

SANITARY SURVEYS INSPECTIONS FOR SMALL WATER SYSTEMS



NMED Drinking Water Bureau

New Mexico Sanitary Surveys

1172 Public Water Systems

- 598 Community Water Systems – 3 years
 - 148 Non-Transient Systems – 5 years
 - 425 Transient Water Systems – 5 years
-
- 2010 State Population – 2,059,000
 - Approximately 1,700,000 people are on Community Water Systems in New Mexico.
 - 5 major cities make up over 800,000 people.



Definition of Sanitary Survey

- **40 CFR 141.2**

"..an on-site review of the water source, facilities, equipment, operation & maintenance of a public water system for the purpose of evaluating the adequacy of such source, facilities, equipment, operations & maintenance for producing and distributing safe drinking water."

- This has been broadened to include a capacity assessment and operator certification appraisal.



Definition

20.7.10.7 NMAC Section J:

- “A sanitary survey evaluates at least nine components: source, treatment, distribution system, finished water storage; pumps; pump facilities and controls; monitoring and reporting and data verification; system management and operation; and operator compliance with state requirements.”



Nine elements of a sanitary survey

Source

Treatment

Finished water storage

Pumps

Pump facilities and controls

Distribution system

Monitoring, reporting and data verification

System management and operation

Operator compliance



Source

Groundwater

Well

Spring

GWUDI

Well

Spring

Infiltration Gallery

Surface Water

Lake or Reservoir

Stream



New Mexico Drinking Water Regulations

20 NMAC 7.1.400 C –

General Operating requirements: Protection of the Water Supply Well: A ground water supply well serving a public water system shall have a sanitary seal installed at the wellhead to protect against entry of storm water and other non-potable fluids or foreign materials and against access by insects, rodents, birds or other vermin. Well vents shall be screened with a fine corrosion-resistant screen (24 mesh or smaller). All cracks, joints or other openings at the wellhead and all penetrations to the casing at or near the ground surface shall be tightly sealed with an impermeable material."



Well Inspection

Well log

Sanitary seal

Casing height* (required or recommendation)

Concrete pad

Cross connections

Security

PSOCs (Potential Sources of Contamination)



Well Log Example – Screen Depth

500-403 (Rev. 11-80) Office of State Engineer 108-36-17-10-06 01/15/2000 2/11
 Revised form 12/92

**STATE ENGINEER OFFICE
WELL RECORD**

Section 1. GENERAL INFORMATION

(A) Owner of well: GRACE HARRIS Owner's Well No. _____
 Street or Post Office Address: U/O ESTER STEINBEL P. O. BOX 2200
 City and State: Albuquerque, New Mexico 87245

Well was drilled under Permit No. Q2107-A into H-1922 and is located in the:
 a. SW 1/4 NE 1/4 W 1/4 of Section 33 Township 10S Range 13E N.M.P.M.
 b. Tract No. _____ of Map No. _____ of the _____
 c. Lot No. _____ of Block No. _____ of the _____
 Subdivision, recorded in LIBERTY County.
 d. X = _____ feet, Y = _____ feet, N.M. Coordinate System _____ Zone in
 the _____ Grant.

(B) Drilling Contractor: New Mexico Drilling, Inc. License No. ND-271
 Address: P. O. Box 1423 Albuquerque, New Mexico 88511-1423
 Drilling Began 8/24/90 Completed 8/27/90 Type tools Rotary Size of hole 8 in.
 Elevation of land surface or _____ at well is _____ ft. Total depth of well 260 ft.
 Completed well is shallow artesian. Depth to water upon completion of well 18 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
From	To			
		18'	SOOP of water	5000
		65'	Broken lime	5
210	212	2	Broken lime	35

Section 3. RECORD OF CASING

Diameter (caches)	Pounds per foot	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
8	150	DVC	0	260	260		220	260

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
From	To				

Section 5. PLUGGING RECORD

Plugging Contractor _____
 Address _____
 Plugging Method _____
 Date Well Plugged _____
 Plugging approved by: _____
 State Engineer Representative _____

