San Joaquin County

Well Standards

(San Joaquin County Ordinance Code Section 9-1115.6)

Amended by Board of Supervisors May 8, 1993, R-93-307

County Ordinance History	
December 21, 1971	Ordinance 1862
July 29, 1992	Ordinance 3675
December 13, 1994	Ordinance 3817

City Municipal Codes	
Stockton	7-700
Lodi	8.08.010
Tracy	5.32.010
Manteca	13.08.010
Escalon	13.04.380 & Ordinance 130
Ripon	13.16.010
Lathrop	8.36.010

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February 2005

STANDARDS FOR

WELL CONSTRUCTION

&

DESTRUCTION

IN

SAN JOAQUIN COUNTY

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1. DEFINITIONS

1.1. DEFINITIONS. Except as otherwise provided in these Standards, all terms used in these well standards shall be interpreted as defined by the following, unless from the context thereof it clearly appears that a different meaning is intended.

1.1.1 ABANDONED WELL. "Abandoned Well" means a well whose original purpose and use has been permanently discontinued or which is in such a state of disrepair that it cannot be used for its original purpose.

1.1.2. AIR CONDITIONING WELL. "Air Conditioning Well" means a well constructed to return to the ground well water, which has been used as a coolant in air conditioning processes. The installation of air conditioning wells is prohibited, unless approved by the Director of the Environmental Health Department.

1.1.3. AGRICULTURAL WELL. "Agricultural Well" means a water well whose purpose is to supply water for irrigation or other agricultural needs.

1.1.4. ANNULAR SEAL. "Annular Seal" means the grout placed between the conductor casing and borehole or the well casing and the borehole.

1.1.5. ANNULAR SPACE. "Annular Space" means the space between two concentric well casings or between the casing and the wall of the drilled hole.

1.1.6 AQUIFER. "Aquifer" means a geologic formation, group of formations or part of a formation that is water bearing and which transmits water in sufficient quantity to supply springs and pumping wells.

1.1.7 CASING. "Casing" means a tubular retaining structure which is installed in the bore hole to maintain the well opening.

1.1.8 CATHODIC PROTECTION WELL. "Cathodic Protection Well" means any artificial excavation constructed by any means for the purposes of installing equipment or facilities for the protection electrically of metallic equipment in contact with the ground (commonly referred to as cathodic protection).

1.1.9 CONTAMINATION. "Contamination" means an impairment of the quality of waters to a degree which creates a potential or actual hazard to the public health through poisoning or spread of disease. Contamination shall include any equivalent effect resulting from the disposal of waste, whether or not water of the State is affected.

1.1.10 DESTROYED WELL. "Destroyed Well" means a well that has been properly filled so that it cannot produce water nor act as a vertical conduit for the movement of groundwater.

1.1.11 DEWATERING WELL. "Dewatering Well" means a well installed for the purpose dewatering an excavation during construction or any other purpose to lower the water table.

1.1.12 DIRECTOR. "Director" means the Director of the Environmental Health Department, or the Director's designee.

1.1.13 DRILLED WELL. "Drilled Well," means a well for which the hole is excavated by mechanical means such as the rotary, auger or cable tool methods.

1.1.14 DRILLING FLUID. "Drilling Fluid" is a fluid used in drilling operations to remove cuttings from the borehole, to clean and cool the bit, to reduce friction between the drill stem and the borehole wall and to prevent caving or sloughing of the hole.

1.1.15 DRILLING FOAM. "Drilling Foam" is a foam used in drilling operations to remove cuttings from the borehole, to clean and cool the bit, to reduce friction between the drill stem and the borehole wall and to prevent caving or sloughing of the hole.

1.1.16 ENFORCING AGENCY. "Enforcing Agency" means an agency designated by duly authorized local, regional or state government to administer laws, ordinances and standards pertaining to the construction, maintenance, and destruction of wells; hereafter referred to in these standards as the Environmental Health Department (EHD).

1.1.17 EXPLORATION HOLE (or BORING). "Exploration Hole or Boring" means an uncased excavation whose purpose is the immediate determination of geological conditions at a site.

1.1.18 EXTRACTION WELL. "Extraction Well" means a well constructed for the purpose of extracting contaminants from the ground water or altering the gradient of the water table.

1.1.19 FILTER PACK MATERIAL. "Filter Pack Material" means a material placed between the borehole and the slotted casing to act as a filtering medium for the groundwater.

1.1.20 GEOPHYSICAL WELL. "Geophysical Well" means a well for immediate testing or logging strata or to obtain soil or water data from the underground.

1.1.21 GEOTECHNICAL WELL. See "Geophysical Well".

1.1.22 GROUNDWATER. "Ground Water" means that part of the subsurface water which is in the zone of saturation.

1.1.23 GROUT. "Grout" means a fluid mixture of cement or other approved material and water of a consistency that can be forced through a pipe and placed as required to form a watertight seal. Various additives, such as sand, Bentonite and hydrated lime are used to meet certain requirements.

1.1.24 HEALTH OFFICER. "Health Officer" means the Health Officer of the San Joaquin County Public Health Services or his or her designee.

1.1.25 INDIVIDUAL DOMESTIC WATER WELL. "Individual Domestic Water Well" means any water well used to supply water for domestic needs of any individual residence or system of 4 or less connections on the same parcel.

1.1.26 INJECTION WELL. "Injection Well" means any bored, drilled, driven shaft, dug pit, or hole in the ground into which waste or fluid is discharged, and any associated subsurface appurtenances, and the depth of which is greater than the circumference of the shaft, pit or hole.

1.1.27 MONITORING WELL. "Monitoring Well" means a well drilled to monitor the ground water quality as defined in Section 13712 of the California Water Code as:

"…any artificial excavation by any method for the purpose of monitoring fluctuations in groundwater levels, quality of underground waters, or the concentration of contaminants in underground waters," or to remediate contaminated water.

