

PPC 9551.1991(05)

NO-MIGRATION PETITION FOR KERR-MCGEE REFINING, OK

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

FEB -5 1991

Mr. Gregg L. Lorimor  
Refinery Manager  
Kerr-McGee Refining Company  
P.O. Box 305  
Wynnewood, Oklahoma 73098

Re: No-Migration Petition submitted for Kerr-McGee Refining Company's  
Wynnewood, Oklahoma Land Treatment Facility (F-91-NWOP-FFFFF)

Dear Mr. Lorimor:

I am writing in regard to your June 22, 1990 "no-migration" petition which requests a variance under 40 CFR §268.6 to allow Kerr-McGee Refining Company (IMC) to continue the land treatment of restricted wastes at KKRC's Wynnewood, Oklahoma land treatment facility (LTF). After a careful review of your petition, we have concluded that your facility does not meet the standard for a nomigration variance. Therefore, we will recommend to the Assistant Administrator for Solid Waste and Emergency Response that the petition be denied.

Our decision to recommend denial of the petition is based on the following concerns:

- Soil-pore monitoring indicates that hazardous constituents have already migrated beyond the unit boundary;
- The ground-water monitoring system is inadequate for the purpose of a no-migration variance, because it will be unable to detect constituent migration at the earliest time practicable; and,
- The required minimum separation between the bottom of the treatment unit and the top of the seasonally high water table has not been demonstrated.

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We discuss our concerns below.

#### Presence of Hazardous Constituents Below the Treatment Zone (BTZ)

Soil-pore liquids monitoring data collected from the active LTF and from the land treatment demonstration (LTD) plot indicate that constituents have already migrated beyond the unit boundary at hazardous concentrations. As shown in Attachment 1, soil-pore monitoring data collected during the LTD (November, 1988 - February, 1989) indicate that antimony, arsenic, barium, benzene, and 2,4-dimethylphenol were detected at concentrations in excess of their respective health-based levels. Additionally, as shown by Attachment 2, soil-pore monitoring data collected from the LTF between December 8, 1983 and November 12, 1986 indicate that lead has migrated beyond the unit boundary at hazardous concentrations above the health-based level (0.05 mg/l). We, therefore, conclude that the presence of these constituents in the soil-core liquids clearly demonstrates that these contaminants have already migrated below the LTF at hazardous concentrations.

#### Ground-Water Monitoring Data and Detecting Releases at the Earliest Time Practicable

As shown by Attachment 3, benzene was detected in shallow well LMW-5-0 at concentrations exceeding the health-based level of 0.005 mg/l during four ground-water sampling events between February and November, 1989. KMRC claims that the benzene detected in this well was attributable to a soil-core sampling event in January, 1989, when LTD soil-core samples were augered through nine inches of standing water (precipitation). KKRC states that this enabled water to run down the boreholes, carrying hazardous constituents to a depth of at least 5.5 feet below the surface. However, IMC has failed to prove conclusively that the soil-core sampling event is directly related to the presence of benzene in shallow well LMW-5-0. For example, the benzene levels found in the sampling events have fluctuated (0.310 mg/l in February, 1989; 0.130 mg/l in May, 1989; 0.240 mg/l in August, 1989; and, 0.130 mg/l in November, 1989). If the soil-core sampling event was directly related to the presence of benzene in the shallow well, it would stand to reason that the benzene concentrations would have peaked, then tapered off. However, since the benzene concentration has fluctuated, we have concluded that the operations at the LTF are contributing to the to the presence of benzene in shallow well LMW-5-0.

Additionally we believe that KMRC has failed to meet the requirements of 40 CFR §268.6(a)(4). Specifically, KMRC has not demonstrated that the ground-water monitoring system at the LTF is capable of detecting (and differentiating) releases at the earliest extent practicable.