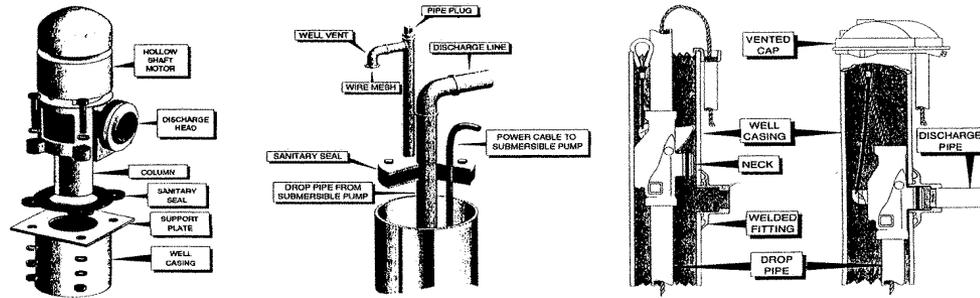
No.	Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received 9/5/90 Quad _____ FWL _____ FSL _____
 File No. H-1922 Use Diagnostic & Commercial Location No. 10-13-33-2373E
10-13-33-2343E



4 Types of Wells



Three Typical Wellhead Designs



Line Shaft Turbine



Turbine Seal



Faulty Seal

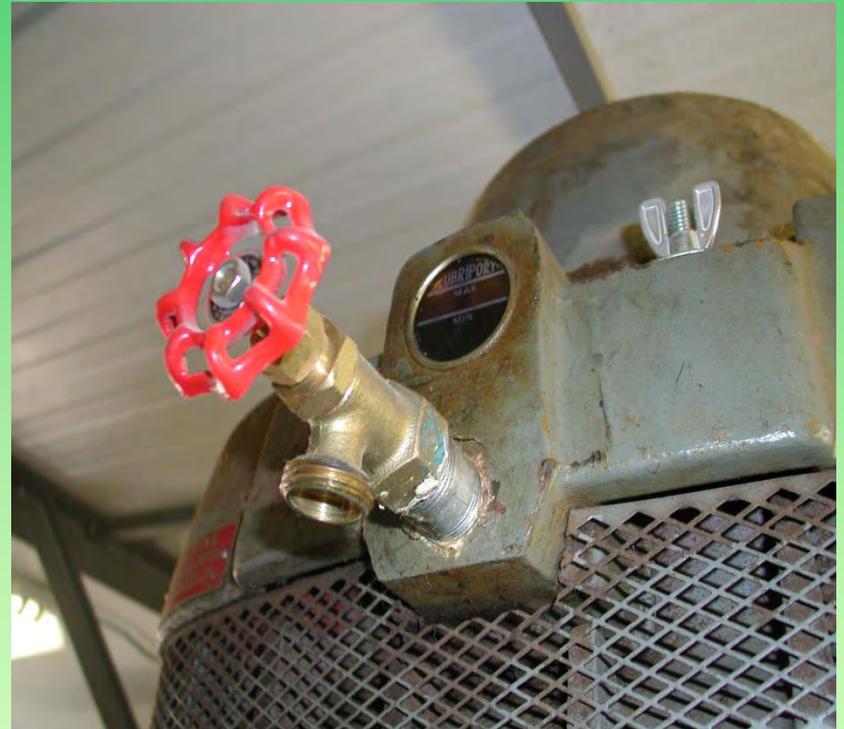
SIGNIFICANT
DEFICIENCY



Food Grade Lubricant



Turbine Oil Level Indicator



Submersible

**SIGNIFICANT
DEFICIENCY**



Pitless Adapter



Proper Seal?

SIGNIFICANT
DEFICIENCY
(NO SEAL)





**SIGNIFICANT
DEFICIENCY**



Sanitary Seal



SIGNIFICANT
DEFICIENCY



Why worry about a sanitary seal?





**SIGNIFICANT
DEFICIENCY**

**SIGNIFICANT
DEFICIENCY**



ACCEPTABLE
SECURITY FOR
SMALL WATER
SYSTEM

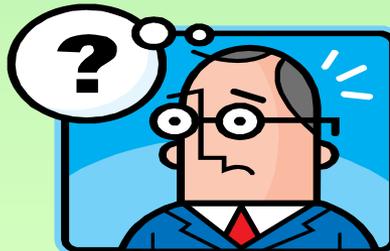


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Well Location?

