STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY

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MCAS EL TORO
SSIC # 5090.3

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Dear Mr. Cerini:

COMMENTS ON THE PERIMETER INVESTIGATION PLAN OF ACTION, MCAS EL TORO

Enclosed are the Department's comments on the Navy's Perimeter Investigation Plan of Action , MCAS El Toro Facility.

If you have any questions, please contact Mr. Scott Simpson at the above telephone number.

Sincerely,

James E. McNally
Program Supervisor
Assessment and Mitigation Unit
Southern California Section
Toxic Substances Control Division

Enclosure

COMMENTS ON THE PERIMETER PLAN OF ACTION, MCAS EL TORO

APPROACH

The Perimeter Investigation Plan of Action (PIPOA) for the MCAS El Toro facility dated April 1987 is not acceptable. The purpose of the PIPOA is to identify whether MCAS El Toro is the source of TCE contamination of agricultural production wells owned by the Irvine Company (TIC). The approach, as outlined in the PIPOA, will not verify or eradicate MCAS El Toro as the source of contamination.

PACKER-ISOLATED PUMPING OF TIC-55

The approach proposed in the PIPOA is contingent upon the validity of data gathered from packer-isolated pumping of TIC well 55. The data is to be incorporated into a finite-difference model for ground water flow. The model cannot be employed without sufficient, valid data.

TIC well-55 is an agricultural production well. Generally, these types of wells are constructed with a pea gravel pack. It is likely that pumping will induce vertical gradients along the gravel pack. The quality and accuracy of any data collected in this manner cannot be validated. Properly constructed monitoring wells must be employed for pump tests in order to validate the quality and accuracy of the data being collected.

The effectiveness of packer-isolated pumping to evaluate changes in contaminant concentrations with depth within an agricultural production well has not been demonstrated.

The information included in the appendices indicates the method is for field permeability tests in boreholes, and is not appropriate for cased wells. In addition, the tests described are of the pumping-in type, not the pumping-out type.

HYDROGEOLOGIC INVESTIGATION

Ground water flow is controlled by the stratigraphy. Thus, the first step which should be taken is to characterize the geology beneath the site. Information must be collected directly to identify the lithology and structural characteristics of the subsurface. A soil boring program should be initiated employing drilling and sampling methods that yield undisturbed samples for detailed examination and physical/chemical testing, and continuous samples to provide a precise record of the materials penetrated.

Continuous sampling is necessary to provide concise stratigraphic data. Once the stratigraphy is well defined, samples may be taken every five feet.

Continuous undisturbed samples should be collected using either:

(1) Shelby tube
(2) Pitcher core barrel
(3) Dennison core barrel

Characterization of the ground water system should begin with the installation of clusters of depth staggered, short screened interval monitoring wells (piezometers). The screen length should be five feet or less. The primary function of the short screen length is to measure ground water flow potential at a specific point within the aquifer. The short screen is influenced only by a small portion of the aquifer, thus providing accurate resolution of the flow potential at that point in the aquifer. Beyond approximately five feet in screen length, the amount of aquifer influencing the well is so great that resolution of flow potential is not acheivable, and the water level data represents an average flow potential of the aquifer. Inadequate resolution of flow potential will provide misleading water levels resulting in the incorrect identification of ground water flow direction.

Following the accurate determination of ground water flow direction and gradient, monitoring wells should be sited and properly installed. The placement of monitoring wells should be guided by the insights provided by the network of piezometer clusters. Other fundamental considerations are aquifer geometry and the nature of known or suspected contaminants.

To verify that the aquifer is a medium through which contamination could have been transported, then the preferred primary location for installation of monitoring wells is adjacent to and directly downgradient of the suspect VOC sources. It is important to stress first establishing the ground water flow direction by the installation of depth staggered, short screened interval monitoring wells (piezometers), since it is an essential factor in the proper siting and installation of the monitoring wells.

Formal multi-well pump tests may then be conducted to determine hydraulic conductivity of the aquifer(s). The analytical method for the pump tests should be selected on the basis of hydrogeology. The assumption of the analytical method should approximate or reflect the actual subsurface setting as closely as possible in order to obtain accurate data and aquifer parameters.

