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Sanitary Survey Report
For The Rural North Vacaville Water District
System No. 4810013
October 2013

San Francisco District
Drinking Water Field Operations Branch
State of California Department of Public Health
Marco Pacheco, P.E., Associate Sanitary Engineer

I. INTRODUCTION

1.1 Purpose of Report

On October 31st, 2013, Mr. Marco Pacheco, an associate sanitary engineer with the California Department of Public Health (Department), conducted a sanitary survey of the Rural North Vacaville Water District water system (RNVWD). The survey covered the following:

- Water source
- Treatment
- Distribution system
- Pumping facilities
- Finished water storage
- Monitoring, reporting, and record retention
- Management and operations
- Operator compliance

This report provides a description of the water system and its operation, details inspection findings, assesses compliance with applicable laws and regulations, identifies sanitary hazards, and makes recommendations.

1.2 Description

RNVWD is a community water system that serves a population of 900 through 372 metered service connections. The system runs on two wells drilled to a depth of 1,400 ft, each having a capacity of 500 gallons per minute. Well 2 has been placed on emergency standby, as the average arsenic concentration has been approximately 16 ppb, consistently above the 10 ppb MCL. Well 1 remains the only source for reliable production, with arsenic levels consistently holding at 6 ppb or less. The water system also includes two 300,000 gallon tanks with two booster pumps each that pump 250 gallons per minute. All potable water distributed by RNVWD contains chlorine residual for disinfection purposes.

1.3 Area Served

RNVWD serves an unincorporated area of rural Solano County, north of Vacaville. The service area covers an area of approximately 22 square miles. RNVWD is comprised of the area enveloping Cantelow Road, English Hills, Gibson Canyon and Steiger Hill, bordered by unincorporated areas of Solano Irrigation District (SID) service area to the southwest, and the City of Vacaville to the southeast.

1.4 History

The Rural North Vacaville Water District was formed by a vote of the property owners in the English Hills and Steiger Hills area north of Vacaville in June 1996, at which time a Community Services District was formed as a Special Assessment District to collect a supplemental tax to pay for the construction of the potable water system. The County Board of Supervisors was appointed as the District's Board of Directors during construction and the first full year's operation of the public potable water system. The Environmental Management Department was the County Department that oversaw the construction of the potable water system.

Construction of the water distribution system was financed through two 20-year, low interest (approx. 2.8%) loans to design and construct the potable water system. The first loan for \$5 million was obtained from California State Department of Water Resources. The second loan (SRF) for \$8.8 million was obtained from the California State Department of Health Services.

1.5 Facilities

Table 1.1 List of facilities inspected

Sources	Finished Water Pumping	Finished Water Storage
Well 1	Pump Station 3	Site 3 Tank
Well 2	Pump Station 4	Site 4 Tank
	Pump Station 5	Site 4 Pressure Tank

1.6 Sources of Information

Sources of information used in this report include:

- Department files
- 2012 Small Water System Annual Report
- Field Inspections

- Water system personnel present during the survey:
 - Gordon Stankowski, General Manager (RNVWD)
 - Sam Silva, Water Quality Project Manager (Cal Water Service Co.)
 - Jack Caldwell, Local Manager (Cal Water Service Co.)
 - John Freeman, Jr., District Manager (Cal Water Service Co.)
 - Julio Lopez, Operator (Cal Water Service Co.)
 - Aaron Allen, Operator (Cal Water Service Co.)

II. INVESTIGATION AND FINDINGS

2.1 Permit, Classification, and Data

2.1.1 Permit Status

The Department issued water supply permit no. 02-04-00P-4810013 on June 16, 2000. The water system is in compliance with the requirement to possess a water supply permit.

2.1.2 System Classification

RNVWD is a small community water system based upon both population and number of service connections, as recorded in Table 2.1 below.

2.1.3 Consumer and Production Data

Table 2.1 Population and Service Connections (2012 Annual Report)

Residents	Resident Service Connections	Total Service Connections
900	372	372

2.1.4 Changes in System

Since the previous inspection, RNVWD has completed the following projects:

- Auto transfer switch installed at Station 1 for portable auxiliary power capability
- Replacement of pump motor and shaft at Well 2

RNVWD has the following projects planned for the near future:

- Auto transfer power switch installation at Station 3

2.2 Sources

2.2.1 Groundwater

RNVWD has one active groundwater source (Well 1) and one emergency standby groundwater source (Well 2). Well 1 and Well 2 are located at the end of Buena Vista Lane, approximately 1,000 feet apart. Hydrogeologically, the wells are located in the Solano subbasin of the Sacramento County Valley groundwater basin (DWR basin no. 5-21.66).

