Once every three years	Mar 2015	
Selenium	< 5.00	ug/l	50	3/18/2012	Once every nine years	Mar 2021	
Thallium	< 1.00	ug/l	2	3/18/2012	Once every nine years	Mar 2021	

Chemical Group : 64432- Primary - Asbestos

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
Asbestos	0.00	MFL	7 MFL	4/15/2008	Once every nine years	Apr 2017	

Chemical Group : 64432.1 -Nitrate/Nitrite

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
Nitrate (as NO3)	< 2.00	mg/l	45	2/4/2014	Once per year	Feb 2015	
Nitrite(as N)	< 400.00	ug/l	1000	3/18/2012	Once every three years	Mar 2015	

Chemical Group : 64449-A & B - Secondary Standards

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
Aluminum (Secondary)	< 50.00	ug/l	200	3/18/2012	Once every nine years	Mar 2021	
Bicarbonate	140.00	mg/l		3/18/2012	Once every three years	Mar 2015	
Calcium	19.00	mg/l		3/18/2012	Once every three years	Mar 2015	
Carbonate	< 1.00	mg/l		3/18/2012	Once every three years	Mar 2015	
Chloride	6.20	mg/l	500	3/18/2012	Once every three years	Mar 2015	
Color	5.00	UNIT:	15	3/18/2012	Once every three years	Mar 2015	
Copper	< 50.00	ug/l	1000	3/18/2012	Once every three years	Mar 2015	
Foaming Agents (MBAS)	< 0.05	mg/l	0.50	3/18/2012	Once every three years	Mar 2015	
Hydroxide	< 1.00	mg/l		3/18/2012	Once every three years	Mar 2015	

System Name: **HUCKLEBERRY MUTUAL WATER COMPANY** System number: **4900634**

Source Name : **WELL 01** Source class: **CTGP**

Source Code : **4900634-001**

Nine-Year Waiver for IOCs except Arsenic and Perchlorate

Chemical Group : 64449-A & B - Secondary Standards

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
Iron	< 100.00	ug/l	300	3/18/2012	Once every three years	Mar 2015	
MTBE (Secondary)	0.00	ug/l	5	7/20/2011	Once every three years	Jul 2014	
Magnesium	9.50	mg/l		3/18/2012	Once every three years	Mar 2015	
Manganese	94.00	ug/l	50	3/18/2012	Once every three years	Mar 2015	
Odor	1.00	unit	3	3/18/2012	Once every three years	Mar 2015	
Silver	< 10.00	ug/l	100	3/18/2012	Once every three years	Mar 2015	
Sodium	12.00	mg/l		3/18/2012	Once every three years	Mar 2015	
Specific Conductance	250.00	uMho	1600	3/18/2012	Once every three years	Mar 2015	
Sulfate	3.80	mg/l	500	3/18/2012	Once every three years	Mar 2015	
Total Alkalinity	120.00	mg/l		3/18/2012	Once every three years	Mar 2015	
Total Dissolved Solids	150.00	mg/l	1000	3/18/2012	Once every three years	Mar 2015	
Total Hardness	87.00	mg/l		3/18/2012	Once every three years	Mar 2015	
Turbidity	0.60	NTU	5	3/18/2012	Once every three years	Mar 2015	
Zinc	< 50.00	ug/l	5000	3/18/2012	Once every three years	Mar 2015	
pH	7.20			3/18/2012	Once every three years	Mar 2015	

Chemical Group : Section 64441-Radioactivity

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
Gross Alpha	0.15	PC/L	15	9/4/2007	Once every nine years	Sep 2016	

Chemical Group : TABLE 64444-A - Volatile Organic Chemicals

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
1,1,1-Trichloroethane	0.00	ug/l	200	7/20/2011	Once every six years	Jul 2017	
1,1,2,2-Tetrachloroethane	0.00	ug/l	1	7/20/2011	Once every six years	Jul 2017	
1,1,2-Trichloroethane	0.00	ug/l	5	7/20/2011	Once every six years	Jul 2017	
1,1-Dichloroethane	0.00	ug/l	5	7/20/2011	Once every six years	Jul 2017	
1,1-Dichloroethylene	0.00	ug/l	6	7/20/2011	Once every six years	Jul 2017	
1,2,4-Trichlorobenzene	0.00	ug/l	5	7/20/2011	Once every six years	Jul 2017	
1,2-Dichlorobenzene	0.00	ug/l	600	7/20/2011	Once every six years	Jul 2017	
1,2-Dichloroethane	0.00	ug/l	.5	7/20/2011	Once every six years	Jul 2017	
1,2-Dichloropropane	0.00	ug/l	5	7/20/2011	Once every six years	Jul 2017	
1,3-Dichloropropene	0.00	ug/l	.5	7/20/2011	Once every six years	Jul 2017	
1,4-Dichlorobenzene	0.00	ug/l	5	7/20/2011	Once every six years	Jul 2017	
Benzene	0.00	ug/l	1	7/20/2011	Once every six years	Jul 2017	
Carbon Tetrachloride	0.00	ug/l	.5	7/20/2011	Once every six years	Jul 2017	
Dichloromethane	0.00	ug/l	5	7/20/2011	Once every six years	Jul 2017	
Ethylbenzene	0.00	ug/l	300	7/20/2011	Once every six years	Jul 2017	
MTBE (Primary)	0.00	ug/l	13	7/20/2011	Once every three years	Jul 2014	
Monochlorobenzene	0.00	ug/l	70	7/20/2011	Once every six years	Jul 2017	
Styrene	0.00	ug/l	100	7/20/2011	Once every six years	Jul 2017	
Tetrachloroethylene	0.00	ug/l	5	7/20/2011	Once every six years	Jul 2017	

System Name: **HUCKLEBERRY MUTUAL WATER COMPANY** System number: **4900634**

Source Name : **WELL 01** Source class: **CTGP**

Source Code : **4900634-001**

Nine-Year Waiver for IOCs except Arsenic and Perchlorate

Chemical Group : TABLE 64444-A - Volatile Organic Chemicals

Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
Toluene	0.00	ug/l	150	7/20/2011	Once every six years	Jul 2017	
Trichloroethylene	0.00	ug/l	5	7/20/2011	Once every six years	Jul 2017	
Trichlorofluoromethane	0.00	ug/l	150	7/20/2011	Once every six years	Jul 2017	
Trichlorotrifluoroethane (FREON 113)	0.00	ug/l	1200	7/20/2011	Once every six years	Jul 2017	
Vinyl Chloride	0.00	ug/l	.5	7/20/2011	Once every six years	Jul 2017	
Xylenes (total)	0.00	ug/l	1750	7/20/2011	Once every six years	Jul 2017	
cis-1,2-Dichloroethylene	0.00	ug/l	6	7/20/2011	Once every six years	Jul 2017	
trans-1,2-Dichloroethylene	0.00	ug/l	10	7/20/2011	Once every six years	Jul 2017	