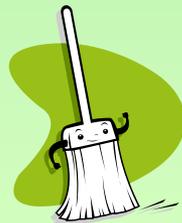
SIGNIFICANT
DEFICIENCY

WELL



Housekeeping

Can be significant if it poses a contamination threat to water system



Springs



Springs



Springs - Security

LACK OF SECURITY



Springs



CONTAMINATION
POTENTIAL



Spring Security



Diversions



Diversions



Parschall Flume



Reservoir Intakes



Reservoirs



V-Notch

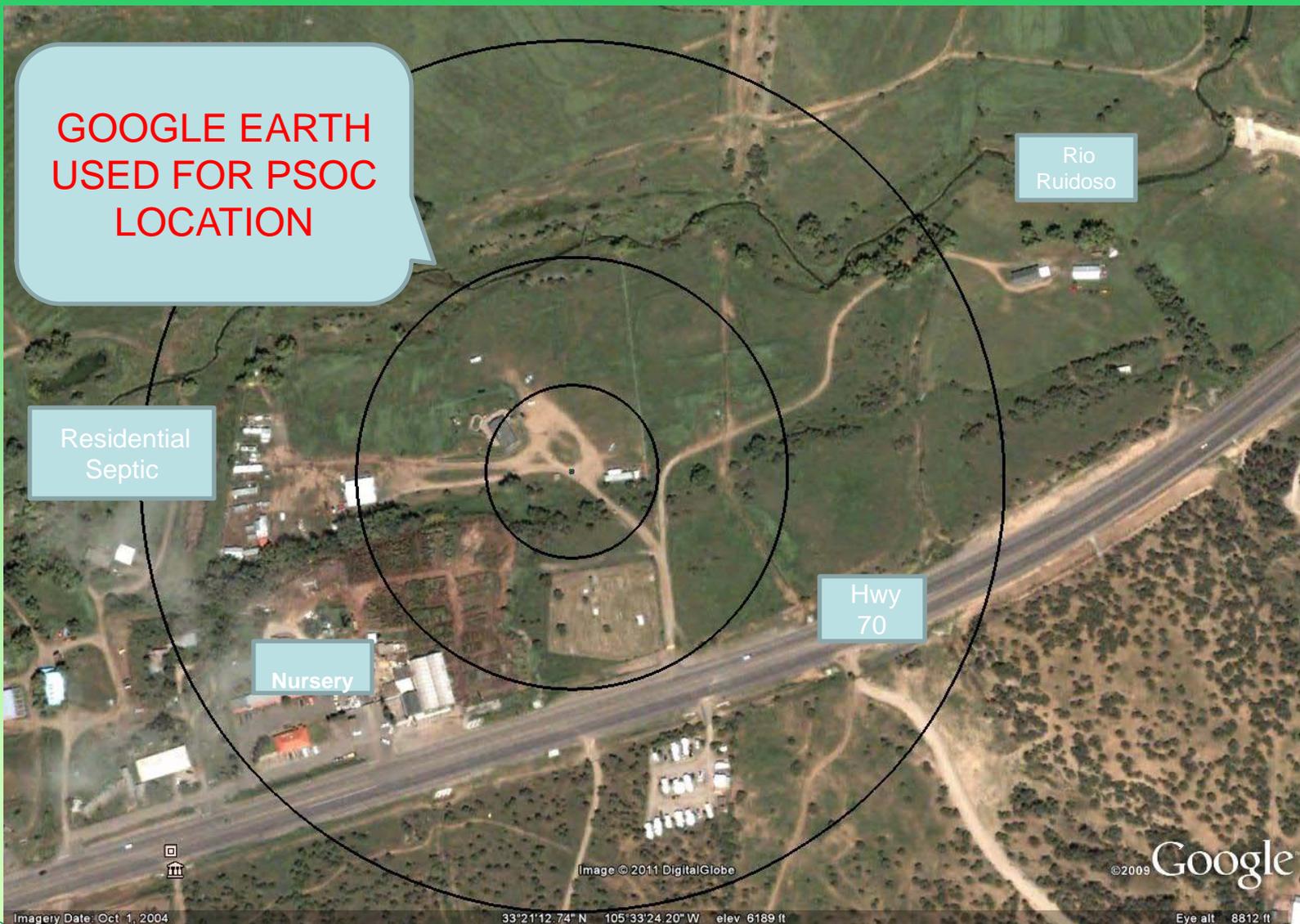


Source Protection





Google Earth



GOOGLE EARTH
USED FOR PSOC
LOCATION

Residential
Septic

Nursery

Hwy
70

Rio
Ruidoso



Source Protection – Multiple Use



Drinking Water Bureau

Multiple Use



Rangeland



Oil & Gas Production Areas



Endangered Species Concern



Socorro Isopods



Does your water system have an Emergency Response Plan?