Table 2.2 Well Specifications

Source (PS Code)	Status	Capacity	Well Depth	Drilling Date	Pump
Well 1 (4810013-001)	Active	450 gpm	1391 ft	10/11/2001	75 hp Vert. Turbine
Well 2 (4810013-002)	Standby	450 gpm	1284 ft	10/29/2001	75 hp Vert. Turbine

Table 2.3 Subsurface Specifications

Source	Casing Material	Casing Diameter	Annular Seal Depth	Annular Seal Material
Well 1	Steel	16.625"	902 ft	Cement Grout
Well 2	Steel	16.625"	901 ft	Cement Grout

Table 2.4 Surface Construction Features

Source	Openings Sealed	Casing Vent	Air Relief Valve	Screen Intervals (feet below ground surface elevation)
Well 1	Yes	Yes	Yes	1017/1047; 1169/1189; 1245/1261; 1271/1291; 1351/1361
Well 2	Yes	Yes	Yes	1071/1099; 1210/1240

Table 2.5 Surface Construction Features Cont.

Sources	Check Valve	Flowmeter	Pump-to-Waste	Enclosed	Sample Tap
Well 1	Yes	Yes	Yes	Metal Shed	Yes
Well 2	Yes	Yes	Yes	Metal Shed	Yes

2.2.3 Adequacy of Supply

RNVWD is required to have sufficient storage and source capacity to meet Maximum Day Demand (MDD). The MDD in 2012 was 0.494 million gallons. Total production capacity of the active Well 1 is approximately 0.648 million gallons per day (MGD). An additional emergency source capacity of 0.648 MGD can be supplied by Well 2. RNVWD has approximately 0.6 million gallons in storage capacity, which is greater than the MDD. RNVWD has sufficient water available to meet its MDD and can comply with the Waterworks Standards based on reliable source, storage, and emergency supply capacity.

2.2.4 Drinking Water Source Assessment and Protection (DWSAP) Program

An assessment of the two groundwater sources was completed by Ludhorff & Scalmanini Consulting Engineers in March of 2002. No identifiable activities were associated with contaminants in the ground-water supply that would impact the water supply wells. The assessment identified livestock grazing, low density septic systems, orchards, and irrigation wells as possible sources of contamination to Well 1 and 2. Both wells were determined to have high physical barrier effectiveness based upon their construction and susceptibility to contamination.

2.3 Treatment

2.3.1 Description

Continuous disinfection is provided at each well through the use of NSF 60 approved calcium hypochlorite, injected using Chlorine Accu-Tab Model 3012 chlorinators. 6% calcium hypochlorite tablets are fed through the pump bowl to provide a chlorine dosage of 0.5 to 0.8 mg/L. Feed rate is controlled manually. A supervisory control and data acquisition (SCADA) system monitors chlorine levels on a continuous basis. There is a low-level chlorine residual alarm which activates when chlorine levels go below 0.3 mg/L at the distribution entry point. According to California Water Service Company (CWS), the chlorination equipment is routinely inspected twice a week.

2.3.2 *Operations and Maintenance*

As defined by Section 63750.85, Title 22, *California Code of Regulations* (22 CCR §63750.85), facilities consisting of only disinfection without inactivation credit are required at minimum to be under the control of a certified D1 operator. RNWVD currently meets this requirement by employing CWS operators, which each hold a minimum D1 license.

2.4 **Distribution and Transmission System**

2.4.1 *Description*

The RNWVD distribution system serves 372 connections in five primary gravity pressure zones with storage. Water is delivered through approximately 36 miles of water mains ranging from 4 to 12 inches in diameter. The distribution system mostly consists of class 150 and 200 PVC piping. Five pressure reducing stations are adjusted to keep the primary reservoirs in the system full. 100 percent of connections serve residences.

Table 2.8 Pressure Zones

Name	Sources	Storage in Zone (gallons)	Pressure Range (psi)
1	Wells, PRV Zone 2	300,000	40-130
2	PRV from Zone 3	-	40-140
3	Station 3 Pumps	300,000	40-120
4	Station 4 Pumps	-	40-80
5	Station 5 Pumps	5,000 (hydro tank)	40-60

Most zones have a designated pump or booster station. Most also have their own storage facilities which are supplied by either a production facility, a regulator (pressure transducer), or a booster station. Pressure is adequately maintained in all zones. There are no known low-pressure problems.