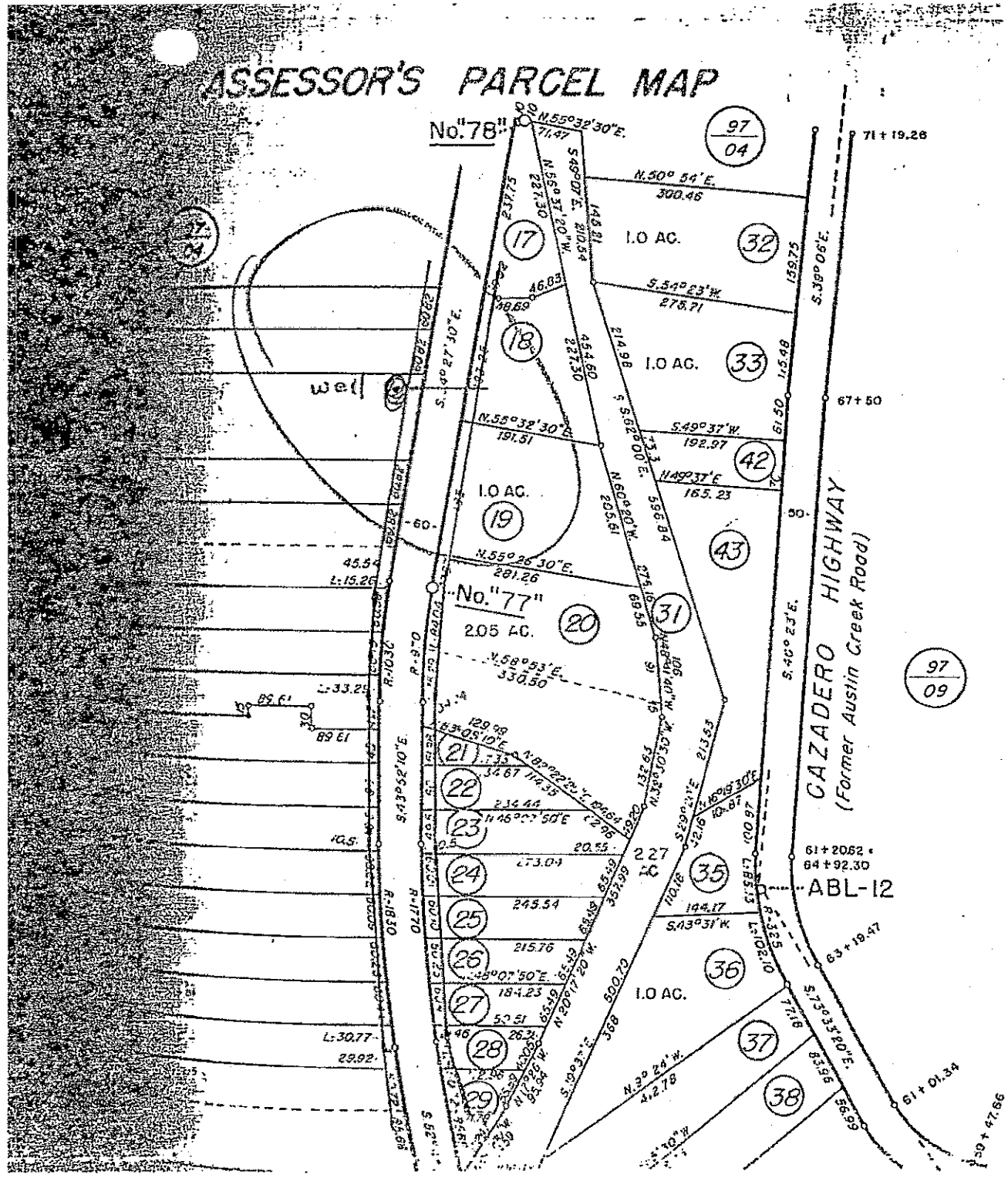
Chemical Group : TABLE 64444-B - Synthetic Organic Chemicals

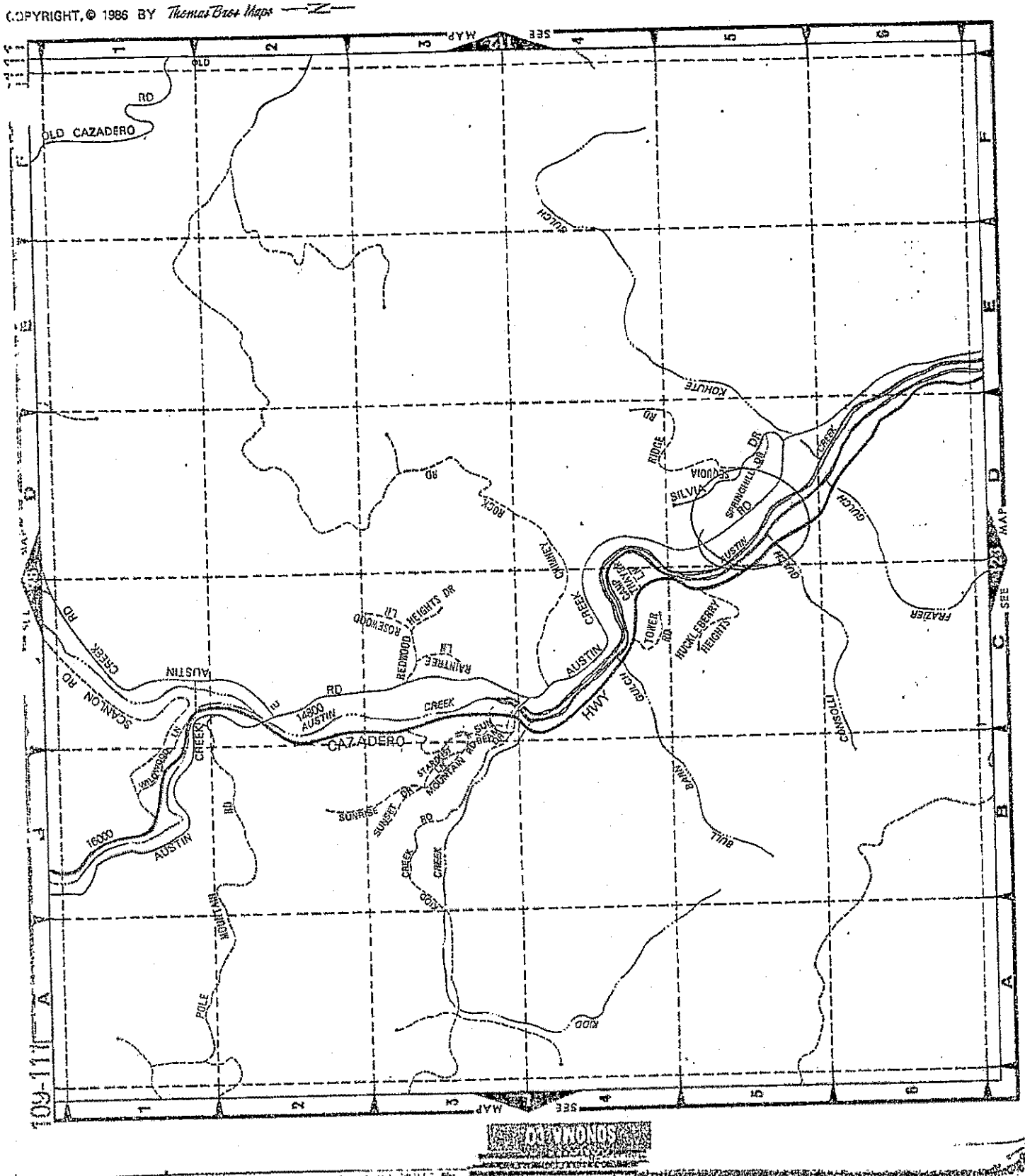
Chemical	Last result	Units	MCL	Date of last	Frequency	Next due	Notes
2,4,5-TP (Silvex)	0.00	ug/l	50	4/15/2008	Once every nine years	Apr 2017	
2,4-D	0.00	ug/l	70	4/15/2008	Once every nine years	Apr 2017	
Atrazine	0.00	ug/l	1	7/20/2011	Once every three years	Jul 2014	
Dalapon	0.00	ug/l	200	4/15/2008	Once every nine years	Apr 2017	
Simazine	0.00	ug/l	4	7/20/2011	Once every three years	Jul 2014	

