GRCC 86 Giant - Enforcement

HEALTH & ENVIRONMENT DEPARTMENT

STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISION

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includes short discussion of Ciniza Sand.

23 April 1986

Carl D. Shook
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

Dear Mr. Shook:

This letter is in regards to ground-water monitoring at the land treatment unit at the Ciniza Refinery. We outline here our understanding of: 1) the hydrogeology beneath the land treatment unit; 2) the ground-water monitoring requirements under the Hazardous Waste Management Regulations (HWMR-2) and Giant's systems installed to meet those requirements; 3) the definition of "Aquifer", and; 4) your options for ensuring that the ground-water monitoring system meets the intent of the regulations and is adequate for the land treatment demonstration.

Within 30 calendar days of receipt of this letter, you must choose one of the four options presented in this letter, and must submit to us a plan and schedule for implementing the required additional monitoring. If you do not do so, we will initiate formal enforcement action.

Attached is the Comprehensive Monitoring Evaluation (CME) report that was prepared subsequent to our inspection at your facility on February 12-13, 1985. The attachments to that report are not included, because they consist of documents that either were submitted by yourself, or that have been provided to you previously.

Hydrogeology

Our present conception of the hydrogeology under the facility is based on the CME, on reports by Dames and Moore and by GeoScience, on the literature, and on discussions with Dave Boyer and Jami Bailey of the Oil Conservation Division, as well as the letter from OCD which was sent to you on April 5, 1986.

It appears that at least four thin lenses of sand/sandstone are embedded within the Chinle shale between the surface and the top of the Sonsela sandstone. The upper two sands are dry. The third sand outcrops under the refinery ponds south of the land treatment unit, and water from these ponds is probably the source of water within within

the third sand. Wells SMW-1, SMW-2, and SMW-3 ("upgradient" wells) are all completed in this third sand. The fourth sand apparently joins the Sonsela southeast of the land treatment unit, and water in this unit is most likely derived from the Sonsela. There is no evidence that the fourth sand outcrops into any of the refinery surface impoundments. Wells SMW-4, SMW-5 and SMW-6 ("downgradient" wells) are completed in the fourth sand.

The four sands appear to be limited in extent: the third sand probably does not extend as far as the northern boundary of the land treatment unit. The fourth sand, however, probably does extend across the entire length of the land treatment unit. It appears that no hydrologic connection exists between the third and fourth sands.

Except for capillary fringes around the third and fourth sands, the Chinle has a very low soil moisture content for several tens of feet beneath the surface. Immediately above the Sonsela Sandstone, however, the Chinle is saturated and will yield water to wells at a rate of approximately 0.5 gpm.

The Sonsela is the first (uppermost) unit in the area which is noted in the literature as an aquifer. Although not a high-quality aquifer (relatively high TDS and relatively low yield) it is used in the area for livestock watering and irrigation. The Sonsela is under artesian pressure and may be the source of water in the Chinle immediately above.

Wells MW-1, MW-2, and MW-4 are completed in the Sonsela. MW-3 was also to have been completed in the Sonsela, and well logs indicate that it was. As explained in the CME, however, it is EID's opinion that MW-3 is not screened across the Sonsela; most likely it is screened in the Chinle shale above the Sonsela. This conclusion is based on the water level of MW-3 relative to the other MW wells, the recharge rate of MW-3, and the fluoride concentrations of water samples from MW-3, which differ significantly from fluoride concentrations in the other MW wells.

Beneath the Sonsela sandstone lie several hundred more feet of Chinle shale. Beneath the Chinle is the San Andres-Glorieta sandstone aquifer, a high-quality, high-yield aquifer which is the primary source of drinking water in the area.

Ground-Water Monitoring Requirements and Systems

In accordance with EPA requirements, notification of the land treatment area as a hazardous waste treatment unit and submittal of a Part A application was done within the allowed timeframes. This conferred Interim Status upon the land treatment unit, and it became subject to regulations under 40 CFR 265, Subpart F. These regulations require a minimum of one upgradient and three downgradient wells, completed within the uppermost aquifer beneath the unit, and capable of immediately detecting any migration of hazardous wastes from the unit into the ground water. Detection of contaminants is to be accomplished by comparing the values for indicator parameters in the downgradient wells against the background value for those parameters. The background value is determined from quarterly samples taken from the upgradient well during the first year of monitoring. When New Mexico adopted the Hazardous Waste Management Regulations, the unit also became subject to equivalent requirements under Section 206.C.1 of HWMR.

Dames and Moore was hired to study the hydrogeology of the area, and then to install monitoring wells around the land treatment area. The MW wells were completed by November 1981, also within the timeframe allowed under EPA's regulations. Samples were taken and analyzed in accordance with the regulations.

Review of the MW system led EPA to dispute whether the intent of the regulations had actually been met. EPA contended that the saturated zone of the Chinle above the Sonsela was the uppermost aquifer, and that it was the formation in which the monitoring system should be installed. Giant countered that the Chinle shale did not meet any normal definition of "aquifer". Because the State received Final Authorization to implement the RCRA program in January 1985, EPA referred the matter to the State.