THIS IS NOT THE
TIME TO START
AN EMERGENCY
PLAN





Drinking Water Bureau

Type of Source

- Ground water
- GWUDI
- Surface water



Is this a ground water source?

MOST LIKELY



Is this a ground water source?



WELL NEAR
ARROYO.

SCREEN NEAR
SURFACE

PROBABLY
GWUDI



Is this a groundwater source?



Is this a ground water source?

INFILTRATION
GALLERY



40 CFR 141.2 Ground water under the direct influence of surface water means

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 ...

...significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH...

Direct influence must be determined for individual sources in accordance with criteria established by the State.



GWUDI Determination

NMED - Drinking Water Bureau

TECHNICAL MANUAL



GWUDI PROTOCOL

GROUND WATER UNDER DIRECT
INFLUENCE OF SURFACE WATER



MPA Sampling



ANALYTICAL SERVICES, INC.

Microbiological Testing, Research and Consulting

Client: New Mexico Environmental Dept.
Address: 525 Camino de los Marquez, Suite 4
Santa Fe, NM 87505

Sampling Date: August 21, 2007
Date Received: August 23, 2007
Analyst: cjf
ASI Sample No.: 28982-01

Client Sample ID: NM 35 [REDACTED]

Section IV.

MPA Risk Rating Table

The risk rating for surface water influence as calculated according to the EPA Consensus Method for Microscopic Particulate Analysis is as follows:

Table 1	Table 2	Total	Risk Rating*
Algae = 9.5×10^3 = EH Rotifers = 2.0×10^1 = R	EH = 14 R = 1	15	Moderate**

EH = Extremely Heavy R = Rare

The tables of relative risk factors used to calculate surface water influence in the EPA Consensus Method for Microscopic Particulate Analysis are based on a limited set of data. These data are not representative of all aquifer types or well designs. Therefore, the relative risk values calculated from these tables are of limited value in determining health risks associated with surface water indicators.

Some rotifers, insects and larvae are found in both surface and ground waters. These organisms live and burrow in soils, and therefore are not necessarily indicative of surface water influence.

*ASI advises that the risk rating be interpreted with caution, as it was developed by the US EPA from a relatively small set of data that may not be representative of conditions throughout the U.S.

**This EPA Risk Rating table classifies each sample according to the number of surface water indicating organisms per 100 gallons; however, it was possible to read only 10 gallons of this sample at a magnification of 100X, and 0.58 gallons at 400X. The relatively small volumes analyzed do not affect the validity of the results; however, decreased volume does decrease the sensitivity of the assay.



Nine elements of a Sanitary Survey

Source

Treatment

Finished water storage

Pumps

Pump facilities and controls

Distribution system

Monitoring and reporting

System management and operation

Operator compliance



Treatment

Disinfection

Chlorination

UV

Filtration

Conventional or
Direct

Pressure Filtration

Membrane

Reverse Osmosis



Disinfection - Chlorination



Disinfection - Miox





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Chlorination – NSF Approved?

SIGNIFICANT
DEFICIENCY



New Mexico Drinking Water Regulations

20 NMAC 7.1.400 K –

General Operating requirements: Direct and Indirect Additives: “A component, material, treatment chemical or other substance that may come into contact with drinking water shall be certified by an independent, third-party certifier accredited by ANSI as meeting at a minimum the most recent version of NSF/ANSI *Standard 60... or 61*”.



