

**County of San Luis Obispo
Environmental Health Services Division**

**2018 CCDEH Excellence in Environmental Health Award Nomination
Water Well Program and Community Outreach Project**

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Abstract

The California drought has contributed to lowering ground water levels within County of San Luis Obispo water basins. This is of particular concern to the region because most of the potable water that serves the County comes from ground water and lowering ground water levels have been found to negatively impact water quality. In response to this negative impact, and to better protect public health, over the last three years, the County of San Luis Obispo, Health Agency Environmental Health Services Division (EHS) worked collaboratively with well drillers, laboratories, hydrogeologists, and other local and state agencies to improve the implementation of the County's water well construction permitting program to better address ground water quality. Tools were also developed to educate private water well owners about the safe operation of their wells.

After consulting with well drillers and a hydrogeologist, criteria was developed for specific water basins within the County that have been the most critically impacted. The criteria includes specific depths that signal when a hydrogeologist and other well drilling monitoring logs will be used by the driller to ensure that lower water quality aquifers will be sealed if they are penetrated so they do not impact higher water quality aquifers. To assist well drillers with the new criteria, a web-based GIS mapping tool was developed so they can identify which ground water basin they are drilling in. Water sampling criteria was also developed to inform property owners about water quality so decisions can be made about whether or not treatment systems should be installed to ensure the water is safe to drink. To better educate private well owners, a YouTube video and a corresponding well owner's checklist was developed and mailed to assist them with monitoring their wells for safety and water quality. The division also partnered with the Central Coast Regional Water Quality Control Board to obtain funding to provide free drinking water sampling and analytical services to domestic well owners to increase their knowledge about the quality of the water they drink.

The Problem

Improvements to the water well construction permitting program were initiated after ground water quality was found to be compromised from deeper wells being drilled and from the lowering of ground water levels in the region. After responding to a complaint in 2015 about a sulfur odor emanating from a new well that was being drilled, it was discovered that the deeper wells could penetrate lesser quality

aquifers, presenting a contamination risk for higher water quality aquifers. This cross contamination could thereby jeopardize the water quality of wells that supply a community. As a result of lowering water ground water levels, it was also discovered, after a response to a complaint about the smell of gasoline in a water well, that contamination present in ground water was less diluted with lower ground water levels. This presents a risk to water quality by increasing the concentration of contaminants within the ground water that can supply water wells. This problem is particularly relevant to the County of San Luis Obispo because most of the region's water supply comes from ground water.

Description of the Program

The Water Well Program and Community Outreach Project was initiated in February 2015 after responding to a complaint about a sulfur smell and ponding water coming from a property where an agricultural irrigation water well was being drilled. This event resulted in the restructuring of the water well program after working with a hydrogeologist, well drillers, area laboratories, and state and local regulatory staff.

As a result of investigating the 2015 complaint, and securing the assistance of a hydrogeologist, criteria started to be developed and refined as lessons were learned during the investigation. Lessons were also learned from investigating other complaints about poor ground water quality from water wells. These complaints provided information that lowering ground water levels were contributing to negative impacts on water quality. In particular, the lowering of ground water levels prompted property owners to start drilling deeper wells and contaminants within basins were found to be more concentrated due to less dilution.

The irrigation well complaint investigated in February 2015 had been drilled 700 feet deeper than reported on the well construction application because the driller and property owner wanted to get to more water. The sulfur smell and ponding water resulted from the well penetrating a lesser water quality aquifer due to its depth of nearly 1500 feet. The water was warm and found to contain contaminants and gas that caused the well to artesian. This was concerning to the community because they were worried their wells would be negatively impacted. The EHS had to retain a hydrogeologist to assist with reviewing drilling logs and in reviewing the contractor's efforts to seal the well from the lower quality aquifer.

To better address the public health risk presented by the drilling of deeper wells that could reach aquifers that had not been penetrated before, EHS worked with area well drillers, a hydrogeologist, local laboratories, and other state and local regulatory officials to develop criteria for specific water basins (due to their varying depths) within the County that have been the most critically impacted. The criteria includes specific depths that signal when a hydrogeologist and other well drilling monitoring logs will be used by the driller to ensure that lower water quality aquifers will be sealed if they are penetrated so they do not impact higher water quality aquifers (attached). Additional criteria were developed to address how well drillers and EHS can better oversee the sealing of lower quality aquifers if they are penetrated. To assist well drillers with the new criteria, a web-based GIS mapping tool was developed so they can identify which ground water basin they are drilling in and what the depth markers are that

signal the additional review needed by a hydrogeologist. Before releasing this tool on the EHS website, well drillers input was provided on the tool to ensure it would be useful for them and a training workshop was provided on its use.

<https://gis.slocounty.ca.gov/Html5Viewer/Index.html?configBase=https://gis.slocounty.ca.gov/Geocortex/Essentials/REST/sites/EHDrillerView/viewers/EHDrillerView/virtualdirectory/Resources/Config/Default>

Water sampling criteria was also developed with the purpose of informing well owners of new or deepened wells about water quality so decisions can be made on whether or not treatment systems should be installed to ensure the water is safe to drink. The water quality sampling can also provide an additional signal on whether or not a lesser quality aquifer had been penetrated. This effort involved working with area laboratories, a hydrogeologist and well drillers on the development of water sampling criteria and a notification process for sampling results because it was not part of the pre-existing program.