1.1.28 POLLUTION. "Pollution", which may include contamination, means an alteration of the quality of the waters to a degree which unreasonably affects:

(a) The value of such water for beneficial uses; or

(b) Facilities which serve such beneficial uses.

1.1.29 PUBLIC HEALTH SERVICES. "Public Health Services" means the Public Health Services of the San Joaquin County Department of Health Care Services.

1.1.30 PUBLIC WATER SYSTEM. "Public Water system" means any potable water supply system serving water to the public as defined in Title 22, California Code of Regulations.

1.1.31 RECHARGE WELL. "Recharge Well" means any well constructed for the purpose of introducing water into the underground as a means of replenishing groundwater basins.

1.1.32 SALINE WATER. "Saline Water" means water containing 500 or more parts per million (ppm) of chloride ion.

1.1.33 SEAL, SANITARY. "Sanitary Seal" means a grout, mastic or mechanical device used to make a watertight joint between the pump and well casing, or the concrete base.

1.1.34 SEAL, SURFACE. "Surface Seal" means a monolithically poured concrete platform constructed around the top of the well casing on thoroughly compacted earth.

1.1.35 SEISMIC TEST WELL. See "Geophysical Well."

1.1.36 SURFACE WATER. "Surface Water" includes but is not limited to rivers, creeks, sloughs, irrigation ditches, irrigation conduits, drainage ditches and natural or unnatural impoundments.

1.1.37 SUBSURFACE BORING. "Subsurface Boring," means any subsurface soil boring that is drilled or driven for testing or logging strata or to obtain data from the underground.

1.1.38 TEST WELL. Wells constructed for the purpose of obtaining the information needed to design a finished well prior to its construction.

1.1.39 VAPOR PROBE. "Vapor Probe" means a device used to test or extract vapors from the subsurface.

1.1.40 WATER QUALITY. "Water Quality" means the chemical, physical, radiological and biological characteristics of water with respect to its suitability for a particular purpose.

1.1.41 WATER SOURCE. "Water Source" means either groundwater or surface water used to supply water.

1.1.42 WATER SYSTEM. "Water System" means all wells, pumps, tanks filters, water treatment equipment, valves, water mains, water service lines, fire hydrants, fire hydrant piping, and all appurtenances to the system.

1.1.43 WELL OR WATER WELL. "Well or Water Well" means any artificial excavation constructed by any approved method for the purpose of extracting water from, recharging or injecting water into, the underground. This definition shall not include: Wells or geothermal wells constructed under jurisdiction of the Department of Conservation, State of California, except those wells converted for use as water wells.

1.1.43.1 Wells used for the purpose of (1) dewatering excavation during construction, or (2) stabilizing hillsides or earth embankments.

1.1.43.2 Wells for the purpose of monitoring groundwater are defined in Section 1.1.27.

1.1.44 WELL CONTRACTOR. "Well Contractor" means any person or company licensed by the State Contractors License Law, as provided in Division 3, Chapter 9, Sections 7026.3, 7058 and 7059 of the Business and Professions Code.

1.1.45 WELL PIT. "Well Pit" means an excavation in which the well head or top of the well casing is installed below the ground surface.

1.1.46 WELL REHABILITATION. "Well Rehabilitation" means the treatment of a well to recover loss in hydraulic efficiency caused by incrustation or clogging of the screen, filter pack, or the water-bearing strata adjoining the well and the repair of the well casing.

1.2 Definitions, items or conditions not specifically outlined in these standards may be addressed in the State of California Water Well Standards Bulletins 74-81 and 74-90, or regulated on a site-specific basis by the Environmental Health Department.

2. PERMIT

2.1. An application for a permit is required for a Well, including: Geotechnical, Geophysical, Recharge, Reconditioning, Deepening, Cathodic Protection, Monitoring*, Test Well, Subsurface Boring, Injection, Extraction and Vapor Probe. (*See Section 13 for Monitoring Well Construction Requirements)

2.1.1. The licensed well contractor (C-57), or his authorized representative, shall make application on forms furnished by the San Joaquin County Environmental Health Department. The application shall contain the following information and a plot plan drawn to scale.

2.1.1.1 Owner's name and address.

2.1.1.2 Address of parcel and/or Assessor's parcel number (APN).

2.1.1.3 Names of streets or roads nearest to, or bordering the property.

2.1.1.4 Outline of the property giving dimensions and North direction.

2.1.1.5 Dimensioned outlines and locations of all existing and proposed structures, including covered areas such as patios, driveways and walkways.

2.1.1.6 Location of house sewer outlet, public sewer, sewage disposal system or proposed sewage disposal system, proposed expansion of sewage disposal system, or any other possible source of contamination.

2.1.1.7 Location of proposed new well, other existing wells and sewage disposal systems within a radius of 100 feet on the property or adjoining property.

2.1.1.8 Intended use of the well.

2.1.1.9 Name, address and license number of licensed well driller/pump contractor.

2.1.1.10 Note on permit application if the well is in a flood plain or drainage course.

2.2. A pump permit shall be required anytime the sanitary seal in the wellhead is removed.

2.2.1. The owner of the property or the appropriate licensed well or pump contractor shall make application on forms furnished by the EHD.

2.2.2. The installation or repair of a pump will require a plot plan showing the location of the well and pump and any structures.

2.2.3. If pump and motor are not installed by the well contractor, approval of the well construction will be given for the contracted work and a separate permit shall be obtained for installing the pump and motor.

2.3. An application for a permit is required for the elimination of a cross-connection at the well discharge.

2.4. The approved permit shall be good for one (1) year from date of issue. Extension may be granted by the Director for one additional year.

2.5 Prior to initiating work, the approved permit shall be available onsite until final inspection.

2.6 Special Water Well Permits may be issued for wells that do not meet these Standards.

2.6.1. Request for Special Water Well Permit shall state the conditions for the request.

2.6.2. Each Special Water Well Permit shall be reviewed on an individual basis.

3. LOCATIONS

3.1. All water wells (excluding monitoring wells) shall be located at an adequate horizontal distance from potential sources of contamination and pollution.