ASSESSOR'S PARCEL MAP

TAX CODE AREA
156-023

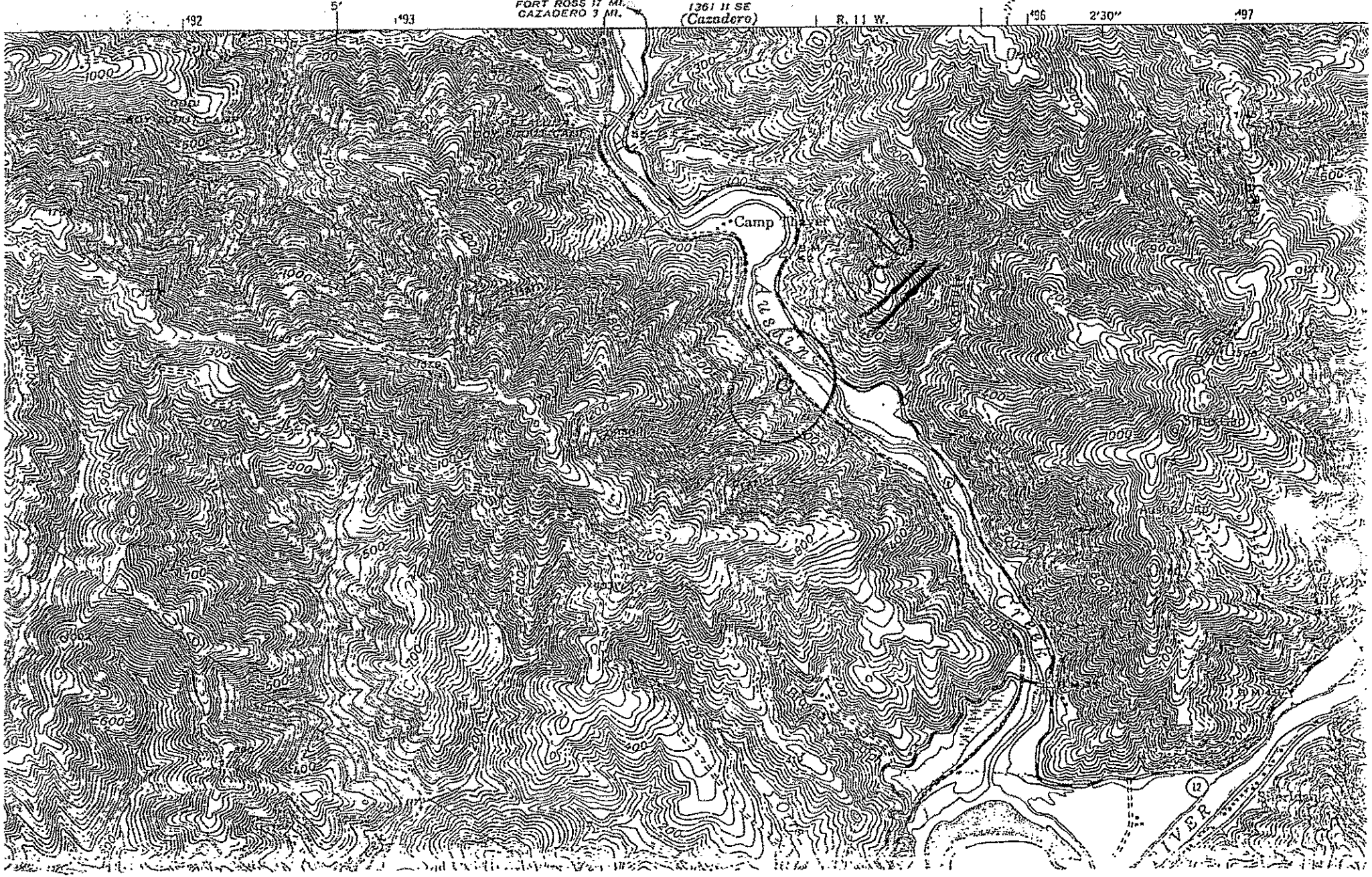
97-05

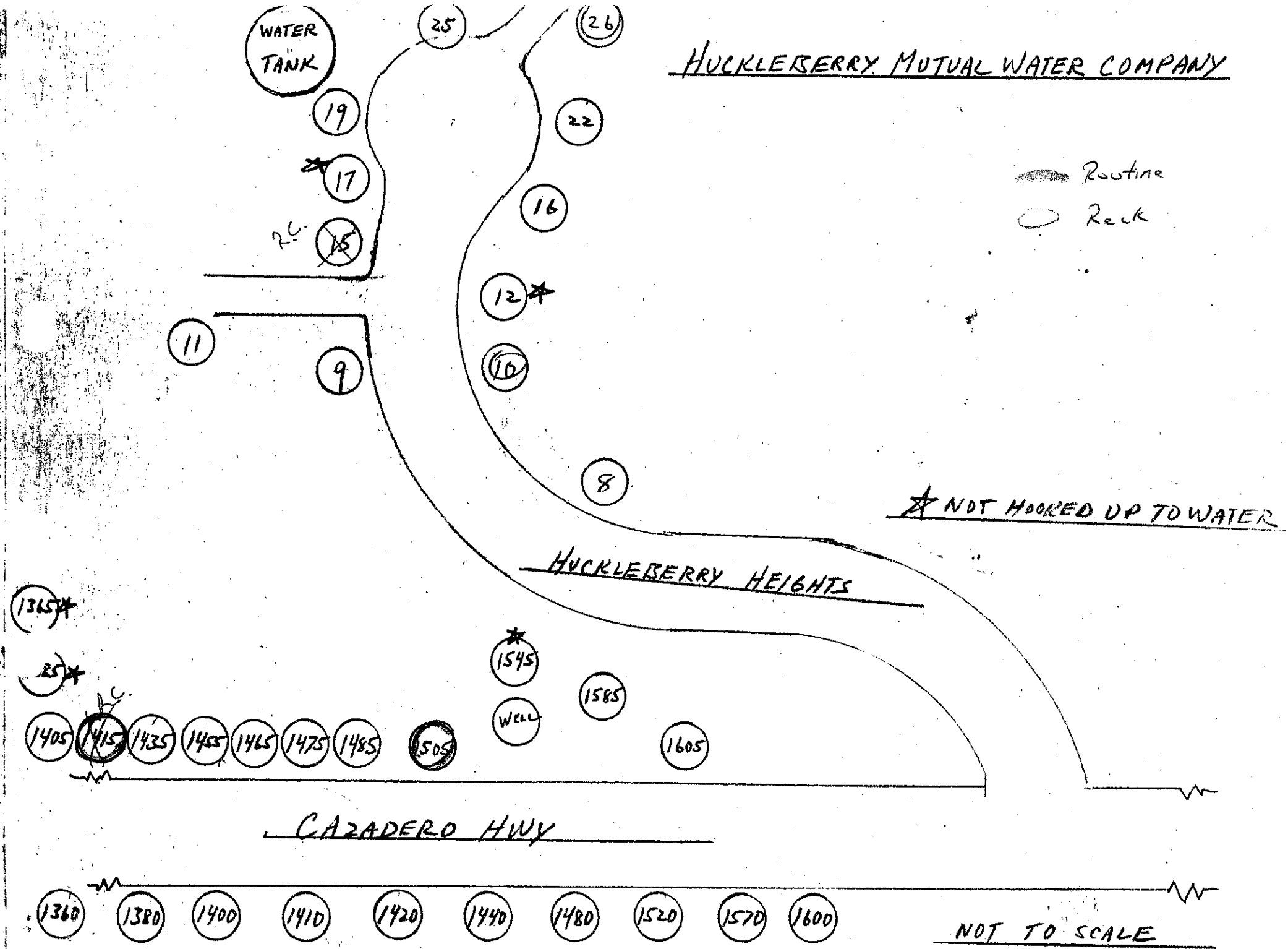




OR

Map # 24


UNITED STATES
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
FORT ROSS 17 MI.
CAZADERO 3 MI.
1361 II SE
(Cazadero)
R. 11 W.
192
193
196
197
Camp Meeker
Austin Creek
RIVER


HUCKLEBERRY MUTUAL WATER COMPANY
WATER TANK
25
26
19
22
17
16
15
12
11
9
10
8
Routine
Rock
NOT HOOKED UP TO WATER
HUCKLEBERRY HEIGHTS
1365
R5
1545
1585
WELL
1405
1415
1435
1455
1465
1475
1485
505
1605
CAZADERO HWY
1360
1380
1400
1410
1420
1440
1480
1520
1570
1600
NOT TO SCALE

Appendix C –CDPH Groundwater Under the Direct Influence of Surface Water Report.

