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Subject KNC-DC RCRA Field Investigation Update

Hello, All,

As we are all involved with different phases of the project, we had discussed some time ago informal updates by e-mail so that we are all aware of developments with the field phase of the investigation. This note covers the period from May 1 through the present.

Field Work - Rotosonic Drilling 1st Phase (May 3 through 9): The order of drilling was changed due to difficulty of access by the rig at AOC 5 (former UAN tank), and due to site conditions caused by weather.

Drilling and logging has been completed on wells SIT-RG01 (west of SWMU 1), SIT-RG02 (near SWMU 6/southwest of SWMU 1), and SIT-RG08 (adjacent to recovery/monitoring well TW-8 east of Lime Pond). These will be developed and equipped with the finishing pads next week.

At AOC 1, two of the three planned borings were completed, A01-SB04 and A01-SB08. However, A01-SB12 (west of the ammonia cooling tower) cannot be completed with the Rotosonic rig, as it is unable to fit under the pipe rack there. There is no alternative location that can accommodate the Rotosonic rig, but it may be possible to complete this boring with the direct-push rig, which does not require as much clearance.

Field Work - Rotosonic Drilling 2nd Phase (May 16 through 24): The plan for next week, depending on weather and site conditions, is to complete the borings at AOC 5. To accommodate the rig on the softer soils at AOC 5, KNC has obtained a crane mat to support the weight of the rig.

Following AOC 5, we will then start SIT-RG07 (Dakota Well) in the latter part of the week. Following those investigations, the rig will begin the three borings on the Maxwell property to the south and the Crane property to the southeast.

It is also planned to begin the GeoProbe (direct-push) borings the week of May 22. The order of completing those borings has not yet been set.

Findings: The drilling operations with the Rotosonic rig are providing more detailed information on the lithology of the site. There are numerous interbedded sand and clay layers, with perched water zones. This lithology may explain the problems observed at certain recovery wells at the site, as well as data that might be interpreted to indicate a vertical concentration gradient.

KNC observed problems with three recovery wells on the pipeline that runs north-south along the east boundary of the site. The water table in TW-2 had dropped in 2004 to a level where it could not be sampled or operated. TW-4 experienced the same problem in April of 2006. TW-8 recently required repair/replacement of the pump for the third time in 18 months. TW-8 cannot currently sustain a pumping rate above 1.5 gpm, whereas the recovery well pumps are sized at 5 gpm. It appears the operational problems are due to pump damage from lack of flow. The well was allowed to stabilize, but its recharge rate cannot accommodate the pumping rate. Boring SIT-RG08 adjacent to TW-8 showed that the level of water overlying the first confining layer has dropped, and it was necessary to extend this boring well below the current terminus of TW-8 in order to convert it to a monitoring well.

Samples that are taken from different perched water levels might also give the appearance of a vertical concentration gradient.

Recommended Modifications: The layering of silts and sands, along with the small volumes in some of the perched zones, has precluded taking the samples at first groundwater and at subsequent 15-foot intervals that Table I-2-2 had originally indicated. Several elements of the investigation were based on an average depth to water of 80 feet and an assumption that there is an essentially continuous saturated zone from first groundwater to the Graneros. This does not reflect the actual lithology.

Further, the actual site conditions result in samples that are turbid and silty, even with extensive purging. In several cases, the solids in the ground water have reacted with the required preservative in the sample containers to the extent that the analysis cannot be completed according to laboratory protocols.

Because of the lithology, a better alternative to obtain representative samples at varying depths is the completion of certain wells with multiple screened zones, or the installation of well clusters to varying depths. Sampling from the properly installed screened intervals will ensure good quality samples.

Consequently it is recommended that the procedure for groundwater sampling in the remaining borings, including the Dakota well, be modified to eliminate "vertical profiling" samples. It is also recommended that turbid samples already collected be discarded, since valid samples will be obtained from these locations after the wells are developed. As it is not possible for the laboratory to analyze silty samples in accordance with the specified groundwater method, at locations where it is desirable to sample groundwater at varying depths, it is recommended instead to install multiple isolated screened intervals (or well clusters) to ensure good sample quality and the acquisition of representative data.

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