

Napa County Well Destruction Guidelines

With increasing concerns over contaminants affecting the quality of groundwater, the potential for inactive or abandoned wells to act as pathways for contaminants into groundwater becomes more critical. Local ordinance as well as California Bulletins 74-81 and 74-90 contains general guidelines as to the materials to be used and procedures to be followed in the destruction of wells. There have been, however, advances in technology and sealing materials since these documents were written. The purpose of these guidelines is to incorporate such new technologies and provide guidance based on current industry practice, on the type and application of sealing materials and techniques for well destructions.

This document covers what exists in County Code as well as what is being incorporated as best practices (*indicated by text in italics*). These guidelines will govern well destruction techniques (as allowed by County Code section 13.12.240 and 13.12.480) and requirements contained herein shall be included in any work plan submitted for a well destruction.

13.12.240 Well destruction.

“Well destruction” means certain work done to an existing well, the intent of which is to effectively seal the entire well up to the ground surface, in such a manner that each intersected water stratum is sealed and isolated from every other stratum and from surface water. Destruction of wells shall be completed in accordance with the procedures outlined in Article IV of this division or as otherwise specified by the director.

Article IV. Destruction of Abandoned Wells

13.12.460 Abandoned wells.

A. The owner of any property shall be responsible for destroying any abandoned well located thereon. A well is considered to be abandoned when it has not been connected for service to any structure and/or not used for a period of one year. An abandoned well also includes a well, which is in such a state of disrepair that no water can be produced.

B. The well will not be considered abandoned if all of the following occur: (1) the owner declares his or her intention to the director, in writing, to use such well again for supplying water or for other approved purposes, (2) the well has no defects in construction which would cause pollution or contamination to the ground water by surface water, (3) the well is covered with a safe well cover, (4) the well is marked so as to be clearly seen, and (5) the ground area surrounding the well is sloped away from the casing and kept clear of brush and debris.

13.12.480 Destruction of wells.

A. Prior to destroying a well, a detailed evaluation and report on the well shall be submitted to the director by a licensed well driller (as defined in section 13.12.250). Such report shall indicate the type of well to be sealed (*including total depth of well, well screened*

interval(s), sealed depth, well casing diameter, well annulus diameter [if known], well pack materials, and static water levels), all known information of the geological conditions of the soil, and the methods and material to be used in the destroying and sealing process. The methods and materials used in destroying wells shall be such that the ground water is protected from pollution or contamination. *The County shall be notified as soon as possible if pollutants and contaminants*

are known or suspected to be in a well to be destroyed, or the immediate vicinity. Well destruction operations may then proceed only after approval by the County.

B. When a water well or an abandoned water well is to be destroyed, it shall be destroyed as follows:

1. Any obstructions in said well, including pipes, pump, etc. shall be removed when possible. *Once pumps, piping and electrical wiring are removed from the well, the presence of any obstructions (including collapsed casing) to the total original depth of the well should be determined. Any obstruction in the casing, such as debris, pumps, or junk should be removed, to the original total depth of the well. All "reasonable" efforts should be made to clear the well casing to the original depth.*

2. As much casing shall be removed as possible, but not less than three (3) feet below grade or as determined by the director. *Well destruction operations performed prior to or simultaneously with the sealing of cased wells may involve pulling any existing casing out of the ground as applicable and/or feasible, or perforating or otherwise causing openings to be made in the casing. Openings in casing may be made with a gun-perforator per oilfield practice, an air-percussion perforator, or ripped with a "Mills Knife" or similar device if casing condition allows. PVC casing cannot be successfully perforated in most cases. In some situations, detonator cord or shaped charges may be placed in the well at selected intervals, and after placement of neat cement sealing material, exploded, thus simultaneously opening the casing and driving the sealing material into the annulus and borehole wall. The purpose of any of these operations is to facilitate entry of sealing material into the annulus and achieve penetration into the native formation of any existing gravel pack to the maximum extent possible. Mechanical perforators generally do not work in PVC casing, and drilling out the PVC casing and accompanying seal is probably the most effective method of destruction. The drilling (using a reaming and long-pilot bit) needs to be done slowly to avoid deflection and plugging of the bit with PVC Chips. Remnants of PVC casing left in place are not considered to be a hazard to water quality.*