Three pump stations are utilized to move water through the storage reservoirs and pressure zones as well as to maintain system pressure at peak demand. Elevation in the system varies from 170 feet to 980 feet above sea level.

Table 2.9 Finished Water Pump Stations

Name	Source	Destination	Number of Pumps	Capacity (gpm)	Firm Capacity (gpm)
3	Zone 1	Zone 3	2 – 30 hp	500	250
4	Zone 3	Zone 4	2 – 20 hp	500	250
5	Zone 4	Zone 5	2 – 5 hp	130	65

Finished water pumping facilities in the distribution system are generally adequate and in good repair. Pump stations are inspected on regular basis, two to three times per week. Security appears adequate to reduce risk of unauthorized entry or theft and vandalism.

Finished water pumping facilities are all designed and constructed in accordance with AWWA standards. The pumps are automatically activated in response to water level in the reservoirs. All pumps can alternate but can be activated to pump jointly to meet peak demands. Each pumping facility provides adequate firm capacity, with each facility having at least two pumps.

2.4.2 Classification and Operator Certification

The RNVWD distribution system has a D1 classification based upon population pursuant to §64413.3. The chief and shift distribution operators must be D1 certified.

RNVWD has one D5 certified operator and two D2 certified operators assigned to the distribution system. RNVWD complies with the chief distribution operator requirement. Distribution system operation is reportedly organized into one daily shift, and operators are on-call during off hours. RNVWD meets the shift distribution operator certification requirement. All distribution system work is reportedly supervised by certified operators.

Table 2.10 Certified Distribution Operators (2012 Annual Report)

Name	License No.	Grade	Expiration Date
Jack Caldwell	9790	D5	09/01/2014
Aaron Allen	38596	D2	03/01/2014
Julio Lopez	37562	D2	05/01/2016

2.4.3 Cross-Connection Control Program

RNVWD has a comprehensive cross-connection control program. As required by 17 CCR §7584, the program includes each of the following:

- Operating rules
- Surveys
- Backflow protection devices
- Personnel trained in cross-connection control
 - 1 certified specialist
 - 1 backflow prevention assembly tester
- Annual backflow prevention device testing
- Records maintenance

The cross-connection control program appeared adequate at the time of the survey.

2.4.4 Maintenance and Design

CWS has a routine maintenance program for distribution system equipment, maps and databases to support maintenance, and design standards for new facilities. As-built drawings are available for most facilities. CWS has adopted standard specifications for water main installation which are designed to meet American Water Works Association (AWWA) standards.

All new and repaired mains are disinfected with dissolved granular or liquid chlorine, in accordance with AWWA standards, before being placed into service. CWS collects and analyzes bacteriological samples and requires a negative sample result before the main is brought into service.

CWS maintains the distribution system according to various internal SOPs and policies. Distribution operators are responsible for distribution system finished water pumping facility operations. No deficiencies in distribution system operation and maintenance procedures were identified during the survey.

RNVWD adheres to an as needed program for exercising distribution system valves and flushing water mains. CWS continually monitors for pipeline water quality and keeps records of valve turning and flushing operations. Critical valves in the system are identified and exercised as needed to ensure system reliability in case of an emergency.

2.5 Treated Water Storage Facilities

RNVWD has 2 finished water reservoirs in the distribution system. The operational storage capacity of each reservoir is typically between 75% and 99%. All reservoirs have level monitoring equipment and transmit signals. RNVWD can monitor storage facility water level through the SCADA system. SCADA also has alerts for storage parameters such as low water level and overflow.

The survey covered the visible features of each storage reservoir, security, operation, and maintenance. Reservoir operation, maintenance, inspection frequency, and cleaning frequency appeared adequate during the survey. Both storage reservoirs are designed with a separate inlet/outlet arrangement. Storage facility site security appeared adequate to reduce the risk of unauthorized access or theft and vandalism. All storage facilities have perimeter fences with locked gates.