THE FOLLOWING MINIMUM DISTANCES SHALL BE MAINTAINED:

	Public Water Systems Wells	Lots Recorded **AFTER** 1972*	Lots Recorded **BEFORE** 1972*
Property Line	25 ft	10 ft	10 ft
Septic Tank	100 ft	50 ft	50 ft
Sewer Line - Cast Iron	50 ft	50 ft	50 ft
Stream, Creek, River, Canal	50 ft	50 ft	50 ft
Disposal Field	100 ft	100 ft	50 ft
Seepage Pit, Sumps >8' Depth	150 ft	150 ft	100 ft
Leaching Sump <8' Depth	100 ft	100 ft	50 ft
Livestock Corrals or Fowl Enclosures	100 ft	100 ft	50 ft
Underground Hazardous Materials Storage Tanks (Excluding natural gas and propane)	150 ft	100 ft	-
Aboveground Hazardous Materials Storage Containers	100 ft	50 ft	-

***LOTS RECORDED PRIOR TO DECEMBER 15, 1972**

3.2 Surface drainage shall slope away from the well site.

3.3. The well shall be so located as to be easily accessible with adequate clearances provided for the proper equipment for cleaning, treatment, repair, testing and other maintenance, but not less than five (5) feet from any permanent structural foundation or overhang.

4. CONSTRUCTION OR REPAIR (WELLS OTHER THAN MONITORING WELLS)

4.1. DRILLING FLUID, FOAM AND WATER

4.1.1. Drilling fluid/foam used shall be free from contamination and organic matter and the water shall be from a potable source.

4.2. SEALING OFF STRATA

4.2.1. Aquifers penetrated that contain poor quality water shall be sealed to prevent contamination. Methods shall be reviewed and approved by the Director.

4.3. CASING

4.3.1. The casing shall be of sufficient strength to withstand forces and stresses imposed during installation. Steel casing equal to, or exceeding the thickness given in Section 4.3.11. shall be used for permanent installations. Casing shall be manufactured in accordance with the American Society for Testing Materials (ASTM), the American Petroleum Institute (API) or American Water Works Association (AWWA) specifications for well casings. Other materials may be used on approval of the Director.

4.3.2. Damaged or defective material shall not be used.

4.3.3. All casings shall be watertight except for the perforations.

4.3.4. All glues and primers appropriate to usage on PVC well casing shall meet applicable ASTM standards.

4.3.5. A drive shoe shall be used on all driven casings.

4.3.6. If a temporary conductor pipe is used to prevent caving in during placement of the seal or during drilling, it shall be removed as the seal is placed.

4.3.7. A permanent conductor casing may be left in place if the seal is placed between the conductor casing is utilized and extended to the surface, it shall be grouted from the first unconsolidated zone to the surface between the borehole and the conductor casing.

4.3.8. If a permanent conductor casing is utilized and extended to the surface, it shall be grouted from the first unconsolidated zone to the surface between the borehole and the conductor casing.

4.3.9. If the minimum grout seal depth is not met, a grout seal will be required below the conductor casing into a clay layer or the required depth, whichever is greater, and between well casing and the borehole to the surface.

4.3.10. If more than one permanent conductor casing is utilized in the same borehole and they do not extend to the surface, the grout seal will be required below the deepest conductor casing into a clay layer or the required depth, whichever is greater, to the surface.

4.3.11. **MINIMUM THICKNESS FOR STEEL WELL CASING:**

6 Inch Diameter	10 Gauge	0.1406 US Standard
8 Inch Diameter	10 Gauge	0.1406 US Standard
10 Inch Diameter	10 Gauge	0.1406 US Standard
12 Inch Diameter	10 Gauge	0.1406 US Standard
14 Inch Diameter	10 Gauge	0.1406 US Standard
16 Inch Diameter	8 Gauge	0.1719 US Standard
18 Inch Diameter	8 Gauge	0.1719 US Standard
20 Inch Diameter	¼	0.2500 US Standard

4.3.12. For other types of approved well casing, see Bulletin 74-81 and 74-90, or as approved by the Director.

4.4 INSTALLATIONS OF CASING

4.4.1. Damage to the casing section and joints are to be avoided during installation. The joints must be structurally sound and watertight.

4.4.2. The casing shall extend a minimum of twelve (12) inches above the ground surface and a minimum of 1 inch above the concrete surface seal.

4.4.3. Casing shall be equipped with centering guides where applicable to ensure even thickness of the annular seal and/or gravel pack.

4.5. GRAVEL INSTALLATION

4.5.1. Gravel used in gravel packed wells shall be well-rounded particles containing no clay, silt, or organic matter, and to be installed at a rate that will prevent bridging. Other material may be used on approval of the Director.

4.5.2. Gravel used in gravel packed wells shall be chlorinated during the installation.

4.6. PERFORATIONS

4.6.1. The perforating of casing shall not deform the casing. The casing shall not be perforated within fifty (50) feet of the ground surface if the total depth of the well is greater than fifty (50) feet. The upper most perforation shall be below an impervious stratum in an aquifer of good quality water.

4.6.2. If a well with perforations fifty (50) feet deep or less from the ground surface is deepened, the perforations fifty (50) feet deep or less shall be

sealed off to prevent commingling with water in a deeper aquifer of good quality.

4.7. WELL GROUTING AND CONSTRUCTIONS

The primary purpose is to prevent contamination, pollution and degradation of water wells and of the ground water by intrusion of poor quality water and cross contamination of aquifers.