This appendix contains the report completed by the CDPH in 2013.

State of California—Health and Human Services Agency
California Department of Public Health
DRINKING WATER FIELD OPERATIONS BRANCH
50 D STREET, SUITE 200, SANTA ROSA, CA 95404
PHONE: (707) 576-2145 / FAX: (707) 576-2722
INTERNET ADDRESS: www.cdph.ca.gov

Ron Chapman, MD, MPH
Director & State Health Officer

EDMUND G. BROWN JR.
Governor

May 29, 2013

System No. 4900634

John McCray-Goldsmith
Huckleberry Mutual Water Company
5514 Doyle Street, #2
Emeryville, CA 94608

RE: DETERMINATION OF GROUNDWATER UNDER THE DIRECT INFLUENCE OF SURFACE WATER

The purpose of this letter is to follow up on the August 31, 2012 letter from the California Department of Public Health (Department) regarding the requirement to conduct monitoring to determine if the Huckleberry Mutual Water Company (System) Well 01 is under the influence of surface water. The well has been determined to not be under the direct influence of surface water. Therefore, full surface water treatment will not be required at this time.

However, increased rainfall does affect temperature and turbidity of both the surface water and the well water. As a precaution, the Department is requiring disinfection that provides a 4-log virus inactivation. A handout on the basics of obtaining 4-log virus inactivation through chlorine disinfection is enclosed.

The System should install 4-log virus inactivation treatment, at a minimum, to mitigate any possible future surface water influence. Create a plan to install 4-log virus inactivation treatment and submit it to our office by **July 31, 2013**.

If you have any questions about this letter, please call Waldon Wong at (707) 576-2764.

Sincerely,

Janice M. Thomas, P.E.
Sonoma District Engineer
Drinking Water Field Operation Branch

Enclosures: Technical Report – Determination of Groundwater Source Under the Direct Influence of Surface Water
Handout 120 – Basics – 4-log Virus Inactivation Through Chlorine Disinfection

CC (w/ Enclosures): Fred Luna, 40 Magic Mountain Road, Cazadero, CA 95421

4900634/Chron
130529 - GWUDI Determination.docx

Huckleberry Mutual Water Company

System Number: 4900634

Technical Report
Determination of Groundwater Source Under the Direct Influence of Surface Water

Prepared by Waldon Wong, P.E.

May 2013

Water quality monitoring was conducted from March 2012 through March 2013 on Well 01, the drinking water source for the Huckleberry Mutual Water Company (System), to determine if the source is under the direct influence of surface water. California Code of Regulations, Section 64651.50, defines Groundwater Under the Direct Influence of Surface Water as "any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae or large diameter pathogens such as *Giardia lamblia* or *Cryptosporidium*, or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity or pH which closely correlate to climatological or surface water conditions."

Based on a thorough analysis of all data collected during the investigative phase of this project, Well 01 has been determined to be a groundwater source under the direct influence of surface water. This determination is based on data that demonstrates a significant shift in water characteristics correlated to climatological or surface water conditions. This report presents an evaluation of data gathered and justification for the determination of groundwater under the direct influence of surface water.

BACKGROUND

Well 01 is a vertical well that feeds to the System's storage tank and the distribution system. Dating back over the last 10 years, the System averages two total coliform positives in their routine and repeat distribution system samples per year.

The Department conducted an inspection on August 29, 2011. Photos showed the well adjacent to a creek that showed the potential that Well 01 was under the influence of surface water. The Department sent a letter to the System dated, January 31, 2012, stating that Well 01 appeared to be under the direct influence of surface water and directed the System to clean up the well shed and begin conducting tests to determine if the source was under the influence of surface water.

Water Quality Monitoring was conducted from March 2012 through March 2013 on Well 01. The results of which and the determination of the status of Well 01 are presented in this report.

DATA ACQUISITION AND PROCESSING

Physical water quality parameters were collected for 12 months from March 2012 through March 2013. The data was collected and submitted each month by Mr. John McCray-Goldsmith and Mr. Ed Griggs of the Huckleberry Mutual Water Company. The data submitted with physical testing for March 2012 – March 2013 are presented in Appendix A.

During the monitoring period, turbidity and temperature were measured twice each month from both the groundwater source and the potentially influencing surface water. Precipitation data was provided by "Weather Underground" located at http://www.wunderground.com. The closest weather station listed on the website is Monte Rio (KCAMONTE13), located at an elevation 360 feet at the Latitude and Longitude of N 38°27'54" and W123°0'33", respectively. It is the weather station located closest to Well 01.

Average monthly turbidity and temperature values and monthly total precipitation are presented in Table 1.

Table 1 – Physical Water Quality Parameters

	Well		Total Rain (in)
	Avg NTU	Avg °F	Monte Rio
March 2012	5.83	54.9	13.80
April 2012	3.10	54.0	2.72
May 2012	1.35	55.4	0.61
June 2012	0.70	55.4	0.21
July 2012	0.80	56.7	0.00
August 2012	1.10	56.2	0.00
September 2012	1.60	55.7	0.00
October 2012	0.90	55.4	1.61
November 2012	0.95	56.0	6.60
December 2012	0.90	53.8	23.22
January 2013	2.25	56.1	1.27
February 2013	0.70	58.3	0.30
March 2013	1.00	59.0	2.52

Raw well bacteriological data were collected twice monthly for twelve months. The bacteriological samples were analyzed for both total coliform and *E. coli* by an approved method that enumerates bacteria density up to 2,400 organisms per 100 milliliters of

sample. None of the 24 samples was positive for total coliform or *E. coli*. The results are presented in Appendix B.

As required, two microscopic particulate analysis (MPAs) samples were taken. One on August 8, 2012 (dry season) and the other on March 9, 2013 (wet season). Both were analyzed by BioVir Laboratories. The results demonstrated that there was no microscopic particulate contamination in either sample. The MPA standard method for the wet season is to sample within 24 hours of a rainfall event greater or equal to one inch. The wet season sample is to occur when the suspected source is under the most impact from surface water. According to the online historical precipitation records for Monte Rio, there was a rain event of 1.46 inches on the week of March 9, 2013. Based on this precipitation data, the results of the MPA were accepted by the Department. Results of both MPAs can be found in Appendix C.

DATA ANALYSIS and DISCUSSION

Turbidity and precipitation data indicates that raw stream water turbidity responds to storm events. In March 2012, there was an increase in turbidity from 1.10 NTU to 6.00 NTU following 4.88 inches of rain during the week of March 29, 2019. In June 2012, there was another increase in turbidity following 0.13 inches of rain during the week of June 8, 2012. This relationship is illustrated by data presented in Figures 1 and 2. As shown in Figures 1 and 4, groundwater turbidity appears to be affected by the surface turbidity.