Disinfection - UV



Conventional Filtration

Coagulation – Flocculation – Sedimentation - Filtration



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Direct Filtration – Package Plant

Coagulation - Filtration





**SMALL PACKAGE
PLANT**



Traveling Bridge



Direct Filtration – Pressure Filter

Coagulation - Filtration



Direct Filtration

Pressure Filter



Direct Filtration – Reverse Osmosis



Drinking Water Bureau

Arsenic Treatment – Adsorption Media



Iron Filtration – Adsorption Media



Nine Elements of a Sanitary Survey

Source

Treatment

Finished water storage

Pumps

Pump facilities and controls

Distribution system

Monitoring and reporting

System management and operation

Operator compliance



New Mexico Drinking Water Regulations

20 NMAC 7.1.400 D –

General Operating requirements: Finished Water Storage

Facilities: “A finished water storage facility shall be protected from flooding or infiltration of raw or non-potable water and from entry by birds, insects, rodents and other vermin. Overflow pipes and vents shall be screened with a corrosion-resistant material or be fitted with an acceptable flap valve. Access hatches or openings that are below the maximum operating water level shall be fitted with a water tight cover or appropriate seal or gasket. Roof hatches or other openings above the maximum operating water level shall be fitted with a watertight cover, appropriate seal or gasket, or framed above the surface of the tank at the opening. Framed hatches must be fitted with a solid cover that overlaps the framed opening and extends down around the frame. All framed hatches must restrict the entry of vermin or water .”



Storage Tank Inspection

General condition of tank

Hatch condition

Foundation

Vent - screened

Overflow – with screen or flapper

Drain

Security – Fence, locked hatch, ladder



Hatch Construction – Storage Tanks



Finished Water Storage



New Mexico Drinking Water Regulations

20 NMAC 7.1.400 B –

General Operating Requirements: Security and Protection of a Public Water System: “Any part or component of a public water system including but not limited to spring junction boxes, well houses, storage reservoirs, collection devices, pump facilities, and treatment facilities shall be constructed, operated and maintained to prevent unauthorized entry to, flooding of, and contamination of, the water supply”.