4.7.1. The annular space between the well casing and the wall of the drilled hole, or between the conductor pipe and the wall of the drilled hole or the well casing shall be filled with approved cement grout or Bentonite clay, or other sealant material approved by the Director, from the ground surface into an impervious formation under-laying the uppermost aquifer. If an impervious formation does not exist, the annular space shall be filled to a sufficient depth to prevent polluted or contaminated water from entering the well. The minimum depth of the annular seal shall be as follows:

Public Water Supplies	100 Feet
Individual Domestic Well	100 Feet
Industrial Wells	100 Feet
Agricultural Wells	50 Feet

4.7.1.1. Local conditions will determine depth of seal. Any deviation from Ordinance requirements will require a Special Water Well Permit.

4.7.2. Gravity installation of sealing material, without the aid of tremie or grout pipe is prohibited unless the interval to be sealed is dry and in no case where the interval is over 30 feet in depth.

4.7.2.1. In placing the annular seal, a tremie pipe shall be installed within 5 feet of the desired seal depth and removed as the grout is installed.

4.7.3. Sealing Material:

4.7.3.1. Neat Cement - 1 bag (94 lbs.) Portland Cement to 5 to 10 gallons of potable water.

4.7.3.2. Cement Grout - Not more than two (2) parts by weight of sand and one (1) part by weight of cement (per bag of cement) to 5 to 7 gallons of potable water.

4.7.3.3. Bentonite-sealing materials and their uses shall be in accordance with the manufacturers specifications or as approved by the Director.

4.7.3.4. Quick setting type cement, retardants to setting, Bentonite, or other additives, may be used not to exceed 5% of the volume. Hydrated lime may be used up to 10% of the volume.

4.7.4. In grouting the annular space, the grout shall be applied in one continuous process. Deviations from this process may be approved on a site-specific basis by the Director. The annular seal shall have a minimum width thickness of two (2) inches.

4.7.5. No repair or deepening of a well shall be done without prior approval from the Director.

4.7.5.1. Each well will be evaluated on a site specific basis to determine the feasibility of the work desired.

4.8. WELL DEVELOPMENT

4.8.1. Developing, re-developing or reconditioning of a well shall be accomplished by a method that will not cause damage to the ground water aquifer. Care shall be exercised to prevent occurrence of adverse subsurface conditions that may destroy barriers to the vertical movement of water, thus permitting exchange of water between polluted or contaminated aquifers.

4.8.2. A minimum of 12 hours of time shall be allowed between placing of the annular seal and well development.

4.8.3. During well development the grout seal shall be protected from erosion.

4.9. WELL COVER

4.9.1. After construction of the well, or before the pump is installed, or while repairs are being made, or if for any other reason the top of the well casing is exposed, it must be protected from foreign objects or contamination entering the well by use of a seal or cover.

4.9.2. The cover shall be watertight and held in place in such a manner that it cannot be removed except by equipment or tools. During construction of the well, the well or the hole opening shall be protected at all times.

4.10. SURFACE SEAL

4.10.1. A concrete surface seal (pedestal) shall be constructed around the top of the casing on all water supply wells at the time the well is constructed by the licensed well contractor.

4.10.1.1. The surface seal shall be monolithically poured on thoroughly compacted earth, shall have a minimum thickness of four inches above grade, shall be free from cracks or other defects and is contiguous with the annular seal.

4.10.1.2. The surface seal shall be graded to allow drainage to flow away from the well casing in all directions.

4.10.1.3. The surface seal shall extend a minimum of 2 feet in all directions.

4.10.1.4. The well casing shall extend a minimum of 1 inch above the concrete surface seal for an individual domestic water well.

4.10.2. To seal existing wells: An evaluation of the condition of an existing well will be made by the Director to determine the best method of constructing a surface seal on a site specific basis.

4.10.3. A minimum of 48 hours setting time shall be required on Bentonite well seals before a concrete surface is installed around the well casing.

4.10.4. Any subsidence of the annular seal shall be replaced with an approved grout sealing material prior to pouring the concrete surface seal.

4.11. SANITARY SEAL

4.11.1. When the pump is mounted directly over the casing, a grout or mastic seal shall be provided to make a watertight joint between the pump and the concrete surface seal.

4.11.2. All holes in the base of the pump which open directly into the well shall be sealed.

4.11.3. The seal shall be shaped to prevent retention of water or other foreign materials.

4.12. SOUNDING TUBE AND AIR VENT PIPE

4.12.1. If a sounding tube or access pipe is required, they shall be installed through the surface seal and welded flush with the inside of the casing or secured by a mechanical means approved by the Director.

4.12.1.1. The upper end shall be provided with a watertight threaded cap.

4.12.1.2. If an air vent pipe is provided, it shall extend twelve (12) inches above the ground surface, inverted in a downward direction, and the end shall be covered with 16-mesh screening.

4.12.2. The fill pipe on a gravel packed well shall be water tight, extend twelve (12) inches above the ground surface, and be provided with a water tight threaded cap.

4.12.3. If a commercially produced sanitary seal is used, a sounding tube will be required if the sanitary seal, approved by the Director, is designed with a means of entrance into the well for chlorinating and sounding.

4.13. SAMPLING TAP

4.13.1. A non-threaded tap shall be installed for the purpose of obtaining water for laboratory examination between the well head and the check valve or within 3 feet of the well head.

4.14. BACKFLOW PREVENTION

4.14.1. All pump discharge pipes shall be installed with approved protective devices to prevent backflow and/or back siphonage into a well. A properly designed air gap may be considered an acceptable protective device for agricultural wells.

4.14.2. No person shall install any equipment or mechanism that uses chemical feeders or injectors without an approved backflow prevention device.

4.14.3. Backflow prevention is required when drinking water supplies are involved, as prescribed in Title 17, California Code of Regulations.

4.14.4. No person shall make a connection or allow one to exist between pipes or conduits carrying domestic water supplied by any public or private water service system, and any pipes, conduits, or fixtures containing or carrying water from any other source or containing or carrying water which has been used for any purpose whatsoever, or any piping carrying chemicals, liquids, gases, or any substances whatsoever, unless there is provided a backflow prevention device approved for potential hazard.