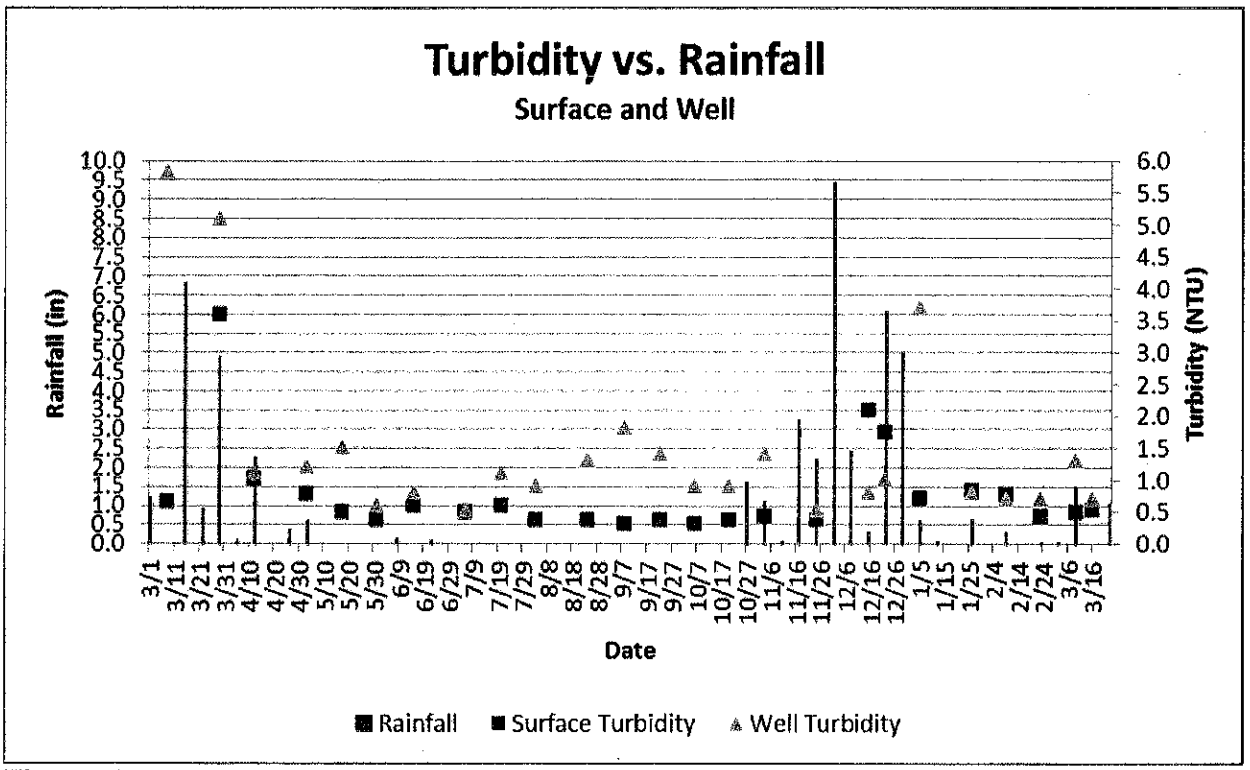


Figure 1 – Turbidity vs. Rainfall for the Stream and Well

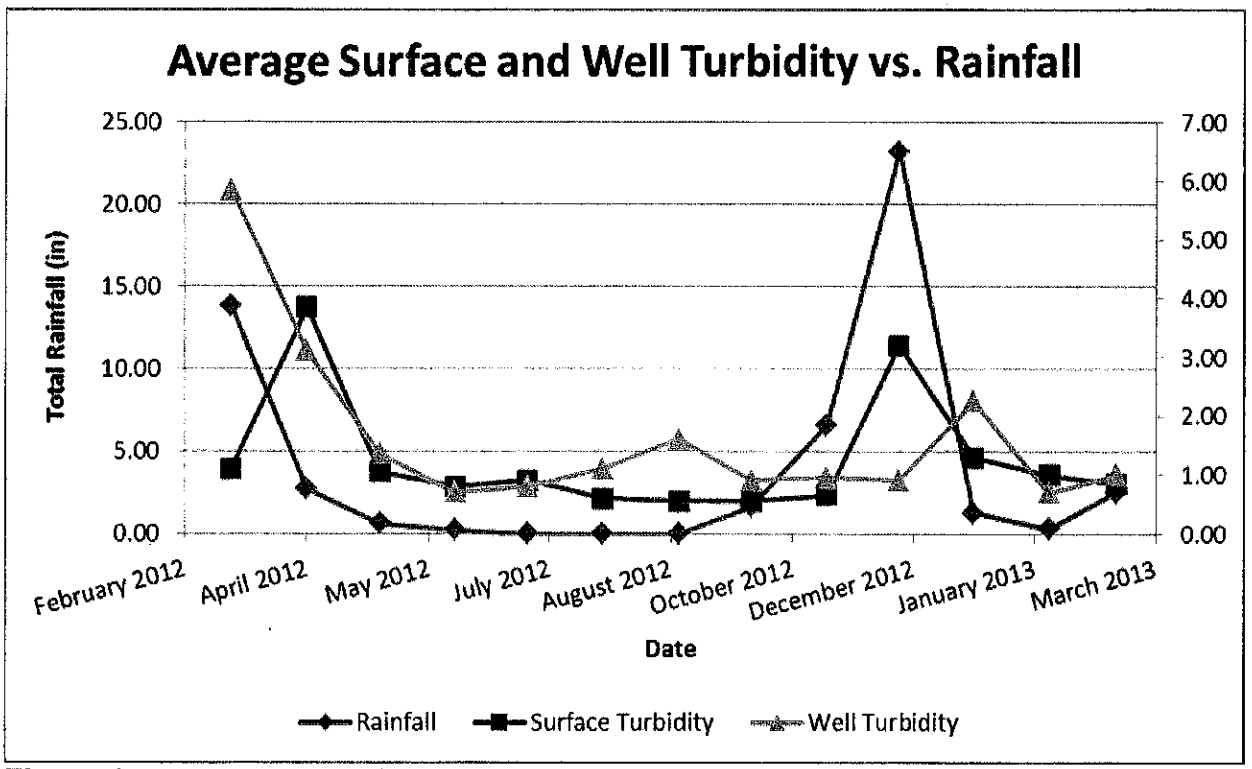


Figure 2 – Average Raw Stream Turbidity vs. Rainfall

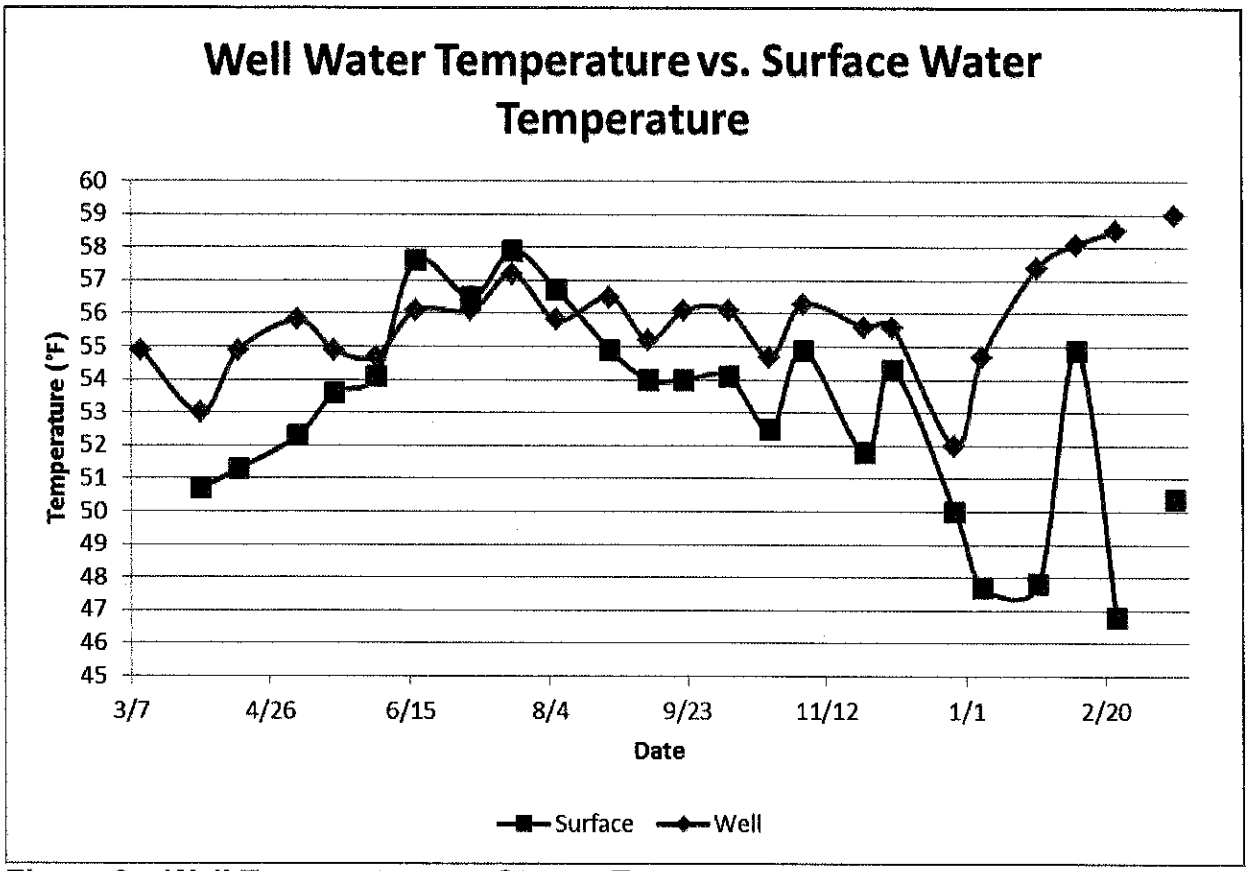


Figure 3 – Well Temperature vs. Stream Temperature

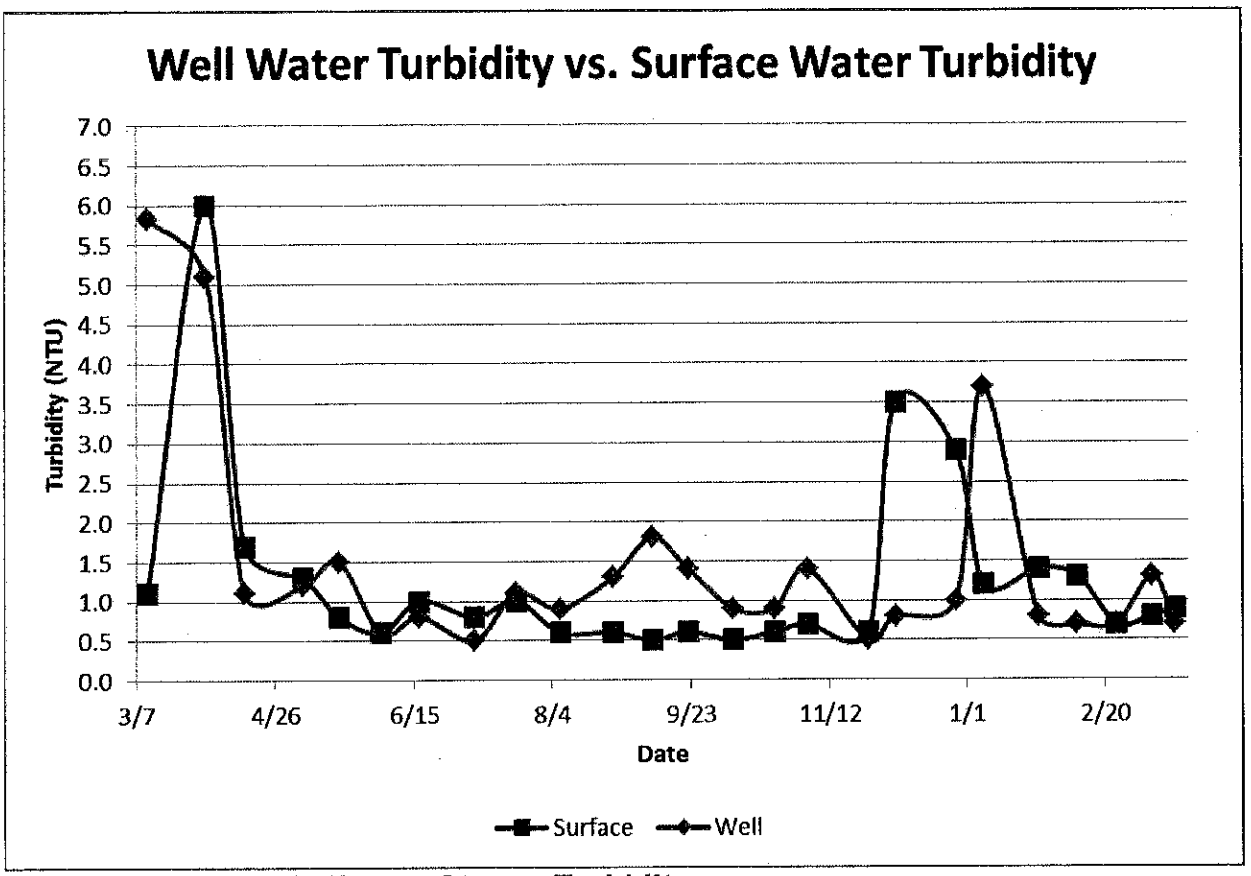


Figure 4 – Well Turbidity vs. Stream Turbidity

Raw water turbidity from March 2012 through March 2013 is presented in Appendix A. The data depicts a range raw turbidity from 0.5 – 6.0 NTU. The range and difference between minimum and maximum turbidities from these data sets are presented in Table 2.

Table 2 – Surface Water Turbidity

	Surface		Difference	Total Rain (in)
	Low NTU	High NTU	in NTU	Monte Rio
March 2012	1.1	6.0	4.9	13.80
April 2012	1.7	1.7	0.0	2.72
May 2012	0.6	1.3	0.7	0.61
June 2012	1.0	1.0	0.0	0.21
July 2012	0.8	1.0	0.2	0.00
August 2012	0.6	0.6	0.0	0.00
September 2012	0.5	0.6	0.1	0.00
October 2012	0.5	0.6	0.1	1.61
November 2012	0.6	0.7	0.1	6.60
December 2012	2.9	3.5	0.6	23.22
January 2013	1.2	1.4	0.2	1.27
February 2013	0.7	1.3	0.6	0.30
March 2013	0.8	0.9	0.1	2.52

CONCLUSIONS AND RECOMMENDATIONS

Based on data analysis presented in the body of this Technical Report and the Appendices, it was determined that the raw water groundwater source, Well 01, is not under the direct influence of surface water.