Table 2.11 Storage Facility Summary

Name	Construction Type	Install Date	Capacity (MG)	Pressure Zone	Source
Site 3 Tank	Steel	2004	0.30	1 & 2	Wells
Site 4 Tank	Steel	2004	0.30	3,4, & 5	Zone 2
Total			0.60		

RNVWD has a routine maintenance program that includes surveying process equipment at the storage facilities. RNVWD attempts to conduct thorough structural and coating inspections along with cleanings at least once every five years, as recommended by the USEPA. Basic tank components are checked weekly.

Table 2.12 Storage Facility Deficiencies and Cleaning History

Reservoir Name	Deficiency or Hazard	Last Inspected	Last Cleaned	Date Relined or Recoated
Site 3 Tank	None	2013	2013	N/A
Site 4 Tank	None	2013	2013	N/A

2.6 Water Quality & Monitoring

2.6.1 Total Coliform Rule

RNVWD is required at minimum to collect 1 bacteriological sample per month from the distribution system. RNVWD currently collects one sample per week. Since January 2012, RNVWD has collected zero total coliform positive samples. RNVWD has continuously complied with the TCR sampling requirement and MCL. The most recent TCR monitoring plan on file is dated July 2002. The plan identifies 12 sample locations and adequately represents the current distribution system size.

2.6.2 Disinfectant and Disinfection Byproducts Rule (D/DBPR)

RNVWD is required to sample for disinfectants at the same time and location as distribution system total coliform sampling. Since the first quarter of 2009, RNVWD’s running annual average (RAA) for chlorine has been in compliance with the maximum residual disinfectant level (MRDL) of 4.0 mg/L.

RNVWD is a schedule 4 system for the purpose of the Stage 2 D/DBPR. RNVWD qualified for a 40/30 waiver based on low detection levels of both TTHM and HAA5, and was not required to conduct an Initial Distribution System Evaluation (IDSE). CDPH approved the 40/30 waiver on March 27, 2008. RNVWD submitted a Stage 2 compliance monitoring plan on September 26, 2013 and will commence with dual TTHM/HAA5 sampling from one location annually in August 2014.

RNVWD has met the sampling requirements and complied with the drinking water standards for TTHM, HAA5, and disinfectants during each quarter from 2009 to the present. RNVWD has also met the reporting requirements.

2.6.3 Lead & Copper Rule

RNVWD is a small water system for the purpose of the Lead and Copper Rule.

RNVWD completed initial standard tap sampling during 2004 and currently conducts reduced triennial sampling at 10 customer taps. During 2012, the 90th percentile copper level (0.16 mg/L) was greater than the 0.05 mg/L detection limit and the 90th percentile lead level was below the 0.005 mg/L detection limit. RNVWD is next required to sample for lead and copper during 2015.

Lead and copper data and 90th percentile levels are reported after each monitoring period as required. Participating customers are notified of their individual lead and copper levels as required by federal regulations.

2.6.4 Source Chemical Monitoring

RNVWD is in compliance with all primary and secondary drinking water standards. The following table presents a summary of the monitoring requirements and recent sampling history for both Well 1 and 2.

Table 2.13 Title 22 Chemical Sampling & Monitoring Summaries

Well 1 (4810013-001)			
Chemical Group	Required Frequency	Last Sample	Next Sample
Secondary	1x / 3 yrs	11/15/2010	2013
General Mineral/Chemistry	1x / 3 yrs	11/15/2010	2013
Inorganics (IOCs)	1x / 3 yrs	11/15/2010	2013
Nitrate	Annually	09/16/2013	2014
Arsenic	Quarterly	07/23/2013	4 th Qtr, 2013
Gross Alpha	1x / 9 yrs	11/29/2005	2014
VOCs	1x / 3 yrs	10/29/2012	2015
SOCs	1x / 3 yrs	10/27/2011	2014

Well 2 (4810013-001)			
Chemical Group	Required Frequency	Last Sample	Next Sample
Secondary	1x / 9 yrs	07/24/2007	2016
General Mineral/Chemistry	1x / 9 yrs	07/24/2007	2016
Inorganics (IOCs)	1x / 9 yrs	07/24/2007	2016
Perchlorate	1x / 9 yrs	05/20/2013	2022
Nitrate	1x / 9 yrs	05/27/2008	2017
Gross Alpha	1x / 9 yrs	10/30/2008	2017
VOCs	1x / 9 yrs	10/30/2008	2017
SOCs	1x / 9 yrs	05/20/2013	2022

2.7 Management and Reporting

2.7.1 Description

Since system installation, the physical operation and maintenance of the RNVWD water distribution system has been performed by the CWS under contract with the RNVWD. In that capacity, CWS performs all of the required functions to keep the system in running order. CWS submits monthly reports to the General Manager to keep him informed on the status of the system. The CWS also conducts water quality testing on RNVWD water.