3. The well (*with properly removed and/or perforated casing*) shall be filled with concrete, or "p" gravel to thirty (30) feet or below the first impervious layer (if known), whichever is deeper. If the well is less than thirty (30) feet deep, proceed to step 4. *If the well is in an area with known contamination or in the immediate vicinity of an existing or planned septic system, the well (with properly removed and/or perforated casing) shall be filled with concrete, or "p" gravel to fifty (50) feet or below the first impervious layer (if known), whichever is deeper. Evidence of at least a 5-foot thick impervious layer must be presented to allow for a seal depth of less than fifty (50) feet. Any such evidence shall be presented to the County for such determination.*

4. Fill well (*with properly removed and/or perforated casing*) with concrete, neat cement or sand-cement grout to surface. *The appropriate sealing materials are to be placed from the bottom of the well up, using a tremie pipe which is kept submerged in the mixture and is periodically raised as the well bore is filled in one continuous operation (continuous pour). Special situations however may dictate two or more stages. Some applications may call for pressure grouting. In some deep wells where lost circulation of cement into the formation behind the casing might result (or actually occurs) from the fracture gradient of the formation being exceeded, use of additives to lighten the mixture, and emplacement in a minimum of two "stages" may be necessary. With any sealing method, the volume of the hole to be filled should be calculated, and compared with the actual volume of sealing materials used, to be sure that the volume of materials emplaced is at least equal to the hole volume.*

5. The placement of the material shall be done in such a way as to assure a dense seal, free of voids, in order to exclude surface water. Gravity installation of sealant without the aid of a tremie or grout pipe shall not be used unless the interval to be sealed is dry.

ADDITIONAL REQUIREMENTS

General.

1. Well penetrating creviced or fractured rock. If creviced or fractured rock formations are encountered just below the surface, the portions of the well opposite this formation shall be sealed with neat cement, sand-cement grout, or concrete. If these formations extend to considerable depth, alternate layers of coarse stone and cement grout or concrete may be used to fill the well. Fine-grained material shall not be used as fill material for creviced or fractured rock formations.
2. Well penetrating specific aquifers, local conditions. Under certain localized conditions, Napa County may require that specific aquifers or formations be sealed off during destruction of the well.

Additional Requirements for Wells in Urban Areas.

1. In incorporated areas or unincorporated areas developed for multiple habitation, to make further use of the well site, the following additional requirements must be met for well destruction:
2. A hole shall be excavated around the well casing to a depth of 5 feet below the ground surface and the well casing removed to the bottom of the excavation.
3. The sealing material used for the upper portion of the well shall be allowed to spill over into the excavation to form a cap.
4. After the well has been properly filled, including sufficient time for sealing material in the excavation to set, the excavation shall be filled with native soil.

Large Diameter Hand-Dug Wells

1. Open, large diameter hand-dug wells not only present a pathway for groundwater contamination, but also provide a physical hazard to persons or animals that may fall in. These wells may involve large volumes of fill and sealing materials, and may present other unusual problems in their destruction. Sometimes there are small-diameter "laterals" at the bottom of such wells as used in the "wagon wheel" type construction, that must be dealt with for effective destruction. Occasionally, there is a drilled well extending from the bottom of the hand dug well, constructed when water levels dropped below the lift of a shallow centrifugal pump, and this bored well at the bottom must be destroyed first.
2. As much of the lining should be removed as possible, consistent with safety concerns, with particular attention paid to the upper 5 feet of "curbing", so as to assure to the extent possible good contact of the upper sealing material with native materials of the well. If the well is dry, or can be pumped dry, clean backfill materials as previously described, can be used to fill the well up to 30 feet below the surface (or a shallower depth as applicable) at which point, sealing material should be placed to the surface or just below the "plowing" depth, with an accompanying concrete cap. If the well contains water, then cement or bentonite grout should be placed from the bottom of the well to several feet above the water

level, followed by fill material to 5 feet below the surface, and in turn covered by a concrete "cap" extending to the surface, or below "plowing" depth. Well destruction methods of these type wells (cased wells extending beyond the bottom of large diameter hand-dug wells) are to be the same as other cased wells as discussed in the sections above.

C. For the destruction of monitoring wells, cathodic protection wells or exploratory holes, refer to Bulletin 74-90 for requirements.

13.12.490 Alternative well or test hole destruction methods: Other methods of destroying wells, including large diameter wells and wells considered to pose a higher degree of risk to the ground water may be approved by the director if in his opinion an equivalent effect will result, and no contamination or pollution to the ground water will occur.