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Date: February 23, 1999
Refer to: EM/ER:99–041

Mr. John Keiling
NMED–HRMB
P.O. Box 26110
Santa Fe, NM 87502

SUBJECT: DRIVE POINT INSTALLATION

Dear Mr. Keiling:

This memorandum was prepared to inform appropriate regulatory oversight personnel of the Environmental Restoration (ER) Project's intention to install a "drive-point" well at the location of proposed alluvial well MCO–0.6 in Mortandad Canyon. This is being done because of the inaccessibility of the site to vehicular travel and the nature of the hydrogeologic setting which appears to have a limited alluvium thickness (3 to 5 ft?) and shallow groundwater depth (2 to 3 ft?). Because of these issues, it is impractical to install a conventional alluvial well at this site.

The use of driven wells is a common practice in the environmental industry. They are most commonly employed in shallow groundwater settings because of the limited depths to which they can be installed. A number of investigators have demonstrated their effectiveness as a lower cost method of obtaining groundwater samples in appropriate settings (Pitkin, et al., 1994; Cordry, K., 1995; Clausen and Solomon, 1994; Hogan, 1992; Ingleton, 1989; to cite a few). (List of references is enclosed). The U.S. Environmental Protection Agency (EPA) has addressed this issue in its Resource Conservation and Recovery Act (RCRA) Ground Water Monitoring Draft Technical Guidance document (EPA, 1992, p. 6–14):

> "...in most cases the agency discourages the use of the driven well construction method for the purpose of installing monitor wells. This is primarily because of the inability to collect representative samples of the materials that are penetrated during well installation, and of the inability to seal the well properly unless an outer casing is driven first. However, if samplers can be driven in advance of the casing to allow subsurface sample collection, the driven well method may be a viable well installation option."

Thus, if soil samples are collected from a boring in advance of the drive point placement, and an adequate annular seal can be established to prevent infiltration from the surface, the installation of a drive–point well is recognized as a viable option under RCRA regulations. Other possible problems with drive–point installations include the possibility of damaging the screen while driving through dense materials or silts and clays clogging the screen. The former circumstance can be alleviated by making a small–diameter boring prior to installing the drive point. The latter issue may or may not be of concern, depending on the lithology of the screened formation.

The proposed drive–point well installation will be accomplished by first hand–augering or power–augering a 2–in. diameter borehole from which soil samples will be collected for characterization analyses per guidance in the Work Plan for Mortandad Canyon (Los Alamos National Laboratory, 1997). The well will be assembled by connecting a 2–in. diameter stainless steel well point with a 3–ft section of 0.010–in. slot–size stainless steel screen to a 5–foot length of 2–in. diameter threaded stainless steel riser pipe. The connection will be made with a stainless steel threaded coupling. A temporary threaded steel drive cap will then be attached to the top of the well riser, and the well assembly will then be inserted into the borehole with the bottom of the screen set at the base of the saturated zone in the alluvium. It is anticipated that the alluvial formation materials will collapse into the borehole after the soil samples are removed. A drive hammer will then be employed to drive the well assembly through the collapsed materials to the desired depth. Intimate contact between the well screen and the formation materials is desired for this natural–packed well. The greater diameter of the threaded coupling will facilitate placement of a bentonite seal above the screened zone. The well will then be completed with a concrete surface pad and protective metal box similar to other recent ER alluvial well installations. It is anticipated that if silt/clay–sized sediments occur within the screened horizon, they can be kept out of collected water samples by utilizing a micro–purging technique and sampling with a peristaltic pump at a very low pumping rate to maintain fine grained sediment immobility.

Previous experience with the development of other ER alluvial wells has shown that the use of a silica sand filter–pack does not prevent silt/clay–sized particles from entering the well and causing turbid water samples. Prior criticism by Department of Energy oversight personnel of ER alluvial well installations which had turbidity problems suggested that the gradation of the filter–pack was not sized appropriately to inhibit the entry of fine-grained materials into the well. However, the use of a filter–pack gradation finer than the 20–40 grade sand which has been used in most recent ER alluvial well installations would require a screen slot–size smaller than 0.010–in. in order to retain 90% of the filter–pack. A slot–size finer than this is likely to result in screen clogging problems and slow recovery rates.

Alluvial well PAO–5N (installed March, 1998) in Pueblo Canyon exhibited extremely high turbidity levels (400 to >1000 nephelometric turbidity unit (NTU) throughout extensive conventional development efforts (surging and bailing with over 30 well bore volumes removed). This well had a 0.010–in. slotted screen and a 20–40 grade silica

sand filter–pack. Development of this well was recently concluded successfully with a measured turbidity of ~4 NTU by using a submersible pump pumping at a rate of ~0.25 gpm. This experience illustrates that the filter–pack does little to inhibit the mobilization of fines from the saturated formation materials into the well and suggests that the most significant factor to consider for obtaining non turbid water samples is pumping at a very low rate during sample collection. In view of these results, we believe that non turbid water samples can be obtained from the proposed natural-packed drive point well by sampling with a peristaltic pump (except for volatile organic compounds which will require the use of a small bailer).

In view of these circumstances and the cited information, it is therefore felt that a conventional gravel–packed design will not be necessary for the proposed drive point well. The absence of an artificial filter–pack will not compromise sample quality or data comparability to water samples collected from other conventional monitor wells. The use of stainless steel materials will prevent any corrosion byproducts from impacting water sample quality.

Should it turn out that problems are encountered with the drive–point installation, such as an inadequate well seal or excessive water sample turbidity, the ER Project will then attempt a more elaborate well design with a larger diameter borehole, prepacked screen, and artificial filter–pack.

If you have any questions regarding this notification, please contact Dave McInroy (505) 667–0819 or Jose Mose (505) 667–5808.

Sincerely,

Julie A. Canepa, Program Manager
LANL/ER Project

Sincerely,

Theodore J. Taylor, Program Manager
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Enclosure: List of References

Cy (w/ encs.):
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Cy (w/o enc.):
EM/ER File, MS M992
Tracker RM 604, MS M992

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