In addition, packer tests could be performed on boreholes.

The rate or velocity of ground water movement will have to be estimated. This requires the integration of the data from the pump tests and physical soil testing data.

Both background and contaminant level water quality will need to be characterized. To properly interpret sampling data from pumping wells, it will be necessary to estimate the geometry of the capture zone.

With an acceptable representation of the ground water flow system, the transport of contaminants through the system can then be modeled.

DRILLING METHODOLOGY

Direct mud rotary drilling can cause problems and is not generally recommended except as a last resort. The primary drawback to mud rotary drilling is that it introduces fluid (drilling mud) into the borehole and thus can cause cross contamination. However, there are steps which can be taken to minimize the problems.

It is strongly recommended not to use drilling mud solids which contain polymers. Ideally, pure non-beneficiated bentonite should be used for the solid fraction of the drilling muds. A sound drilling mud maintenance program should be instituted, keeping the mud weight below 9.5 pounds per gallon, Marsh funnel velocity viscosity below 45 seconds, and sand content below 5 percent by volume. These steps will help ensure that filtrate loss is minimized, formation damage is minimized, and that development of the well will repair what formation damage has occurred.

Where a well must penetrate a contaminated strata, the drilling methods should be modified to include the placing of conductor casing into a lower permeability layer below the zone of contamination.

A minimum 10 1/2 inch borehole is required for a four inch diameter monitoring well(4 1/2 inch outside diameter) to provide an annulus of no less than 3 inches.

2 inch diameter wells should be drilled using an auger of at least 6 inch inside diameter to provide a minimum annulus of 3 inches.

WELL DESIGN AND CONSTRUCTION

General Comments

It should be noted that regarding the selection of PVC for well materials, current information (Barcelona, 1985) indicates that for plastic casing and well screen materials, exposure to high levels of VOC's will promote sorption, and that subsequent low-level desorption could occur, biasing analytical results. Therefore, when site mitigation requirements make low levels (1 to 10 ppb) of these compounds a critical issue, stainless steel is recommended for casing and screening. Regulatory agencies presume that any contaminants detected in purged well samples represent contamination of the water in the aquifer and are not an artifact of well construction materials.

PVC may be used in combination with stainless steel provided the PVC is installed above the (projected) water table.

Construction specifications of wells should be better detailed, i.e. please indicate whether a dimension is inside or outside diameter.

Slotted PVC is not recommended for well screens. Generally, stainless steel wire wrapped screens are recommended.

The filter pack must be designed for the aquifer in which the well is to be installed. To correctly design a filter pack, it is first necessary to obtain representative samples of the aquifer materials, perform a sieve analysis on each sample, and construct a sieve analysis curve for each sample, etc. Then an appropriate screen slot size can be selected.

The filter pack should extend 1 1/2 to 2 feet above the well screen.

From three to five feet of bentonite should be placed directly on the filter pack. In dry conditions (above the water table) bentonite will be of a granular type of 8-20 mesh gradation. In wet or saturated conditions the bentonite will be in 1/4 inch pellets.

Hollow Stem Auger

During the installation of filter pack in hollow stem augered holes,the auger should be removed at two foot intervals, during and after the placement of sufficient material to fill two feet of borehole. The hole should be sounded at each two foot interval during this process. This process should be repeated until the entire filter pack is in place.

The remaining annulus will be grouted from the top of the bentonite seal to the ground surface. The grout will be pumped into the HSA; use of a tremie pipe is not required because the HSA acts as a tremie. The HSA will be filled with grout to the ground surface and then a section of HSA can be removed. This process is repeated until all HSAs have been removed.

Mud Rotary

For mud rotary applications, centralizers (casing guides) to aid in proper installation of the gravel and pack and sealing materials.

The filter pack material must be fed into the pipe at a slow enough rate to maintain a slurry of pack material and water. The position of the filter pack should be checked regularly by sounding. The distribution of the filter pack should be uniform around the well screen.