The System should install 4-log virus inactivation treatment, at a minimum, to mitigate any possible future surface water influence.

The Department reserves the right to reevaluate the groundwater source in the future for possible contaminating events.

Appendix A

March 2012 – March 2013 Data and Analysis

Date	Surface		Wellhead		Meter
	Temperature (°F)	Turbidity (NTU)	Temperature (°F)	Turbidity (NTU)	
3/11/2012		1.1	54.9	5.8	-
4/1/2012	50.7	6.0	53.0	5.1	8,120
4/15/2012	51.3	1.7	54.9	1.1	38,620
5/6/2012	52.3	1.3	55.8	1.2	94,940
5/19/2012	53.6	0.8	54.9	1.5	134,850
6/3/2012	54.1	0.6	54.7	0.6	185,460
6/17/2012	57.6	1.0	56.1	0.8	240,010
7/7/2012	56.5	0.8	56.1	0.5	312,760
7/22/2012	57.9	1.0	57.2	1.1	368,160
8/7/2012	56.7	0.6	55.8	0.9	431,930
8/26/2012	54.9	0.6	56.5	1.3	498,690
9/9/2012	54.0	0.5	55.2	1.8	551,410
9/22/2012	54.0	0.6	56.1	1.4	589,750
10/8/2012	54.1	0.5	56.1	0.9	637,090
10/23/2012	52.5	0.6	54.7	0.9	680,080
11/4/2012	54.9	0.7	56.3	1.4	712,260
11/26/2012	51.8	0.6	55.6	0.5	770,890
12/6/2012	54.3	3.5	55.6	0.8	803,790
12/28/2012	50.0	2.9	52.0	1.0	922,660
1/7/2013	47.7	1.2	54.7	3.7	983,850
1/27/2013	47.8	1.4	57.4	0.8	1,112,640
2/10/2013	54.9	1.3	58.1	0.7	1,213,820
2/24/2013	46.8	0.7	58.5	0.7	1,295,580
3/9/2013		0.8		1.3	1,346,810
3/17/2013	50.4	0.9	59.0	0.7	1,360,700