4.14.5. Agricultural discharge pipes utilizing an air gap for backflow prevention shall maintain an air gap equal to the size of the discharge pipe, but not less than 6 inches. The discharge pipe shall also have two - ¼ inch slit extending 6 inches from the bottom of the pipe and opposite each other.

5. OUT OF SERVICE WELLS

5.1. If the owner declares his intention to use the well again, and the well is capable of functioning as originally designed, he shall maintain it in such a way that:

5.1.1. The well has no defects that will impair the quality of water in the well or the water bearing formations.

5.1.2. The well is capped with a watertight seal or cover.

5.1.3. The well is marked so it may be easily seen.

5.1.4. The area around the well is kept clear of brush and debris.

5.2. After remaining out of service for five (5) years, the Director may call for the well to be properly abandoned.

6. DESTRUCTION OF WELLS

6.1. When a well no longer functions as originally designed, or cannot appropriately function in place of another design, or has fallen in to such a state of disuse or disrepair that it may become a source of impairment to the ground water quality, constitutes a safety hazard, or found to be abandoned, it must be destroyed under a well destruction permit.

6.2. All oil residue from oil lubed pumps shall be removed and disposed of properly.

6.3. SEALING REQUIREMENT:

6.3.1. When a well is to be destroyed, the interior of the casing shall first be cleared to eliminate any obstructions, which might interfere with effective sealing procedures.

6.3.2. The open well may then be filled with approved filler material from the bottom up to 100 feet below the ground surface; however a deeper seal may be required by the Director according to site specific requirements. The approved sealing material (see Section 4.7.3.) shall be installed from the filler material to the top of the casing.

6.3.3. If there is no annular seal or the integrity of the seal or the well is unknown, or the well is gravel packed, the casing shall be perforated upward beginning just above the filler material to the surface. Grout shall be applied above the approved filler material in such a manner that the grout will be forced out of the perforated holes, forming a barrier to the vertical movement of water.

6.3.4. Where the maximum depth of a well being destroyed is less than 100 feet, and there is no standing water, the well shall be sealed from the bottom to its total depth with grout, Bentonite, or a minimum of five (5) sack mix of concrete not greater than ¼" aggregate, or as specified by the Director.

6.3.5. Approved Bentonite may be allowed to freefall up to 200 feet in a well destruction if the space will allow no bridging, and if done in accordance with manufacturer's specification.

6.3.6. For the protection of the seal, and to facilitate the future use of the land site, a hole at least one foot larger in diameter than the originally drilled hole shall be excavated around the outside of the well casing to a depth not less than three feet below the ground surface. The well casing shall then be cut off six inches above the bottom of this excavation and removed. During the sealing operation, the grout used to fill the well shall be allowed to spill over into the excavation and fill it for a thickness of one foot and form a cap which has a diameter of at least on foot greater than the diameter of the originally drilled hole. This procedure should result in the exposed edge of the casing being covered with six inches of grout. After the sealing operation and the sealing material have set, the excavation shall be back filled with clean native soil.

6.3.7. Under no circumstances shall an abandoned well be used for disposal of any solid or liquid wastes.

6.3.8. If a test hole is drilled for construction of a well, and is not used in the final construction of the well, the test hole shall be destroyed from the total depth to the surface and under inspection.

7. INSPECTION OF WELLS

7.1. Approval of the application for permit will be withheld until an onsite inspection is made, if a necessary and the requirements regulating the well location are met.

7.2. Inspections will be made to ensure compliance with these Standards during and after well construction, destruction, deepening, reconditioning, subsurface boring, seismic test holes, monitoring wells, geophysical/geotechnical wells, cathodic protection wells, injection wells, recharge wells, extraction wells and other wells.

7.3. Final inspection of the well surface seal, sanitary seal, check valve, sample tap, and/or pump including the use of food grade lubricants, shall be made after pump is installed and operating.

7.4. The permit applicant shall provide a minimum of 24-hour advance request for all required inspections.

7.5. Other inspections will be made as deemed necessary by the Director.

8. DISINFECTION OF WELLS

8.1. Following initial installations or subsequent repairs, all public and individual domestic water wells and all appurtenances shall be disinfected by a method approved by the Director.

8.2. To disinfect new wells, the required amount of disinfectant shall be placed in the well and the well surged with the pump several times to mix the disinfectant with the water. The well should remain idle for a minimum of 24 hours and then be pumped until free of disinfectant. When placing the disinfectant in the well, a solution of the disinfectant shall be used to wash down the well casing and drop pipe.

8.3. To disinfect wells in use, double the amount of disinfectant required and follow the directions as above. In addition, sufficient water should be run through all pipes and water outlets until the disinfectant is in all pipes and fixtures. All the disinfectant to remain over night and then pump free of disinfectant.

8.4. Disinfectant requirements during well construction are addressed in Section 4.5.2.

9. SAMPLING OF WELLS

9.1. PUBLIC WATER SYSTEMS

9.1.1. The water shall comply with Federal Safe Drinking Water Standards and Chapter 15, Title 22 of the California Code of Regulations.

9.1.2. The water from public water supply wells and industrial wells used in food processing shall be analyzed for chemical content and bacteriological quality at the frequency required by the regulations specified above by a laboratory certified by the State of California.

9.2. INDIVIDUAL DOMESTIC WATER WELLS

9.2.1. To determine quality of water produced by a new water well, it shall be sampled by the EHD for bacteriological and chemical analysis after development, the installation of the well pump, and disinfection.

9.2.2. The tests shall be performed by a California State Certified Laboratory.

9.2.2.1. At a minimum, tests to be performed will be those tests required in State Regulations for State Small Water Systems.

9.2.2.2. Additional analysis to be performed will be as specified by the Director.

9.2.2.3. Copies of these water quality tests and reports shall be filed with the Director.

9.3. Section 9.2 will not become effective until the Well Program fee revenues are adjusted to provide for the cost of the quality-testing program.