Finished Water Storage

**SIGNIFICANT
DEFICIENCY**

**NOT LIMITED
ACCESS**



Finished Water Storage Security

**SIGNIFICANT
DEFICIENCY**



Finished Water Storage

**SIGNIFICANT
DEFICIENCY**



Finished Water Storage Overflows



SIGNIFICANT
DEFICIENCY

NO SCREEN



Finished Water Storage



Finished Water Storage

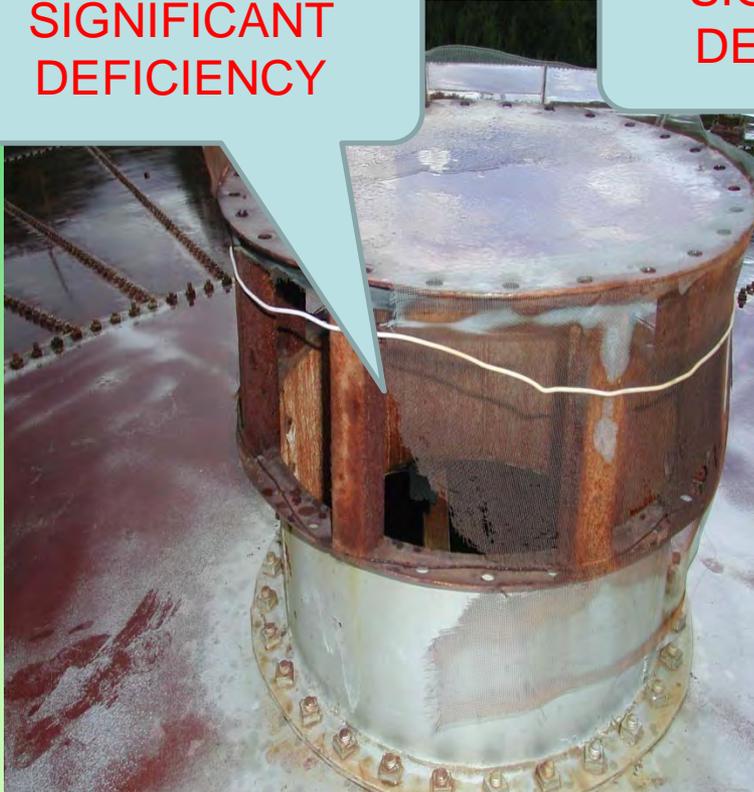


DEFICIENCY



Finished Water Storage

SIGNIFICANT
DEFICIENCY



SIGNIFICANT
DEFICIENCY



Finished Water Storage

IMPLODED TANK



Finished Water Storage

IMPROVED TANK



Nine elements of a sanitary survey

Source

Treatment

Finished water storage

Pumps

Pump facilities and controls

Distribution system

Monitoring and reporting

System management and operation

Operator compliance



Pumps



Pumps



Nine elements of a sanitary survey

Source

Treatment

Finished water storage

Pumps

Pump facilities and controls

Distribution system

Monitoring and reporting

System management and operation

Operator compliance





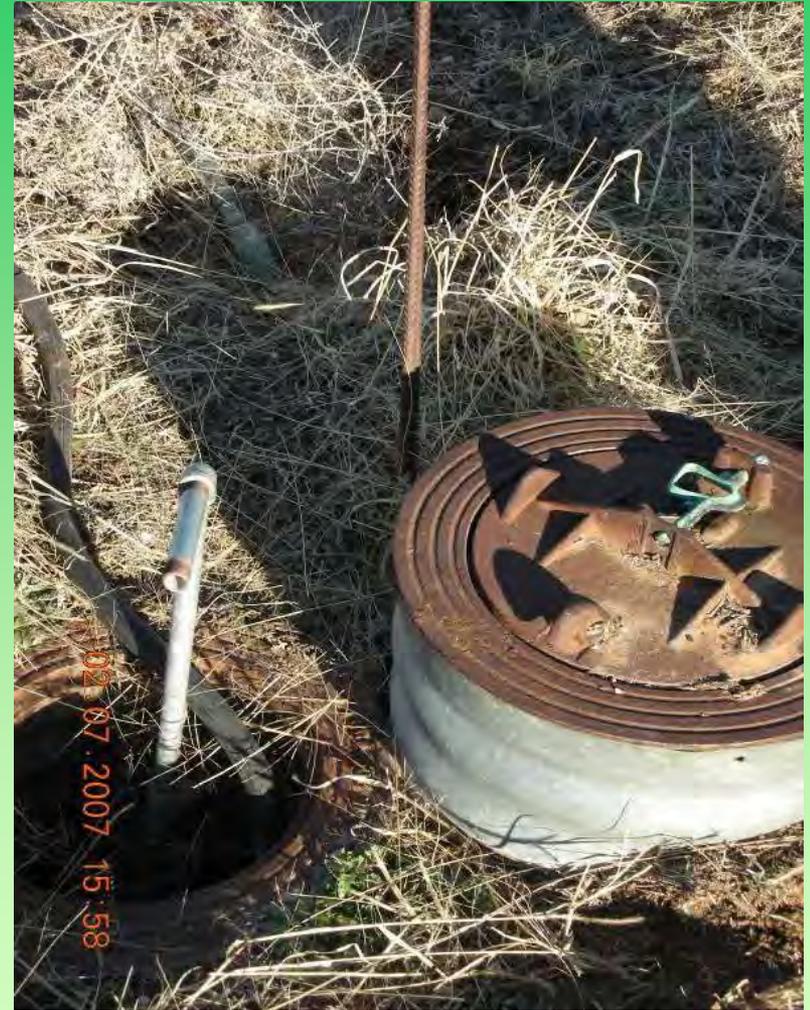
Distribution



Air relief valves
Pressure relief valves
Isolation valves
Flush hydrants
Meters



AIR RELIEF VALVES



Isolation Valve

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DEFICIENCY**



Pressure Reducing Valve (PRV)



Meters



New Mexico Drinking Water Regulations 20 NMAC 7.1.400 L –

General Operating requirements:

Cross-connections: “Cross-connections to a public water system or within a public water system shall be prohibited, unless the public water system is protected by a method acceptable to the department using either a device listed by the foundation for cross connection control and hydraulic research or a device acceptable to the department to prevent the back flow of water”.





Cross Connection



IS THIS A
SUFFICIENT
AIR GAP?



Drinking Water Bureau

**SIGNIFICANT
DEFICIENCY
IF NO
BACKFLOW
PREVENTION
DEVICE**





**NEED BACKFLOW
PREVENTION
DEVICES**



RPZ:
ACCEPTABLE
BACKFLOW
PREVENTION



RPZ- Dual Check



Double Check Valve



Nine elements of a sanitary survey

Source

Treatment

Finished water storage

Pumps

Pump facilities and controls

Distribution system

Monitoring and reporting

System management and
operation

Operator compliance



Monitoring and Reporting

Bacteriological samples – 5 years

Chemical samples – 10 years

Records of action taken to correct violations – 3 years after last action

Reports, correspondence, communications and sanitary surveys – 10 years

Variance granted to the system – 5 years following the expiration of the variance