WELL DEVELOPMENT

Air development is considered to have too many drawbacks to be satisfactory for use in the investigation of hazardous waste sites. The compressors providing air for development are oil lubricated and invariably oil mist is incorporated in the air stream, contaminating the well.

Surging is the preferred method for well development. Vented rather than solid surge blocks should be used because they subject the well screen to less stress during development.

The U.S. EPA concluded that a well or piezometer producing water having a turbidity les than five nephelometric units (NTU) will provide a sample of acceptable quality. To avoid compromising the integrity or validity of ground water samples, it would prudent to develop all sampling installations to the point where they produce water that has a total sediment content of less than five ppm and a turbidity of less than five NTU.

MONITORING WELL SAMPLING

Bailers are generally considered unsuitable for well purging. They require very careful operation and sample handling precautions; field performance is open to question.

Positive displacement mechanical pumps are suitable for well purging. Sampling performance is very dependent on specific design and operational details.

Positive displacement bladder pumps are recommended. They are expected to provide both efficient averagewell purging and representative samples over a wide range of conditions with minimum difficulty in field operations.

QUALITY ASSURANCE/QUALITY CONTROL

The quality assurance/quality control is inadequate. Procedures must be fully detailed. For guidance, refer to the U.S. EPA's "Guidance on Remedial Investigation Under CERCLA", dated June of 1985.

Some basic guidelines are:

(1) Use stainless steel sampling devices.

(2) Apply teflon film and tape to samples in combination with other sealing devices as required by specific application.

(3) Dry ice is recommended but bag ice will suffice. The acceptable refrigerated temperature of the samples is 4 degrees Centigrade.

GENERAL COMMENTS

There is no health and safety plan included in the PIPOA. Protecting the health and safety of the investigative team, as well as the general public, is a major concern in hazardous waste site remedial investigations. For guidance, refer to the U.S. EPA's "Guidance on Remedial Investigation Under CERCLA", dated June 1985.

There is no community relations plan provided in the PIPOA. For guidance, refer to the U.S. EPA's "Community Relations in Superfund: a Handbook", dated Marah 1968.

PAGE SPECIFIC COMMENTS

1.1 Background

(1) Page 1-1: It appears that the most recent data on contamination concentrations was collected in June of 1987. Monitoring on a regular basis should be established to determine if the levels of contamination are increasing.

1.3.3 Structure of the Tustin Plain

(2) Page 1-4: Fife, 1974, mapped several faults, apparently Pliocene in age, extending northwest across the northeastern section of the base (Geology of the South Half of the El Toro Quadrangle, California Division of Mines and Geology Special Report 110).

1.3.4 Geology Specific to MCAS El Toro

(3) Page 1-5: The geology section should include a site specific geologic map.

It is evident that the data available on the stratigraphy is insufficient. A soil boring program is required to establish the subsurface geology.

One cross section is not sufficient. An adequate number of cross sections should be presented to depict significant geologic or structural trends and reflect geologic structural features in relation to local and regional ground water flow.

1.4.1.1 Ground Water Occurence and Movement

(4) Page 1-6: For an unconfined aquifer, transmissivity values for the main aquifer should be estimated by multiplying the specific capacities of wells by 1500, not 2000 (Driscoll, 1986).

1.4.2 Geohydrology of MCAS El Toro

(5) Page 1-7: It is very evident in this section that the geohydrology of MCAS El Toro in general is poorly understood.

(8) Page 2-7: The USGS Finite-Difference Model should be better clarified (abstract in appendices is not sufficient).

(9) Page 2-8: Using the irrigation well data as input parameters into the model is not valid.

2.2.7 Determination of Monitoring Well Depths

(10) Figure 2-3: The zone of influence should be asymmetric in shape, reflecting the affect of the regional gradient.

(11) Page 2-12: The results of the packer test at TIC-55 and the results of the cross-sectional modeling will not be considered adequate to define the hydrogeology.

(12) Page 2-13: The potential for contamination to leak through, from one aquifer to another, along a well gravel pack or a casing exists.