10. CONSTRUCTION AND ABANDONMENT OF GEOPHYSICAL OR SEISMOLOGICAL TEST HOLES OR WELLS

10.1. The sealing of drilled geophysical or seismological borings shall be subject to the following requirements:

10.1.1. Borings shall be sealed with graded Bentonite chips or Bentonite rocks designed for use within geophysical shot holes. All graded Bentonite chips or rocks must have industry product guidelines showing the product to be acceptable for this use and environmentally safe.

10.1.2. Gravity installation of graded Bentonite chips or Bentonite rocks will be allowed with the aid of a conductor pipe or drill stem as long as the conductor pipe is placed within thirty (30) feet from the bottom of the drilled hole.

10.1.3. Any boring that uses less than the calculated amount of graded Bentonite or cement product will be redrilled to the original depth and resealed according to the above procedures.

10.2. A San Joaquin County Environmental Health Specialist will be present during drilling and sealing of all holes drilled in the waterways of San Joaquin County.

11. CATHODIC PROTECTION WELLS

11.1. Cathodic Protection Wells are not specifically outlined in these Standards; however, Cathodic Protection Wells are addressed in the Department of Water Resources Bulletin 74-90.

12. SPECIFIC STANDARDS FOR PROBLEM AREAS IN SAN JOAQUIN COUNTY

12.1. It is recognized that specific problem areas exist in San Joaquin County, and it is the intent of these Special Standards to allow well construction, if appropriate, while maintaining the integrity of the groundwater.

12.1.1. Wells to be constructed in areas of known or suspected contamination may be required to determine water quality characteristics prior to construction.

12.1.2. Wells constructed or destroyed in areas of known or suspected contamination may be required to seal the annular space to a depth greater than those specified in Section 4.7. and Section 6., respectively. The depth of the annular space seal will be reviewed on a site-specific basis and determined by the Director.

12.1.3. All aquifers containing saline water shall be properly sealed off to prevent intermingling.

12.1.4. Minimum distance between wells and sources of contamination shall be maintained as specified in Section 3.1. of these Standards.

12.1.5. The extraction of the shallow groundwater through dewatering wells, when necessary to suppress the water table, shall be reviewed on an individual basis with prior approval by the Director.

12.1.6. To prohibit intermingling of poor quality aquifers above and below the Corcoran Clay layer, wells constructed and perforated below the Corcoran Clay layer shall have sealing requirements determined on a site specific basis and approved by the Director.

13. MONITORING WELLS

13.1. APPLICATION TO WELL TYPE

13.1.1. These standards apply to all types of monitoring wells, except as prescribed in Section 13.2 that follow. Before a change in use of a well is made, standards for the new use shall be complied with.

13.2. EXEMPTIONS FOR UNUSUAL CONDITIONS

13.2.1. Under certain circumstances the Director may waive compliance with these standards and prescribe alternate requirements. These standards may be waived only where they are impractical or ineffective because of unusual conditions, or would result in an unsatisfactory well condition or function. In waiving these standards EHD shall, if possible, require that measures be implemented to provide the same or greater level of water quality protection than would otherwise be provided by these standards.

13.3. PERMITS

A permit application for monitoring, exploration holes (borings), extraction wells, injection wells, vapor probe, or other wells covered by this Section is required.

13.3.1. The licensed well contractor, or his authorized representative, shall make application on forms furnished by the San Joaquin County Environmental Health Department. The application shall contain the following information and a plot plan drawn to scale.

13.3.1.1. Owner's name and address.

13.3.1.2. Address of parcel and Assessor's parcel number (APN).

13.3.1.3. Names of streets or roads nearest to, or bounding the property.

13.3.1.4. Outline of the property giving dimensions and North Direction.

13.3.1.5. Location of facility sewer outlet, public sewer, sewage disposal system or proposed sewage disposal system, proposed expansion of sewage disposal system, or any other possible source of contamination.

13.3.1.6. Location of proposed new well, other existing wells and sewage disposal systems within a radius of 100 feet on the property or adjoining property.

13.3.1.7. Intended use of the well.

13.3.1.8. Name, address and license number of licensed well driller/pump contractor.

13.3.1.9. Note on permit application if the well is in a flood plain or drainage course.

13.4. LOCATION

All underground utilities, pipelines, underground fuel or hazardous materials tanks, septic systems, or other structures shall be visibly marked on site prior to well construction.

13.4.1. All surface drainage shall be away from the well site.

13.4.2. Application for permit shall be good for one (1) year from date of issue. Extension may be granted by the Director for one additional year.

13.5. INSPECTION OF WELLS

13.5.1. Inspections will be made to ensure that these well standards are being adhered to during all phases of constructions, development, sampling, and/or destruction.

13.6. CONTRACTOR REQUIREMENTS

13.6.1. Construction, alteration, or destruction of monitoring wells and exploration holes (borings) or shallow exploration holes (borings) installed to monitor hazardous waste facilities, other waste facilities, or underground storage tanks, or land acquisitions, shall be performed by a C-57 licensed contractor under the direction of a California Registered Professional Engineer, California Registered Geologist, or a California Certified Engineering Geologist, [Sections 6735, 7835 and 7835.1, Business and Professional code and Rule 415, Professional and Vocational Regulations].

13.6.2. Work performed under the direct supervision of a Registered Civil Engineer, Registered Geologist, Registered Environmental Health Specialist, or Registered Environmental Assessor, where the total depth is less than ten (10) feet, is not required to be performed by a C-57 licensed contractor.

13.7. REPORTS

13.7.1. Monitoring well construction, alteration, or destruction reports shall be filed with the California Department of Water Resources in accordance with provisions of Sections 13750 through 13754 (Division 7, Chapter 10, Article 3) of the California Water Code.

13.7.2. Subsurface Investigative Reports and all analytical data obtained in the course of the permitted investigation shall be submitted to the Director, and other appropriate regulatory agencies, upon completion.

