

ARKANSAS DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY

MEMORANDUM

TO : Harry Elliott, Enforcement Coordinator, SWD
THRU : Bruce Kirkpatrick, Manager, State Permits Branch
FROM : Gerald Delavan, Senior Geologist, Water Division
SUBJECT : Multi-Media Inspection El Dorado Chemical Corp.
DATE : March 29, 1994

On March 29, 1994, at the request of Harry Elliott, coordinator for this multi-media inspection, I conducted an inspection of El Dorado Chemical (EDC) Corporation's El Dorado facility. The purpose of this inspection was to evaluate the status of active water permits and perform a site inspection of existing holding ponds at this facility. In addition, an attempt was made to determine if there are problems with groundwater contamination in and around these holding basins.

I arrived on site at approximately 12:50 pm accompanied by John Lamb, ADPC&E Water Inspector, from the El Dorado field office. We were met by Glenn Dively, Environmental Manager for the facility. Mr. Dively proceeded to show us Lake Lee, State Water Permit 177-W, issued in 1960 and Lake Killdeer, for which there is no permit. Each of these ponds are used as a equalization, pH adjustment, and storage for nitrate/sulfate contaminated plant runoff and process water. Lake Lee was constructed in the early 1960's and covers one acre, while Lake Killdeer, constructed in the mid-70's covers approximately 50 to 60 acres.

EDC was unable to locate any construction plans, specifications or diagrams for either pond. Therefore, it is unknown whether or not the ponds were lined during construction. A close inspection of both ponds did indicate no synthetic liners were employed to prevent leakage. A review of EDC files and ADPC&E files turned up several significant pieces of information regarding these ponds. EDC correspondence files showed problems with excessive high levels of nitrogen entering Lake Killdeer as early as March of 1978. Ongoing discussions in EDC files indicated nitrogen build-up had been proceeding unabated for several years. EDC was concerned about groundwater contamination from Lake Killdeer and indicated it was a potential serious problem. Efforts were made by EDC to reduce the amount of nitrogen being discharged to Lake Killdeer in response to this problem. Monitor wells were installed sometime in 1980 or 1981 in and around Lake Killdeer. Monitoring of those wells began 1981.

Lake Lee was the first pond constructed, presumably in the late 50's and/or early 60's based on the state water permit issued in May, 1960, for a nitrate recovery system. Lake Lee must have been used early on for actual recovery of excess nitrates captured by the pond via storm water and process water runoff. In 1981, a Ground Water Study was performed by McClelland Engineers, Inc. The results of this study confirmed Lake Lee was leaking considerably. However, in its wisdom McClelland stated, because only the upper water bearing units were adversely impacted and because the deeper "aquifers" appeared to be unaffected (Sparta), no action should be taken by EDC, in regards to ongoing releases from Lake Lee. McClelland Engineers also indicated there was a significant potential impact from nitrate/sulfate contaminated groundwater discharging into surface water bodies offsite.

A second study on Lake Lee was performed by McClelland Engineers, in 1985, as part of EDC's RCRA Part B application. This report found Lake Lee was leaking based on samples taken from three monitor wells adjacent to the pond. Wells were monitored semi-annually. Results of sampling were not forwarded to the ADPC&E. If they had been problems with nitrate/nitrogen contamination at this site could have been addressed much earlier by the Department. EDC supplied me with monitor well data for both ponds going back to 1981 to present. These ponds are sampled for nitrate, ammonia, sulfates and pH. The sampling results indicate groundwater contamination has occurred in and around both ponds.

Monitor well samples taken from 1985 to 1994 show Lake Lee has levels of nitrate contamination from 2 to 37 ppm. Oddly, the upgradient well has the highest nitrate value 50% of the time. Earlier reported nitrate levels were 2 to 22 ppm for the reporting period of 1981 to 1994. Sulfate levels around Lake Lee range from 45 ppm to 1460 ppm for the same reporting interval. Primary Drinking Water Standards (groundwater standards) are 10 ppm for nitrates and 250 ppm for sulfates.

Monitor well data from Lake Killdeer also indicates significant groundwater contamination has occurred throughout the period of operation for this pond. In 1981, levels of sulfate and nitrate concentration were zero to less than 1 ppm. As the years progressed so did contaminate levels. In 1983, nitrates were 8.0 ppm and sulfates 398 ppm. From 1983 to present nitrate levels in some monitor wells had increased to 192 ppm. Sulfate levels over the same time period increased to 450 ppm in specific wells. Once again, some of the highest levels for sulfates were observed in the upgradient well adjacent to Lake Killdeer. Highest nitrate levels were primarily confined to down gradient wells K-3 and K-4 at Lake Killdeer.

The rise in nitrate/sulfate levels for both Lake Lee and Lake Killdeer were not straight line increases. Some wells showed high levels of sulfate or nitrate contamination at one sampling event and lower values at the next sample event. This may be due to the highly mobile nature of nitrates in groundwater or be due to

flushing after a rain events. What the data does show is a trend towards ever increasing levels of both nitrate and sulfate contamination in the shallow groundwater in and around these holding ponds. These ponds sit on the Cockfield Formation. the Cockfield in Union County has historically been used for domestic and rural water supplies.

The EPA definition of an aquifer is a water bearing strata which has been used as an underground source of drinking water in the past, is being used at the present or may be used in the future. Therefore, it is apparent that EDC as early as 1981 knew the ponds were leaking significantly. This pond leakage continues today and adversely impacts shallow groundwater supplies locally and may in fact be adversely impacting surface water supplies offsite by discharging nitrates to groundwater and ultimately to surface water.

Based on the aforementioned information regarding these ponds, State Permits staff recommend the following actions be taken by EDC:

1. It is apparent both Lake Lee and Killdeer have significant leakage and are adversely impacting shallow groundwater. Consequently, the Department cannot permit these ponds as currently constructed. EDC must submit to the Department, plans and options for correcting these pond leakage problems. This may include retrofitting the existing ponds, closing out those ponds, going to above ground storage or may require presenting some other options not mentioned here. As it stands now, EDC is in violation of Act 472, the State Air and Water Pollution Control Act.
2. EDC must perform a site/facility wide assessment to determine the lateral and vertical extent of nitrate, sulfate and/or other groundwater contamination in and around the EDC facility. This not only includes the ponds but, a site characterization of the entire facility. This is in response to contamination found in the upgradient monitor wells around both ponds.
3. Locate all other sources and potential sources of groundwater contamination at the EDC facility. This may include acid neutralization pits, neutralization drainage ditches, areas of significant nitrate/sulfate loss, such as loading areas etc. Submit plans and specifications for eliminating or reducing groundwater contamination at these locations.
4. Submit a groundwater remediation strategy to address groundwater contamination at this facility. This strategy could include a risk assessment determination. This would allow the agency to evaluate the potential impact of both leaking ponds and groundwater contamination in and around the EDC facility as well as offsite.