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**NEW MEXICO ENVIRONMENT DEPARTMENT
Hazardous and Radioactive Materials Bureau**

MEMORANDUM TO FILE

DATE: April 23, 1996
TO: PHILIPS SEMICONDUCTOR FILE
cc: Ron Kern, Technical Compliance Program Manager, NMED-HRMB
Stephanie Kruse, RCRA Permits, NMED-HRMB
FROM: Dale E. Conover, Technical Compliance Program, NMED-HRMB
Dale E. Conover
RE: PHILIPS SEMICONDUCTORS / CITY OF ALBUQUERQUE MONITOR WELL SCREEN LENGTHS

Doug Earp with the City of Albuquerque, NM has proposed using the Well Wizard Manufactured low-flow volume Micro Purge well sampling pump in combination with very long 2" diameter monitor well screens. The screens Mr. Earp proposes are 40 ft. in length. His reason for the long screens is to extend the useful life of four proposed monitoring wells at the former Coronado Landfill or Philips Semi-Conductor Facility.

I received several references (below) from the manufacturer and discussed this issue over the telephone separately with William Stone, Ph.D., of the DOE Oversight Bureau (AIP phone #505/845-4103), and Baird Swanson of GWPRB District One. The low flow sample pumps are designed to work through as short a screen length as is practical and are not recommended for use in very long screen lengths (personal communication with Well Wizard's Craig Bamm @ 1-800-624-2026 ext: 281).

Bill felt that the only way to know for sure which depth of the

aquifer was being sampled was to set packers in between separately screened zones before pumping. What Bill is suggesting is basically a "home made" copy of the Westbay Instruments, Inc. MP (multiport) System. Each screened zone would be separated in the well bore from the zones above and below with bentonite seals. He knows of a Kelly Summers with the City of Albuquerque who was able to identify more productive water zones using down-hole cameras and flow logs. Kelly then had the City construct a well like that described above to obtain discrete depth samples. This was a very expensive well. Although Bill did not know exactly how much it cost, it was on the order of half a million dollars.

Baird Swanson (GWPRB District One phone #505/841-9458) is only comfortable with screens no longer than 20 ft. in length (15 ft. wet and 5 ft. dry). He mentioned the dilution problem with samples and also referred to the EPA's RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (TEGD, 09/1986). The TEGD recommends 20 ft. maximum screen lengths. The length of service for monitoring wells in the TEGD is thirty years. With a water level drop of approximately 6 inches per year at Philips, the fifteen feet of wet screen would last just long enough.

Baird also recommended taking a sample with a bailer and compare the analytical results with that obtained with a MicroPurge Pump.

Ron Kern, Section Manager of NMED, HRMB RCRA Technical Compliance, also brought to my attention the issue of cross-contamination of samples within the screened interval. This occurs due to no control over mixing of water from various strata across which the well is screened. The open screen provides a pathway for contaminants from one confined water bearing zone to travel up, or down, to another, uncontaminated zone. An additional concern is the mixing of water inside the well column, especially in the open screened zone. There is no way of knowing if the water pumped from the middle of 40 ft. of screen actually came from that depth, or if it is a mixture of the formation waters from across the entire screened interval.

I also researched the contaminants of concern (COCs) identified at the Philips Site. 1,1,2,2 Tetrachloroethane has a specific gravity of 1.59 and a solubility of 0.29% in water. Perchloroethylene (tetrachloroethylene) has a specific gravity of 1.63 and a solubility of 0.015% in water. Thus, these meet the definition of DNAPLs, dense, non-aqueous phase liquids. The significance of this is Baird cited a University of Waterloo recommendation of less than five ft. screen lengths for the detection of DNAPLs. Baird's experience at the Digital site some 1 ½ miles south of the Philips site, has been that DNAPL contaminants may occur in only a 6-inch thick plume at the bottom of the aquifer. Contaminant concentrations drop off rapidly just

a few feet above the maximum levels.

To Summarize:

- I. Monitor wells are for the purpose of contaminant detection and not long term monitoring, at this stage of the investigation.
- II. Contaminants are DNAPLs in their physical properties, which indicates shorter screen lengths should be used for their detection.
- III. The manufacturer recommends that low flow MicroPurge pumps be used in conjunction with short screen lengths to maximize their effectiveness in sampling from a discrete zone of an aquifer. (References below.)
- IV. Ron Kern, Baird Swanson and William Stone, groundwater professionals with experience with the Albuquerque, NM alluvial aquifer in the area near the Philips site, recommend shorter screen lengths for detection monitoring wells for a variety of reasons mentioned in detail above.

Well Wizard Supplied References:

- 1) Puls, Robert and Barcelona, Michael (1995), "Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures", in EPA Groundwater Issue, December, 1995, 12 pgs.
- 2) Puls, Robert (1994), "A New Approach to Purging Monitoring Wells", in Ground Water Age, January, 1994, pgs. 18-19.
- 3) Schilling, Keith (1995), "Low Flow Purging Reduces Management of Contaminated Groundwater", in Environmental Protection, December, 1995, pgs. 24-26.