KMRC's current ground-water monitoring system consists of seven pairs of wells, each pair consisting of a shallow well (indicated by a "-0" suffix) and a deep well. Free hydrocarbon products were detected in the ground water at LWM-1 during the first sampling event on November 17, 1981 (LMW-6 replaced LMW-1 in 1984). According to KMRC, this was the first indication of the existence of a liquid hydrocarbon plume on the refinery property. Ground-water monitoring between November 1988 and November 1989 at deep wells LMW-2, LMW-4, LMW-5, LMW-6, and RW-2 indicated the presence of benzene above health-based levels, which KMRC attributed to impacts from the hydrocarbon plume.

We believe that the locations of the monitoring wells are generally adequate, provided that the local ground-water flow pattern will not change in the future. However, given the proposed free oil recovery and ground-water remediation to be carried out in the next few years by KMRC, the local hydrogeologic regime may be drastically altered because of the hydraulic drawdown (to remove free products) in the currently upgradient processing area. In response to the planned remediation activities, some of the upgradient wells may become temporarily downgradient (e.g., RW-2 and RW-2-0) to those wells that are currently downgradient.

Lastly, the ramifications of the contamination resulting from the underlying hydrocarbon plume in regard to ground-water monitoring of the LTF are unclear. KMRC has not provided detailed analytical results that describe the extent of the known contamination beneath the LTF and KMRC is relying on the shallow wells to differentiate between releases from the LTF and the underlying hydrocarbon plume. Shallow well LMW-5-0, however, is already contaminated with benzene. We, therefore, believe that KMRC will be unable to differentiate between the two releases and therefore, conclude that the ground-water monitoring system will not be able to detect constituent releases at the earliest extent practicable.

#### Maintaining Minimum Separation

Federal regulations require that the depth-to-ground water at land treatment facilities be no less than three feet from the bottom of the treatment zone to the seasonal high water table (see 40 CFR 264.271(c)(2)). Based on the discussion below, we have concluded that KMRC has not demonstrated that the required minimum separation of three feet between the bottom of the treatment unit and the top of the seasonally high water table is consistently maintained.

KMRC stated that during the LTD in 1988-89, the water table beneath the LTF averaged from 9.2 to 11.9 feet, with seasonal fluctuations ranging from 1.22

to 1.82 feet. Given this range, the water table can rise to 7.38 feet of the surface, or 2.88 feet below the treatment zone. Historically, however, the water table at the LTF has shown much more fluctuation than observed during the LTD. In June, 1985, a depth of 4.92 feet was recorded at well RW-1, and in March, 1987, depths of 5.03, 5.82, and 6.01 feet were recorded at LMW-3, LMW-6, and LMW-2, respectively (Part B Permit Application, pages E-38 to E-41). These data indicate that fluctuations ranging from 0.42 to 1.51 feet of separation between the treatment zone (4.5 feet deep) and the water table have occurred, showing that the required three foot separation is not maintained.

### Incomplete Petition

Finally, our review indicates that the petition is incomplete and that information and clarification in areas beyond those highlighted above would be needed to complete the petition. However, because of the problems discussed above, we believe we have sufficient information at this time to move toward a denial of your petition.

It is our practice to give petitioners the option of withdrawing their petitions to avoid a negative publication in the Federal Register. If you prefer this option, you must send us a letter withdrawing your petition and acknowledging that the petitioned wastes are still considered to be restricted wastes subject to the Third Third Land Disposal prohibitions. This letter should be forwarded to the following address within two weeks of the date of receipt of today's correspondence:

Patricia Cohn, Acting Chief  
Assistance Branch (OS-343)  
U.S. Environmental Protection Agency  
401 M Street, S.W.  
Washington, D.C. 20460

If you choose not to withdraw your petition, we will recommend that a proposed denial decision be published in the Federal Register.

Any questions regarding our findings may be submitted in writing to Mr. James Michael of my staff.