Lead and Copper samples – 12 years



Nine elements of a sanitary survey

Source

Treatment

Finished water storage

Pumps

Pump facilities and controls

Distribution system

Monitoring and reporting

**System management and
operation**

Operator compliance



System Management and Operation

Updates since last survey

Operators
Population
Connections
Sources
Storage Facilities
Water Outages
Distribution Line Breaks
Siting Plan up to date
Average and Peak water demand

Adequate staff
Administrative support



Capacity Assessment

acquire data for team

Managerial – conduct affairs and compliance of the SDWA

Financial – acquire/manage financial resources

Technical – adequacy of operation, physical infrastructure, proper operation



Nine elements of a sanitary survey

Source

Treatment

Finished water storage

Pumps

Pump facilities and controls

Distribution system

Monitoring and reporting

System management and
operation

Operator compliance



New Mexico Drinking Water Regulations

20 NMAC 7.1.400 M —

General Operating requirements:

Operator Certification: “Public water systems shall comply with the utility operator certification requirements in the Utility Operator Certification Act, NMSA 1978, 61-33-1 et seq. as amended, and in regulations and program requirements adopted pursuant to the Safe Drinking Water Act”.



Type of Treatment Process	Population Served				
	25 to 500	501 to 5,000	5,001 to 10,000	10,001 to 20,000	20,000 +
Filtration (sand, gravity)	SWA	WS3	WS3	WS3	WS4
Coagulation, sedimentation, filtration	SWA	WS3	WS3	WS4	WS4
Chemical precipitation (Mn, Fe, softening)	SWA	WS3	WS3	WS4	WS4
Aeration	SW	WS2	WS3	WS3	WS4
Odor and taste control (activated carbon)	SW	WS2	WS3	WS3	WS4
Chemical addition (stabilization)	SW	WS2	WS2	WS3	WS4
Pressure filtration	SWA	WS2	WS2	WS3	WS4
Ion exchange (softening, defluoridation)	SWA	WS2	WS3	WS3	WS4
Chlorination	SW	WS2	WS2	WS3	WS4
Fluoridation	SW	WS2	WS2	WS3	WS4
Arsenic removal	SWA	WS3	WS3	WS3	WS4
Radionuclide removal	SWA	WS3	WS3	WS3	WS4
Special, such as desalinization	SWA	WS4	WS4	WS4	WS4
Production, ground water only	SW	WS1	WS2	WS3	WS4



Operator Certification

Type of Distribution Systems	Population Served				
	25 to 500	501 to 5,000	5,001 to 10,000	10,001 to 20,000	20,000 +
Distribution of treated surface water	SW	DS2	DS2	DS2	DS3
Distribution of chlorinated groundwater	SW	DS2	DS2	DS2	DS3
Distribution of unchlorinated groundwater	SW	DS1	DS2	DS2	DS3



Certified Sampler

[20.7.4.12 NMAC - RP, 20 NMAC 7.4.112, 1-26-01; A, 11-15-06]

Type of Water Sampling	Population Served				
	25 to 500	501 to 5,000	5,001 to 10,000	10,001 to 20,000	20,000 +
Distribution	SW or WST1	WST1	WST1	WST1	WST1
Chemical and Radiological	WST2	WST2	WST2	WST2	WST2



Sanitary Survey Report

Significant Deficiencies

Regulatory Deficiencies

Recommendations

Management

General Information

Sampling Schedule

Other Related DWB Program Information



Additional Components to Survey Report

Cover Letter

Water System Sampling Schedule

System Data

Photo Appendix -Optional



Significant Deficiencies under the Ground Water Rule

Significant Deficiencies are defined as deficiencies that are causing or has the potential of causing a threat to public health.



Regulatory Deficiencies under the Ground Water Rule

Regulatory Deficiencies are deficiencies that result from non-compliance with a portion of the New Mexico Drinking Water Regulations.



Response or Violation?



System Response

Within 30 days of report
must include:

Written Corrective Action Plan for All Significant Deficiencies



Significant Deficiency Compliance Schedule

The written response from the PWS under the Ground Water Rule must include how all Significant Deficiencies will be corrected within 120 days. A PWS can also request in writing an extension. Failure to remedy significant deficiencies may result in an enforcement action.



The End