13.8. CASING

13.8.1. Casing shall be ASTM, API and/or AWWA approved. Refer to the State of California Water Well Standards Bulletin 74-81 and 74-90.

13.8.2. Casing should be protected from damage due to sagging and bending, severe impacts and loads, direct sunlight or subjected to freezing temperatures and potentially harmful chemicals.

13.8.3. All well casing shall be assembled and placed with sufficient care to prevent damage to casing sections and joints. All casing joints above intervals of perforations or screen shall be watertight. Any perforations shall be below the depth specified in Section 13.12. The casing shall be equipped with centering guides or "centralizers", if installed in open borehole, to ensure the even radial thickness of the annular seal and filter pack.

13.8.4. Steel casing may be joined by welds, threads, or threaded couplings. Welding shall be accomplished in accordance with standards of the American Society or the most recent revision of the American Society of Mechanical Engineers Boiler Construction Code. Casing shall be equipped with a "drive shoe" at the lower end if it is driven into place.

13.8.5. A specifically designed adapter may be used to join plastic casing to metallic casing or screen.

13.8.6. Special considerations for monitoring well casings are:

13.8.6.1. Casing, couplings, centralizers, and other components of the well casing shall be free of pollutants and contaminants at the time of installation and non-reactive with water chemistry and contaminants.

13.8.6.2. The bottom of a monitoring well casing shall be plugged or capped to prevent sediment or rock from entering the well.

13.8.6.3. Depending upon the type of material and its fabrication, plastic casing shall be mechanically joined (threaded or otherwise coupled) in a manner that ensures its water tightness. Organic solvent cements or glues shall not be used for joining plastic casing where a monitoring well is to be used for certain sensitive water quality determinations.

13.8.6.4. Plastic casing or screen shall not be driven or otherwise subjected to significant impact forces during installation.

13.9. CONDUCTOR CASING

13.9.1. If temporary conductor casing is used to stabilize the borehole during drilling, it shall be removed during the placement of the filter pack and annular seal materials.

13.9.2. If a permanent conductor casing is to be installed or temporary conductor casing cannot be removed, the monitoring well borehole

diameter shall be at least 4 inches greater than the outside diameter of the conductor casing. The inner diameter of the permanent conductor casing shall in turn be at least 4 inches greater than the outside diameter of the well casing. Appropriate sealing material shall be placed between the permanent conductor casing and the borehole wall and the well casing and the conductor casing. The seal shall extend at least to the depth specified in Section 13.12.

13.10. FILTER PACK MATERIAL

13.10.1. Filter pack material shall not degrade or consolidate after placement.

13.10.2. The grain-size of the filter pack shall be matched to the slot size of the well screen.

13.10.3. Filter pack material shall be non-reactive, and obtained from clean sources and properly packaged for handling, delivery and storage.

13.10.4. The storage of filter pack materials at a drilling site shall be done to ensure that material does not come into contact with chemical pollutants or contaminants.

13.10.5. Foreign substances shall not be introduced during placement of the filter pack.

13.10.6. Filter pack material shall be placed in the well boring by use of a tremie pipe or equivalent.

13.10.7. The depth of the top of the filter pack shall be carefully checked and the volume of the filter pack material installed shall be considered to verify that no bridging of filter pack materials occurred.

13.10.8. Surging the well prior to the installation of the transition seal and/or the annular seal is highly recommended. Refer to Section 13.15, "Well Development" for appropriate methods.

13.11. TRANSITION SEAL

13.11.1. A one (1) to five (5) foot long transition seal consisting of Bentonite or other approved material may be placed in the annular space between the filter pack and cement-based annular seals in monitoring wells.

13.11.2. Bentonite transition seals shall be installed by use of a tremie pipe or equivalent for depths greater than 30 feet and where water is present in the borehole.

13.11.3. Potable water shall be added to the Bentonite transition seal where it exists in the dry form in the borehole prior to the placement of neat cement-based sealing materials.

13.11.4. Sufficient time shall be allowed for Bentonite transition seals to properly hydrate before neat cement-based sealing materials are placed.

13.12. SEALING THE UPPER ANNULAR SPACE

13.12.1. The annular space shall be sealed from the top of the filter pack, or the Bentonite transition seal (refer to Section 13.11), to the ground surface.

13.12.2. The annular seal shall be a minimum of 2 inches in radial thickness.

13.12.3. Sealing material shall be selected based on required structural, handling, and sealing properties and the chemical environment into which it is placed. Sealing material shall consist of neat cement, Bentonite neat cement grout, or Bentonite clay.

13.12.4. Drilling fluid or cuttings from drilling the borehole shall not be used in the sealing material.

13.12.5. Neat cement grout shall be mixed at a ratio of one 94-pound sack of Portland cement to 5-10 gallons of potable water.

13.12.6. Cement-Bentonite grout shall contain not more than 3-5% Bentonite.

13.12.7. Neat cement and cement-Bentonite grouts shall be thoroughly mixed.

13.12.8. Water used for sealing mixtures shall be potable.

13.12.9. All Bentonite used must be NSF approved or equivalent type designed by the manufacturer for the intended usage.

13.12.10. All equipment used in the construction of the well and placement of the annular space seal shall be free of debris and/or contamination.

13.13. TEMPORARY COVER

13.13.1. The well or borehole opening shall be covered to prevent the entry of foreign material, contaminants and pollutants and ensure public safety whenever work on the well is interrupted.

13.13.2. The cover shall be watertight and held in place in such a manner that it cannot be removed except by equipment or tools.

13.14. SURFACE SEALS

13.14.1. Surface construction features of a monitoring well shall serve to prevent physical damage to the well; prevent entrance of surface water, pollutants, and contaminants; and prevent unauthorized access.

13.14.2. The top of a monitoring well shall be protected by a locking cover or equivalent level of protection to prevent unauthorized access.