The Hazardous and Solid Waste Amendments of 1984 required that all hazardous waste facilities subject to ground-water monitoring certify that their monitoring was in compliance with the regulations by November 8, 1985. If they did not so certify, the facility would lose Interim Status and would be required to close.

In September 1985, the SMW wells were installed and sampled in accordance with Section 206.C.1 requirements. According to information provided to Ann Claassen by Geoscience (Alberto Guiterrez) over the phone, these wells were installed so that Giant could unquestionably certify compliance on November 8. It was Geoscience's belief that the SMW wells had been installed in the very uppermost water-yielding unit beneath the facility. After November 8, 1985, Ms. Claassen was told by Geoscience (Jim Hunter) that the certification was based on the MW wells, and that the SMW wells were simply an additional "early detection" system.

Unfortunately, it now appears that neither the MW nor the SMW series is adequate to meet the minimum requirements of 206.C.1. Because MW-3 is not completed within the Sonsela, the MW series is short of the "three downgradient" minimum requirement. The upgradient and the downgradient SMW wells are completed in two different sands which are charged by very different sources of water. This system can not, therefore, be utilized to compare downgradient to upgradient water quality as required by the regulations.

MW5 installed

Definition of Aquifer

We understand Giant's position to be thus: the Sonsela is the uppermost aquifer and is therefore the unit which must be monitored under 206.C.1. Although there are units above the Sonsela which are saturated and which yield water to wells, these units are not "aquifers". You point to the definition of an aquifer as a formation which yields <u>significant</u> quantities of water to wells, and contend that the yields of units above the Sonsela are not "significant", primarily because they do not produce enough water to support a four-person household. It is in fact unlikely that these units would be developed for any kind of water use.

Rather than discussing the meaning of aquifer, we would like to discuss the intent of the ground-water monitoring regulations. A basic premise of the Hazardous Waste Program is that hazardous waste units should be designed and managed so

that there is no escape of hazardous waste constituents from the unit. It therefore is desirable to have a system which detects contaminant migration as soon as possible. EPA directed monitoring within the uppermost aquifer not because they thought the uppermost aquifer was the water most likely to be utilized, but because they wanted the earliest possible signal that the unit was leaking contaminants to ground water.

It appears that the regulation writers had little appreciation for the typical depth to water in the West (not to mention for vadose-zone monitoring). But as EPA has become aware of the vast amount of contamination that can occur between the surface and the uppermost drinking-water source, they have tended to interpret "aquifer" in a manner which best meets the original intent of the ground-water monitoring regulations. I believe that EPA will eventually come out with a very clear policy which considers any water-bearing formation to be an aquifer for purposes of applying the RCRA regulations, and they will expect the States to adhere to that definition.

If we understand Giant's position correctly, the definition of aquifer is an important issue because of the effect it willl have on potential need for clean-up, should contaminants migrate out of the land treatment unit. For example, if contaminants were detected in the third sand, then Giant would be required to restore water in that sand, even though the water would never be used for anything. You should be aware that, under the no-migration philosophy of RCRA, any contamination -- soil and water -- would have to be cleaned up. Clean-up requirements are not contingent on whether the aquifer is used for drinking or other purposes, but simply on the fact that the contamination exists. If the Sonsela were deemed the uppermost aquifer, and contamination from the land treatment unit were detected in it, then Giant would be faced with clean-up of all soil and water beween the land treatment unit and the Sonsela, as well as the Sonsela itself. It therefore clearly is to your advantage to monitor a unit above the Sonsela.

Giant's Options for Compliance

The situation at the Ciniza Refinery is clearly quite complex. In the strictest application of the regulations, it appears that there was not in fact a fully-compliant ground-water monitoring system in place on November 8, 1985, and therefore that the facility should lose Interim Status, the land treatment unit be closed, and all future hazardous wastes shipped off-site. (Any such action would be taken by EPA, since the 1984 Amendments have not yet been incorporated into New Mexico law and regulation.) New Mexico 's position is that such action would not be appropriate, if Giant is willing to undertake one of the options given in this section. Our reasons include:

i) Since the inception of the RCRA program, the Ciniza Refinery owner (formerly Shell Oil and now Giant) has acted in good faith to comply with the regulations. Much money and effort has been expended to define the hydrogeology and to implement an acceptable ground-water monitoring program. The refinery was in fact the only facility in New Mexico which had wells in place by the November 1981 deadline. The fact that there is not presently a system which precisely meets the regulatory requirements in no

way appears to reflect any intentional effort to circumvent the regulations, but simply reflects the complexity of the hydrogeology combined with some errors by contractors.

ii) There is no evidence that any hazardous waste constituents have migrated out of the land treatment unit. The Chinle clay/shale provides an excellent natural barrier to migration of wastes. Additionally,the isolated location of the refinery means that were a release of contaminants to occur, there would be a good cushion of time in which to remediate the situation before any population was threatened.

iii) The Loss of Interim Status provision of the 1984 Amendments grew out of Congress's frustration that, four years into the RCRA program, many facilities had not installed ground-water monitoring systems and many facilities were contaminating the ground water. In light of the above two comments, we do not believe that it was Congress's intent to close down a facility such as Ciniza.

