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CROWS LANDING
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AGRICULTURAL IRRIGATION WELLS, ESCOBAR PROPERTY, NASA CROWS LANDING FLIGHT FACILITY, CROWS LANDING, STANISLAUS COUNTY

Two agricultural irrigation wells are on the Escobar property, which is east across Bell Road from the former NASA Crows Landing Flight Facility. The old well on the Escobar property, which was installed in 1994, is no longer in use and has been replaced by a new well that was installed in October 2007. The old and new wells are within close proximity to each other. The issues related to the two wells and the possible impacts to cleanup of contaminants in groundwater at the NASA Crows Landing Flight Facility are discussed below.

Old Well

The old well was drilled in 1994 to a total depth of 476 feet below ground surface (bgs). Two screen intervals were installed from 348 to 476 feet bgs and from 200 to 228 bgs. The deeper screen interval was placed in strata described as gravel streaks, clay, and gravel that are below the Corcoran Clay, which is a regional clay layer that is laterally extensive and approximately 25 to 30 feet thick in the project site vicinity. The upper screen interval was placed in a sand layer that lies directly on top of the Corcoran Clay. The sand layer directly above the Corcoran Clay has been assigned an informal name (as related to the NASA Crows Landing Flight Facility cleanup project) and is referred as the Deep Aquifer. Gravel pack placed in the annular space extended from total well depth (467 feet bgs) to 20 feet bgs. The gravel pack, therefore, extends through the Corcoran Clay interval. With the gravel pack placed through the Corcoran Clay interval, this provides an opportunity for contaminants in the aquifers above the Corcoran Clay to migrate to those aquifers below the Corcoran Clay. The breach in the Corcoran Clay is not protective of water quality in the deeper aquifers below the Corcoran Clay.

Because this well is no longer in use, the well should be properly destroyed in accordance with State and local guidelines and regulations. Additionally, the Corcoran Clay interval, which extends from approximately 229 feet to 255 feet bgs, should be sealed with bentonite or bentonite grout.

California Environmental Protection Agency



New Well

The new well was drilled in 2007 to a total depth of 480 feet bgs. However, the bottom of the well pipe was set at 230 feet bgs. The well was gravel packed from 480 feet bgs to 20 feet bgs. The screen interval extends from 205 to 225 feet bgs, which corresponds to the sand layer (the Deep Aquifer) that is directly above the Corcoran Clay. The Corcoran Clay interval extends from 224 to 240 feet bgs. As with the old well, the construction of the new well places the gravel pack through the Corcoran Clay interval, thereby providing an opportunity for contaminants in the aquifers above the Corcoran Clay to migrate to those aquifers below the Corcoran Clay. The breach in the Corcoran Clay is not protective of water quality in the deeper aquifers below the Corcoran Clay.

In addition to the issue of the well's construction specifications, use of the new well has caused contaminants in groundwater in the Deep Aquifer to migrate to the new well. The Navy has installed a sampling port on the wellhead of the new well. Groundwater from the new well was recently sampled and carbon tetrachloride was reported at concentrations currently below the maximum contaminant level (MCL) for drinking water.

To address the issue of carbon tetrachloride and other possible contaminants of concern in the new well, the Navy has proposed developing a contingency plan, the highlights of which are presented below.

1. Collect another sample from the new well during the next irrigation cycle, which will not occur again until next spring (2009).
2. Perform a groundwater risk evaluation to establish an action level for carbon tetrachloride and other contaminants of concern in the irrigation well.
3. If contaminant concentrations exceed the action level established by the risk assessment at the irrigation well, the Navy will conduct a time critical removal action to address the elevated levels of the contaminants in extracted groundwater. The action will involve the installation of a groundwater treatment system on the new well so that contaminants can be removed from the well water before being used for irrigation.

Comments

The proposal to develop a contingency plan appears to be a reasonable step in assuring contaminants above an acceptable risk level are not discharged to the land surface with irrigation water. However, the plan will need to be able to identify when that risk limit has been reached before the irrigation water is applied to the land because there will be a lag time between when the limit has been reached and when the treatment equipment will be installed and ready for operation. If sampling occurs only when the well is being used for irrigation purposes, then it is conceivable that by the time the risk limit is exceeded and the treatment equipment has been installed, the irrigation season could be over. As such, the contingency plan will need to include a methodology to address this time-lag issue.

The contingency plan does not address the Corcoran Clay breach issue in each of the wells. Because the old well is not in use, California Department of Water Resources guidelines and

regulations call for it to be properly destroyed. The destruction of the old well must include sealing the Corcoran Clay interval. The well pipe at the interval of the Corcoran Clay must be perforated and pressured grouted during the destruction process of the well. Mr. Escobar will receive a separate letter regarding this issue. Given the circumstances, we believe the Navy should assist Mr. Escobar with the destruction of the old well, especially as it relates to sealing the Corcoran Clay.

The Corcoran Clay breach noted in the new well, however, presents a more complicated situation. Short of pulling the well casing from the new well, drilling out the gravel pack, and then sealing the Corcoran Clay interval, there is likely not a viable alternative that can assure the placement of an adequate seal through the Corcoran Clay interval. As such, it would seem prudent to install a deep monitoring well, located very near to the new well (within 15 feet) that is screened below the Corcoran Clay interval. If contaminants are detected in the monitoring well, then the new well can be immediately destroyed and the Corcoran Clay interval properly sealed off. This new monitoring well would need to be sampled as part of the sampling program at the site. The contingency plan should include this scenario.

Conclusion

By 16 January 2009, please provide a draft of the contingency plan taking into account the above comments regarding the new well, including the installation of the deep monitoring well. Additionally, **by 6 February 2009**, the old well should be properly destroyed and the Corcoran Clay interval properly sealed. Sealing the Corcoran Clay interval would not be an issue of concern at the project site if contaminants from the NASA Crows Landing Flight Facility were not beneath the Escobar property. As mentioned above, it would seem appropriate that the Navy assist Mr. Escobar with the destruction of the old well, especially as it relates to sealing the Corcoran Clay interval.

If you have any questions regarding the above, please call Greg Issinghoff at 559-488-4390.



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