13.14.3. The top of a monitoring well casing shall be fitted with a watertight sanitary seal to prevent surface water, pollutants, and contaminants from entering the well.

13.14.3.1. Openings or passages for water level measurements, venting, pump power cables, discharge tubing, and other access, shall be protected against entry of surface water, pollutants, and contaminants.

13.14.4. For aboveground completions, a 2 ft X 2ft concrete surface seal shall be constructed around the top of a monitoring well casing at ground surface at least four (4) inches thick and shall slope to drain away from the well. The depth may extend three (3) feet below the ground surface and the seal shall be continuous with the annular seal and the well cover.

13.14.4.1. The surface seal should be free of cracks, voids, and other significant defects that would allow the entry of water, pollutants, and contaminants.

13.14.4.2. The joints between the surface seal, the annular seal, and the well casing shall be designed and built so that they will not fail, or cause the failure of the well casing or annular seal, and remain watertight.

13.14.5. Permanent protective barriers or the equivalent shall be installed to house the top of a monitoring well where the well casing must be terminated above ground surface.

13.14.6. A structurally sound, watertight vault, or equivalent, shall be installed to house the top of a monitoring well where the well casing must be terminated below ground surface.

13.14.6.1. The barriers shall be easily seen and shall protect the well from vehicular impact.

13.14.6.2. The annular seal shall contact the subsurface vault.

13.14.6.3. The joint between the vault and the annular seal, and the vault and the well casing, if any, shall not fail or cause the failure of the annular seal or well casing, and shall be watertight.

13.14.6.4. Appropriate sealing material shall be placed between the outer walls of the vault and the excavation into which it is placed.

13.14.6.5. The vault and its lid shall be strong enough to support vehicular traffic, where such traffic might occur.

13.14.6.6. The vault lid shall be clearly labeled.

13.14.6.7. A security device to deter unauthorized access shall be installed.

13.14.6.8. The top of the vault should be set at, or above, grade so that drainage is away from the vault.

13.14.6.9. The well cap should be provided with a pressure relief or venting device for gases, where appropriate.

13.15. WELL DEVELOPMENT

13.15.1. Monitoring well development, redevelopment, and conditioning shall be performed with care so as to prevent damage to the well and any strata surrounding the well that serve to restrict the movement of poor quality water.

13.15.2. Mechanical surging devices, such as "plungers", bailers, and surge blocks shall be operated in such a way as to prevent damage to the well, and without producing excess sediment.

13.15.3. The air or gas supply used in development operations shall be free of hydrocarbons, and other pollutants or contaminants. Air development and air jetting methods must obtain prior approval from the Director.

13.15.4. Water used in jetting operations shall be free of pollutants and contaminants. Water jetting development methods must obtain prior approval from the Director.

13.15.5. All equipment used for developing, sampling, and/or repairing of wells must be free of contamination and cleaned between the construction and/or sampling of wells to prevent cross contamination.

13.15.6. A minimum of 12 hours of time shall be allowed between placement of the annular seal and well development.

13.15.7. Development and purge water that is not permitted for discharge to land or sanitary sewer shall be containerized in properly secured and labeled DOT drums prior to disposal in accordance with all applicable federal, state and local requirements.

13.16. REHABILITATION AND REPAIR OF MONITORING WELLS

13.16.1 Rehabilitation methods should be compatible with the use of the monitoring well. Well rehabilitation methods which include surging by use of compressed air, backwashing or surging by alternately starting or stopping a pump, water jetting, sonic cleaning, or combinations of these, must obtain prior approval from the Director.

13.16.2 Materials used for repairing well casing shall meet the requirements of Section 13.8.

13.17. REQUIREMENTS FOR DESTROYING MONITORING WELLS AND EXPLORATION HOLES

13.17.1. A monitoring well shall be investigated to determine its condition and details or its construction prior to its destruction.

13.17.2. The well shall be sounded immediately before it is destroyed to determine whether there are obstructions that will interfere with filling and sealing.

13.17.3. Any obstructions found in the well or boring shall be removed before filling and sealing operations begin.

13.17.4. If the well was constructed and maintained in accordance with these Standards, the sealing material shall be placed under pressure to ensure that the monitoring well is properly filled and sealed.

13.17.5. Casing material may require perforation, or puncturing, to allow for proper placement of sealing materials.

13.17.6. If the well construction is unknown and/or is located in an area of known or suspected pollution or contamination, the well shall be destroyed by removing all material within the original borehole (including the well casing, screen, filter pack, and annular seal); and the created hole filled completely with appropriate sealing material.

13.17.7. Exploratory borings, installed for sampling purposes, shall be completely grouted with appropriate sealing material. The top 3 feet of the boring may be backfilled with clean, uncontaminated fill material.

13.17.8. The well or exploratory boring shall be filled by use of a tremie pipe or equivalent, proceeding upward from the bottom of the well or boring. Any deviation from this method must be approved by the Director.

13.17.9. Sealing materials shall be placed in one continuous operation unless conditions in the well or boring dictate that sealing operations be conducted in a staged manner and prior approval is obtained from the Director.

13.17.10. Pressure required for the placement of sealing material shall be maintained long enough for sealing materials to properly set.

13.17.11. Verification shall be made to determine that an adequate seal has been installed by an EHD representative.

13.17.12. If the well casing was left in place during sealing operations, a hole at least one foot larger in diameter than the originally drilled hole shall be excavated around the outside of the well casing to a depth of 3 feet below the ground surface, and the well casing shall then be cut off 6 inches above the bottom of this excavation and removed.

13.17.13. The grout used to fill the well shall be allowed to spill over into the excavation, during the sealing operation, and fill it for a thickness of one foot and form a "cap" which has a diameter of at least one foot greater than the diameter of the originally drilled hole.

13.17.14. After the sealing operation and the sealing material have set, the excavation shall be filled with clean soil.

13.17.15. Any deviation from this section must obtain prior approval from the Director.