Appendix B

Total Coliform and *E. coli* Results (MPN/100mL)

Date	TC	*E. coli*
3/11/2012	A	A
4/1/2012	A	A
4/15/2012	A	A
5/6/2012	A	A
5/19/2012	A	A
6/3/2012	A	A
6/17/2012	A	A
7/7/2012	A	A
7/22/2012	A	A
8/7/2012	A	A
8/26/2012	A	A
9/9/2012	A	A
9/22/2012	A	A
10/8/2012	A	A
10/23/2012	A	A
11/4/2012	A	A
11/26/2012	A	A
12/6/2012	A	A
12/28/2012	A	A
1/7/2013	A	A
1/27/2013	A	A
2/10/2013	A	A
2/24/2013	A	A
3/9/2013	A	A
3/17/2013		

Appendix C

Microscopic Particulate Analysis Results (Dry Season, Wet Season)

BioVir Laboratories, Inc

NELAC #05234CA
EPA ID# 01401, CA-ELAP #179

685 Stone Road, Unit 6 • Benicia, CA 94510 • (707) 747-5906 • 1-800-GIARDIA • FAX (707) 747-1751 • WEB: www.biovir.com

LAB Sample ID: 121032-001

Client / Address: John Mc-Cray Goldsmith,5514 Doyle Street #2 , Emeryville CA 94608
Client No: GOL010 **Purchase Order No:** CC Payment
Client Contact: John Mc-Cray Goldsmith, **Client Phone:** 917-744-5515

SAMPLE INFORMATION:

Name of Sampler:	John McCray-Goldsmith	**Customer Sample ID:**	
Matrix:	Groundwater	**Sample Site**	Wellhead
Sample Collection Date:	8/8/2012	**Date/Time Received:**	8/9/2012 3:30:00 PM
Sample Time:	8:00:00 PM	**Check-in Temp. (0-20C)**	12.1
Container Type:	ywdf	**Sample Volume:**	1892.5 L

Comments:

ASSAY RESULTS: **Microscopic Particulate Analysis** **MPA (Standard)**
EPA 910/9-92-029 (600/R-95/178)

PRIMARY BIO-INDICATORS

Giardia	0 in 1514 L	Cryptosporidium	0 in 1514 L
Coccidia	0 / 100 gal	Diatoms	0 / 100 gal
Other Algae	0 / 100 gal	Insect/Larvae	0 / 100 gal
Rotifers	0 / 100 gal	Plant Debris	0 / 100 gal

SECONDARY BIO-INDICATORS

Amorphous Debris	TNTC / 100 gal	Minerals	TNTC / 100 gal
Plant Pollen	0 / 100 gal	Nematodes	0 / 100 gal
Crustacea	0 / 100 gal	Amoeba	0 / 100 gal
Ciliates/Flagellates	0 / 100 gal	Other Organisms	0 / 100 gal

Analysis Date: 8/15/2012 Analyst: RDanielson Date: 8/13/2012 7:43:23 PM

BioVir Laboratories, Inc

NELAC #05234CA
EPA ID# 01401, CA-ELAP #179

685 Stone Road, Unit 6 • Benicia, CA 94510 • (707) 747-5906 • 1-800-GIARDIA • FAX (707) 747-1751 • WEB: www.biovir.com

LAB Sample ID: 121032-001

MICROSCOPIC PARTICULATE ANALYSIS RISK FACTORS
(Consensus Method for Determining Groundwaters Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA) - EPA 910/9-92-029

PRIMARY BIO-INDICATORS: Numerical range of each primary bio-indicator based on numbers counted per 378.5 Liters (100 gallons) sampled

	EH (Extremely Heavy)	H (Heavy)	M (Moderate)	R (Rare)	NS
Giardia	>30	16 - 30	6 - 15	1 - 5	None Seen
Coccidia/Crypto	>30	16 - 30	6 - 15	1 - 5	None Seen
Diatoms	>150	41-149	11 - 40	1 - 10	None Seen
Other Algae	>300	96-299	21 - 95	1 - 20	None Seen
Insects/Larvae	>100	31-99	16 - 30	1 - 15	None Seen
Rotifers	>150	61-149	21 - 60	1 - 20	None Seen
Plant Debris	>200	71-199	26 - 70	1 - 25	None Seen

SECONDARY BIO-INDICATORS: Secondary bio-indicators are reported as a number based on relative concentration per 378.5 Liters (100 gallons) sampled and should be used only to support information derived from the primary bio-indicator category

RELATIVE SURFACE WATER RISK FACTOR ASSOCIATED WITH SCORING OF PRIMARY BIO-INDICATORS

	EH	H	M	R	NS
Giardia	40	30	25	20	0
Coccidia/Crypto	35	30	25	20	0
Diatoms	16	13	11	6	0
Other Algae	14	12	9	4	0
Insects/Larvae	9	7	5	3	0
Rotifers	4	3	2	1	0
Plant Debris	3	2	1	0	0

RISK OF SURFACE WATER CONTAMINATION

High Risk	Moderate Risk	Low Risk
20 or Greater	10 - 19	0 - 9

SAMPLE EVALUATION PERFORMANCE CRITERIA: The precise rates of recovery of organisms from environmental samples cannot be determined. B ioVir Laboratories has analyzed your sample(s) in accordance with the method described with each analyte above, however, due to inherent limitations of these methods organisms may avoid detection. For additional information regarding the limitations of the method(s) referred to above please call us at 1-800-GIARDIA.
COMPANY IS NOT AN INSURER: BioVir Laboratories is not an insurer or guarantor of the quality and/or purity of water, wastewater, biosolid or other material from which the sample was taken. BioVir offers no express or implied warranties whatsoever concerning the quality or purity of any water, wastewater, biosolid or other material which is ultimately consumed, distributed, applied or disposed.
MAINTENANCE OF RECORDS: BioVir Laboratories, Inc. shall maintain records pertaining to the historical reconstruction of client's data for a minimum of five years from the date of issuance of the final report. Records m ay be destroyed after that date unless a written client's request for records transfer is received by BioVir which requests otherwise. Records transfer or storage charges may apply after the 5 year period. THIS REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF BIOVIR LABORATORIES, INC.

8/24/2012
Report Date

Richard E Daniel
Signature

Quality Checked DCelio

BioVir LABORATORIES

GIARDIA / CRYPTOSPORIDIUM / MPA ASSAY SAMPLE DATA SHEET

(Please fill out applicable areas, sign and return to BioVir with the sample.)
Phone: 1-800-GIARDIA Fax: 707-747-1751 WEB: www.bioVir.com

LAB USE ONLY:
LIMS #: 307-1
Client #: 906910
Date Rec'd: 3/11/13
Time Rec'd: 1328
Temp Rec'd: 7.4°C

Note: Please print clearly using waterproof ink

COMPANY NAME & ADDRESS: McCray - Goldsmith

Contact Name: Tel: 917-744-551

NAME OF SAMPLER: FRED LUNA

SAMPLE SOURCE: WELL - RAW WATER

SAMPLE LOCATION: HUCKLEBERRY HEIGHTS MUTUAL WATER CO. - WELL HEAD

SAMPLE DESCRIPTION (MPA):

SAMPLE VOLUME: (Meter # 20007630)
Meter Start: 4167.0 Meter Stop: 4990.0
Total Volume: 823 Gallons _____ Liters

SAMPLE DATE: 3-9-2013

SAMPLE TIME: 0850 - 2105

Water Temp (C): 58.5°F

Turbidity (NTU): 1.3 NTU

TREATMENT CHARACTERISTICS (Check One):
Raw Surface Water ☐ Treated Drinking Water ☐
Treated Wastewater ☐ Wastewater ☐
Ground Water ☒ Other: _____