In order to bring Giant's ground-water monitoring program into complete compliance with the regulations, we are requesting that you implement one of the following options:

1. Another well in the Sonsela, with supplemental "early detection" monitoring.

As explained in the definition of "aquifer" section, we do not think it is to Giant's advantage to utilize the Sonsela as the uppermost aquifer. However, if you still wish to insist on the point, then the EID is willing to accept the MW series as the official ground-water monitoring system under the following conditions:

a. A new well must be installed near the location of MW-3 and must be completed within the Sonsela. After development of the new well, samples must be taken from it and from MW-1, MW-2 and MW-4. The samples must be analyzed for all parameters required under 206.C.1c.(2). If the analytical values for the new well fall within the range of values for the other wells, then the new well can simply be incorporated into the ongoing semi-annual sampling program. If the results indicate that the new well has a different water quality from the other MW wells, further investigations will be necessary to determine the reason for the difference.

b. In addition to semi-annual monitoring of the MW series, Giant should monitor SMW-4, SMW-5, SMW-6, OW-4 and OW-24 for pH, conductivity, TOC, TOX, lead and chromium. (Instead of TOC and TOX, we would accept purgeable screens by GC/MS.) The results of these samples would not be compared against some upgradient background level, but would simply be compared against previous samples from the same well. If any of parameters appear to increasing over time (or decreasing, in the case of pH) within a given well, this would signal the need to control releases from the land treatment unit, before contamination reaches the Sonsela.

2. Upgradient wells in the fourth sand, with backup monitoring in the Sonsela.

As explained under the section on hydrogeology, the problem with the SMW series is that the "upgradient" wells are completed in the third sand, while the "downgradient" wells are completed in the fourth sand. While the third sand may be the very uppermost occurence of saturation, use of the third sand for a monitoring system is inappropriate for two reasons. First, it is not clear that the third sand extends far enough that downgradient wells could be installed that were also outside of the land treatment unit. Second, because the third sand outcrops into refinery effluent ponds, it is impossible to site upgradient wells that are not affected by the facility. A RCRA monitoring system compares downgradient to upgradient quality, and thus theoretically would detect the impact of the land treatment unit separate from the effect of the ponds. But we are concerned that the high levels of contaminants in the third sand (due to the effluent pond) would mask any increase that was contributed from the land treatment unit.

Therefore, the uppermost saturated zone which is suitable for a monitoring system is the fourth sand. If Giant chooses this option, at least one upgradient well must be installed that is completed in the fourth sand. This well (or wells) must be sampled and analyzed as required under 206.C.1.c.(2) for a full year of quarterly samples (this would include replicate analyses of pH, conductivity, TOC, and TOX). Samples from this(these) well(s) will provide the data to establish the background water quality against which subsequent semi-annual samples will be compared.

Because of the complex network of thin sands beneath the land treatment area, there is some concern that contaminants might migrate along a preferential path that would escape detection by a monitoring system in the fourth sand. Therefore, under this option, Giant must also continue to monitor the existing MW wells.

3. Wells in the Chinle, with supplemental "early detection" monitoring.

The potential danger with option 2 is that more shallow wells might simply reveal more complexities and still leave us questioning whether upgradient and downgradient wells have been completed in a single, continuous unit. Installation of wells into the saturated portion of the Chinle shale, right above the Sonsela, would provide monitoring of a continuous system, and would also provide earlier warning of ground-water contamination than would the MW series.

If Giant chooses this option, at least one upgradient and three downgradient wells must be installed and completed within the saturated portion of the Chinle Shale immediately above the Sonsela aquifer. A full year of quarterly monitoring in accordance with 206.C.1.c.(2) must be conducted for all the new wells, and then a program of semi-annual monitoring in accordance with 201.C.1.c.(3), (4) and (5) until a Part B permit is issued.

Also under this option, Giant must monitor SMW and OW wells exactly as specified under part "b." of option 1.

4. Giant's proposal.

Because of the complexity of the situation at Giant, there may be other acceptable alternatives. EID is willing to entertain Giant's proposal of an option different from the above three if the proposal is clear, detailed, in compliance with the regulations, and addresses all of our concerns as expressed in this letter. If Giant does submit such a proposal, and EID finds it unacceptable, we will notify you of such. Within 15 days of such notification, Giant must submit a plan in conformance with one of the three above options.

In order to respond to this letter, please send us a letter that states which option you are choosing. Attached to the letter should be a plan for implementing the option that includes: siting, construction, and completion specifications for new wells; a sampling and analysis plan for the entire monitoring system; a revised ground-water assessment plan outline; and a schedule for the implementation plan. Your response is due 30 calender days after receipt of this letter. If you have any questions, please contact us at 827-2929.

Sincerely,

Peter H. Pache
Program Manager
Hazardous Waste Section

PP:AC:ac

cc: Ernest Rebuck, GW/HW Bureau Chief
Dave Boyer, Oil Conservation Division
Carlos Castillo, EPA Region VI
Alberto Guiterrez, Geoscience