At its inception, RNVWD operations were under the management of Solano County and the Solano County Board of Supervisors sat as the District's Board. Effective in November 2007, the RNVWD owners elected their own Board of 5 Directors to take over the leadership of the District.

Since the RNVWD is owned by its subscribers, it is now operated by the all-volunteer Board of Directors who reside within the District. They are elected by their peers, other residents of the District. The term of office for each director is four years. The water operation is managed by a General Manager who reports directly to the board.

In 2008, after taking over the management of the RNVWD, the elected Board of Directors set up annual budgets to operate the water system and set rates for its operation.

No inadequacies in water system management, communication, planning, or budgeting were observed during the survey. Reportedly, management is organized and effective, staff roles are well defined, and communication is rapid. The water system has budgetary control, and funding is reportedly adequate for operation and maintenance. Planning is reportedly adequate and the RNVWD has a current and funded water system budget, which is developed every year. RNVWD also keeps adequate written working plans for sampling, monitoring, and cross-connection control.

2.7.2 Annual Reports

RNVWD submitted a complete 2012 Annual Report on May 8th, 2013.

2.7.3 *Emergency Notification Plan (ENP)*

The most recent ENP for RNVWD was submitted by CWS on 4/13/2011. The ENP does not contain contact information for any RNVWD representatives and should be updated to include all current emergency contacts.

2.7.4 *Emergency/Disaster Response*

CDPH does not currently have an Emergency/Disaster Response plan on file for RNVWD. At the time of the survey, CWS indicated that a plan was currently in the draft stages, and would be submitted to CDPH upon completion.

2.7.5 *Consumer Confidence Report (CCR)*

RNVWD submitted a complete and on time 2012 CCR. The content and delivery of the 2012 CCR met all requirements.

III. SYSTEM APPRAISAL & SANITARY HAZARDS

3.1 Overall System Appraisal

RNVWD facilities are in adequate condition. RNVWD works proactively to comply with water quality standards and deliver a safe, adequate, and reliable supply of drinking water. CDPH did not identify any significant deficiencies in the active or standby water source. The finished water storage, pumping, and distribution facilities are generally in adequate condition. CDPH did not identify any significant deficiencies in the storage, pumping, or distribution facilities. RNVWD has complied with all water quality sampling and reporting requirements, and has delivered water meeting all primary and secondary drinking water standards. RNVWD has designated chief and shift distribution operators who meet certification requirements. CDPH did not identify any management or financial conditions that could lead to sanitary hazards. RNVWD adequately plans for future water supply conditions, facility improvements, and emergency response.

3.2 Compliance

3.2.1 *Permit Conditions*

RNVWD currently complies with all conditions set forth in water supply permit no. 02-04-00P-4810013.

3.2.2 *Statutes and Regulations*

RNVWD currently monitors Well 1 quarterly for iron and manganese concentrations. As required by 22 CCR §64449, RNVWD began quarterly monitoring in 2005 when levels for both constituents exceeded their respective secondary MCLs during startup testing. Since 2006, RNVWD has not exceeded the secondary MCL based on a running annual average of four quarterly samples. RNVWD may reduce iron and manganese monitoring frequency at Well 1 to once every three years in accordance with 22 CCR §64449(c)(4).

3.3 Sanitary Hazards

No significant sanitary hazards were identified during the survey.

IV. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

RNVWD continues to be capable of meeting the requirements of the California Safe Drinking Water Act and provides a reliable and adequate supply of safe and potable drinking water. The water system generally complies with regulations and permit conditions and supplies water meeting all primary drinking water standards.


The following are required or recommended to ensure continued compliance with drinking water regulations and water quality standards:

4.2 Deficiencies and Recommendations

Recommended:

1. Reduce iron and manganese monitoring at Well 1 to once every three years in accordance with 22 CCR §64449.
2. Submit a revised Emergency Notification Plan and Emergency/Disaster Response plan to the Department.
3. Install permanent auxiliary power supplies at Station 1 and Station 3, or obtain a portable generator to provide power to these facilities during emergencies.

Prepared by



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11/7/2013

Date