DECHLORINATION/ DISINFECTANT NEUTRALIZATION (If Treated Water):
Yes (No)

SAMPLE DESCRIPTION (G/C):
Regular Grab Sample ☐ Matrix Spike Grab ☐
Regular Filtered Sample ☐
Matrix Spike Grab / Matrix Spike Filter Pair (>10 L Sample) ☐
Filtered Volume: _____ Liters Grab Volume: _____ Liters

Client Sample ID:

P.O. #:

ASSAY REQUESTED: Please check one of the following

METHOD 1623: Cryptosporidium and Giardia (EPA 821-R-01-025)	
	REGULAR SAMPLE
	MATRIX SPIKE SAMPLE
METHOD 1622: Cryptosporidium Only (EPA 821-R-01-026)	
	REGULAR SAMPLE
	MATRIX SPIKE SAMPLE
MICROSCOPIC PARTICULATE ANALYSIS (MPA)	
X	MPA WITH GIARDIA/CRYPTO BY FLUORESCENCE ASSAY (FA) (EPA 910/9-92-029 & 821-R-01-025)
	MPA WITHOUT FLUORESCENCE ASSAY (EPA 910/9-92-029)

COMMENTS:

RELINQUISHED BY: [signature] DATE / TIME: 3/11/13 1328

RECEIVED BY: [signature] DATE / TIME: 3/11/13 13:28

SHIPPING ADDRESS: BIOVIR LABORATORIES, INC., 685 STONE ROAD, UNIT 6, BENICIA, CALIFORNIA 94510

BioVir Laboratories, Inc

NELAC #05234CA
EPA ID# 01401, CA-ELAP #179

685 Stone Road, Unit 6 • Benicia, CA 94510 • (707) 747-5906 • 1-800-GIARDIA • FAX (707) 747-1751 • WEB: www.biovir.com

LAB Sample ID: 130307-001

Client / Address: John McCray-Goldsmith,5514 Doyle Street #2 , Emeryville CA 94608
Client No: GOL010 **Purchase Order No:**
Client Contact: John Mc-Cray Goldsmith, **Client Phone:** 917-744-5515

SAMPLE INFORMATION:

Name of Sampler:	Fred Luna	**Customer Sample ID:**	Well-Raw Water
Matrix:	Groundwater	**Sample Site**	Huckleberry Heights, Mutual Water C
Sample Collection Date:	3/9/2013	**Date/Time Received:**	3/11/2013 1:28:00 PM
Sample Time:	8:50:00 AM	**Check-in Temp. (0-20C)**	7.4
Container Type:	ywdf	**Sample Volume:**	3115 L

Comments:

ASSAY RESULTS: **Microscopic Particulate Analysis** **MPA (Standard)**
EPA 910/9-92-029 (600/R-95/178)

PRIMARY BIO-INDICATORS

Giardia	0 in 1368 L	Cryptosporidium	0 in 1368 L
Coccidia	0 / 100 gal	Diatoms	0 / 100 gal
Other Algae	0 / 100 gal	Insect/Larvae	0 / 100 gal
Rotifers	0 / 100 gal	Plant Debris	0 / 100 gal

SECONDARY BIO-INDICATORS

Amorphous Debris	TNTC / 100 gal	Minerals	0 / 100 gal
Plant Pollen	0 / 100 gal	Nematodes	0 / 100 gal
Crustacea	0 / 100 gal	Amoeba	0 / 100 gal
Ciliates/Flagellates	0 / 100 gal	Other Organisms	0 / 100 gal

Analysis Date: 3/13/2013 Analyst: Cigdem Alemdar Date: 3/15/2013 5:46:49 PM

BioVir Laboratories, Inc

NELAC #05234CA
EPA ID# 01401, CA-ELAP #179

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LAB Sample ID: 130307-001

MICROSCOPIC PARTICULATE ANALYSIS RISK FACTORS
(Consensus Method for Determining Groundwaters Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA) - EPA 910/9-92-029

PRIMARY BIO-INDICATORS: Numerical range of each primary bio-indicator based on numbers counted per 378.5 Liters (100 gallons) sampled

	EH (Extremely Heavy)	H (Heavy)	M (Moderate)	R (Rare)	NS
Giardia	>30	16 - 30	6 - 15	1 - 5	None Seen
Coccidia/Crypto	>30	16 - 30	6 - 15	1 - 5	None Seen
Diatoms	>150	41-149	11 - 40	1 - 10	None Seen
Other Algae	>300	96-299	21 - 95	1 - 20	None Seen
Insects/Larvae	>100	31-99	16 - 30	1 - 15	None Seen
Rotifers	>150	61-149	21 - 60	1 - 20	None Seen
Plant Debris	>200	71-199	26 - 70	1 - 25	None Seen

SECONDARY BIO-INDICATORS: Secondary bio-indicators are reported as a number based on relative concentration per 378.5 Liters (100 gallons) sampled and should be used only to support information derived from the primary bio-indicator category

RELATIVE SURFACE WATER RISK FACTOR ASSOCIATED WITH SCORING OF PRIMARY BIO-INDICATORS

	EH	H	M	R	NS
Giardia	40	30	25	20	0
Coccidia/Crypto	35	30	25	20	0
Diatoms	16	13	11	6	0
Other Algae	14	12	9	4	0
Insects/Larvae	9	7	5	3	0
Rotifers	4	3	2	1	0
Plant Debris	3	2	1	0	0

RISK OF SURFACE WATER CONTAMINATION

High Risk	Moderate Risk	Low Risk
20 or Greater	10 - 19	0 - 9

SAMPLE EVALUATION PERFORMANCE CRITERIA: The precise rates of recovery of organisms from environmental samples cannot be determined. B ioVir Laboratories has analyzed your sample(s) in accordance with the method described with each analyte above, however, due to inherent limitations of these methods organisms may avoid detection. For additional information regarding the limitations of the method(s) referred to above please call us at 1-800-GIARDIA.
COMPANY IS NOT AN INSURER: BioVir Laboratories is not an insurer or guarantor of the quality and/or purity of water, wastewater, biosolid or other material from which the sample was taken. BioVir offers no express or implied warranties whatsoever concerning the quality or purity of any water, wastewater, biosolid or other material which is ultimately consumed, distributed, applied or disposed.
MAINTENANCE OF RECORDS: BioVir Laboratories, Inc. shall maintain records pertaining to the historical reconstruction of client's data for a minimum of five years from the date of issuance of the final report. Records m ay be destroyed after that date unless a written client's request for records transfer is received by BioVir which requests otherwise. Records transfer or storage charges may apply after the 5 year period. THIS REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF BIOVIR LABORATORIES, INC.

3/22/2013
Report Date

Richard E Daniels
Signature

Quality Checked DCelio

BASICS -
4-LOG VIRUS INACTIVATION THROUGH CHLORINE DISINFECTION

If a water system is required to provide 4-log virus inactivation through chlorine disinfection, the chlorination system must be maintained to provide continuous, reliable disinfection. At a minimum, a daily grab sample must be obtained and monitored for chlorine residual, temperature, pH, and peak flow rate of the disinfected water. Continuous monitoring equipment may also be used. The water system must monitor and maintain a chlorine residual concentration to ensure that 4-log virus inactivation is provided at all times. Inactivation through chlorination is a function of the chlorine concentration (C) and the time (T) the water is in contact with the chlorine before it reaches the first customer. CT is chlorine concentration (C) multiplied by the time (T) that the water is in contact with the chlorine.

Water systems must provide a system schematic indicating the location of chlorine injection, location of compliance monitoring, length and diameter of piping used for CT, and/or dimensions of CT tank. Water systems must monitor the chlorination system on a daily basis and must provide a monthly report to the Department by the 10th day of the following month. Upon receipt of the schematic, the Department will provide the water system with a customized spreadsheet to calculate the virus inactivation for its system.