Another complaint investigation in October 2015 about a gasoline smell in a private well provided information that lowering ground water levels can also reduce dilution of contaminants. In this particular investigation, trichloroethylene was identified as the contaminant at concerning levels within area wells. The contamination was from a historical soil contamination that the State Regional Water Quality Control Board was working on over a number of years. Contaminated groundwater in area wells was never before identified as a public health concern. EHS worked with the State regulatory agency to help fund and provide resources for water sampling of a number of wells in the area to inform residents of the risk. The State hydrogeologist confirmed that the lowering ground water levels likely led to the concerning contamination found within the wells. This prompted EHS to develop tools to better educate private well owners because their wells are not routinely monitored by a regulatory agency.

To better educate private well owners who are responsible for their own wells, a YouTube video and a corresponding well owner's checklist was developed, posted on the EHS website, and mailed to provide guidance on how to monitor their wells for safety and water quality. The State regulatory agency also worked with EHS to provide grant funding for private well owners to test their water at area laboratories.

<http://www.slocounty.ca.gov/Departments/Health-Agency/Public-Health/Environmental-Health/All-Environmental-Health-Services/Private-Well-Owner-Resources.aspx>

Information about the drinking water project can also be found online:

<https://sites.google.com/lgc.org/slodwtesting/home>

To assist with improving knowledge about well construction and the safe operation of wells, trainings were developed collaboratively by EHS staff, a hydrogeologist, and a well driller. They were subsequently delivered to both EHS staff and to well drillers. The collaborative efforts in sharing knowledge and in developing criteria, outreach materials, the GIS well driller viewer, and the trainings

helped to build trust and ownership of the changes in order to better protect the health of the community.

Use of Technology

Technology was leveraged to help implement the water well construction and community outreach project. This included:

1. The development of a GIS well driller viewer that is posted on the EHS website to help drillers with implementing the new well construction criteria.
http://gis.slocounty.ca.gov/Html5Viewer_2_7_1/Index.html?configBase=/Geocortex/Essentials/REST/sites/WELL_DRILLER/viewers/5261/virtualdirectory/Resources/Config/Default
2. A YouTube video that corresponds with a well owner's checklist and is posted on the EHS website.
http://www.slocounty.ca.gov/health/publichealth/ehs/services/water/private_wells.htm
3. Information from domestic water well sampling project is on the Geotracker GAMA website.
http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T10000010583

The Cost of the Program

The operating costs of the program are recovered by permit fees, including the development of the GIS viewer and YouTube video. However, the cost of investigating the two complaints referenced in the project description had to be recovered outside of the well permit fees. The February 2015 deep well investigation resulted in \$25,000 in investigative fees that have to be recovered directly from the well driller. The second complaint involving the neighborhood investigation and sampling of water wells where trichloroethylene was found resulted in \$5,000 in costs that were recovered by one time general funds. The improvements made as a result of this project are expected to prevent these types of costs from re-occurring, ultimately leading to cost containment rather than cost recovery efforts.

A grant was obtained to fund domestic water wells so owners are more informed about the quality of their water. The grant also funded mailers to all known domestic well owners to advertise the program in pilot test areas. Grant funding is still available and will be pursued to fund testing in other areas of the County.

The Results/Success of the Program

Since the program was fully implemented, over 200 wells were drilled and water quality results are available for the well owners. Guidance was also provided to these well owners on how to maintain their well and whether or not they should consider having a water treatment system in place for the safety of their families. Well drillers have also taken ownership of the new construction requirements and the implementation has been smooth because most area well drillers were part of the collaborative criteria development process and training efforts. They also have a GIS based tool that can be used either on their desktop or mobile device to help them identify what water basin they will be drilling in and whether the proposed depth of the well will require that they have an expert hydrogeologist review

the well drilling to ensure it does not penetrate a lower quality aquifer. This is because penetrating a lower quality aquifer can contaminate a community's water supply if it is not properly sealed. Area laboratories were also prepared and informed about the new water well sampling requirements and the State Regional Water Quality Control Board worked with EHS to obtain grant funds to pay for domestic well owners to have their water tested free of charge.

Domestic water well owners are more informed with how to maintain their well and ensure the water quality is safe. They have both a checklist that was mailed to them and a YouTube video is available on the EHS website to provide a visual "how to" that corresponds with the Well Owners Checklist. The domestic well sampling grant funded program resulted in 187 samples being taken. Of the 187 wells sampled, 59 wells exceeded primary drinking water standards. The well owners were informed of the results and they can also be found on the states Geotracker GAMA website.

EHS staff and well drillers are also more informed by the collaborative training that was provided and new partnerships have also been formed.

Worthiness of the Award

The project is worthy of an award because it protects public health by better informing residents about monitoring the safety of their wells and in protecting ground water quality as deeper wells are being drilled due to decreasing ground water levels. These impacts are particularly far reaching because ground water is the main source of potable water for the region. The collaborative approach to making the improvements also involved a number of stakeholders in the community including well drillers, laboratories, hydrogeologists, and other local and state agencies. This made implementation easier because of the project's participative process of sharing of knowledge, providing input, and building processes that are based on science and practicality of implementation. This reduced resistance to the change because of the feeling of collaborative ownership. Tools were also developed to educate private water well owners about the safe operation of their wells. An innovative GIS based well driller viewer was also developed so well drillers can safely drill wells that will not contaminate a community's ground water supply. All of this resulted in the building of trust and lasting partnerships that will continue to help make our County of San Luis Obispo communities healthier and our ground water quality safer for generations to come.