Sincerely,

Jeffery D. Denit, Deputy Director  
Office of Solid Waste

Attachments

cc: Bill Gallagher, Region VI  
Fenton Rood, OSDH  
Patricia Cohn, PSPD, OSW  
James Michael, PSPD, OSW  
bcc: Terry Keidan, AB, PSPD, OSW  
Jeffrey Gaines, AB, PSPD, OSW  
Dave Reeves, AB, PSPD, OSW  
Richard Kinch, WMD, OSW  
Kathy Stein, OE  
Nikki Roy, WMD, OSW  
Howard Finkel, ICF Incorporated

ATTACHMENT 1

Summary of Soil-Pore Liquids Monitoring Data  
 For Constituents Detected Above Health-Based Levels (mg/l)

(Data from LTD Final Report, Appendix C)

Constituents	Sampling Dates	Lysimeter Numbers	Concentrations	Health-Based Levels
Antimony 1/	11/88	3	0.036	0.01
Arsenic 1/	11/88	3	0.06	0.05
Barium 1/	11/88	3	1.7	1.0
Benzene	11/88	2	1.3	0.005
		3	2.3	
	01/89	3	2.1	
		4	0.014	
	02/89	2	1.5	
		4	0.32	
		bkgrnd	0.011	
	04/89	2	2.6	
		4	0.36	
	07/89	1	0.71	
	4	0.42		
08/89	4	0.43		
2,4-Dimethyl Phenol	11/88	2	0.044	0.02
	04/89	2	0.029	

1/ Analyses for inorganics only performed on 11/88 samples due to limited volume of soil-pore liquids collected during subsequent sampling events.

ATTACHMENT 2

Summary of Soil-Pore Liquids Monitoring Data  
 For Constituents Detected Above Health-Based Levels (mg/l)

Data from LTF, Recon. Report, Table 3-4)

Constituents	Sampling Dates	Lysimeter Numbers	Concentrations	Health-Based Levels
Chromium	06/05/84	1 (bkgrnd)	0.2	0.05
	2	0.05		
	3	0.16		
	4	0.05		
	06/12/85	2	0.08	
	05/16/86	2	0.07	
	5	0.05		
Lead	12/08/83	2	0.19	0.05
	4	0.18		
	5	0.14		
	05/16/86	1 (bkgrnd)	0.29	
	2	0.45		
	3	0.5		
	4	0.37		
	5	0.4		
	11/12/86	1 (bkgrnd)	0.06	
	3	0.05		
4	0.09			

ATTACHMENT 3

Summary of Ground-Water Monitoring Data For Benzene Found  
at Concentrations Above the Health-Based Level a

Concentration (mg/l)

Downgradient Wells

Date	LMW-3	LMW-3-0	LMW-4	LMW-4-0	LMW-5	LMW-5-0	RW-1	RW-1-0
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Nov., 1988	LD <sub>b</sub>	LD	0.049	LS <sub>c</sub>	0.056	LD	LD	LD
Feb., 1989	LD	LD	0.033	LD	0.036	0.310	LS	LD
May, 1989	LS	LD	0.0073	LD	0.064	0.130	LS	LD
Aug., 1989	LD	LD	LS	LD	0.023	0.240	LS	LD
Nov., 1989	LD	LD	0.018	LD	0.140	0.130	LD	LD

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Upgradient Wells

Date	LMW-2	LMW-2-0	LWM-6	LWM-6-0	RW-2	RW-2-0
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Nov., 1988	0.034	LD	0.049	LD	0.500	LD
Feb., 1989	0.0047	LD	0.022	LD	0.150	LS
May, 1989	0.0061	LD	0.023	LD	0.180	LD
Aug., 1989	LD	LD	0.025	LD	0.220	-d
Nov., 1989	LD	LD	0.017	LD	0.190	LD

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Footnote:

- a. The current health based level for benzene is 0.005 mg/L.
- b. "LD" means a concentration lower than the detection limit.
- c. "LS" means a concentration greater than the detection limit but less than the drinking water standard.
- d. "-" means data was not available.