

ARKANSAS DEPARTMENT OF POLLUTION CONTROL & ECOLOGY

MEMORANDUM

TO : Gerald Delavan, Senior Geologist, Water Division

FROM : Tammie J. Hynum, Toxicologist, Haz. Waste Division ~~TH~~

DATE : April 6, 1998

SUBJECT : "Development of Risk-Based Target Monitoring Levels" for El Dorado Chemical Company, El Dorado, Arkansas

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This memorandum is in response to your written request dated March 26, 1998 for technical assistance in reviewing the subject report for El Dorado Chemical Company (EDC). This memorandum will attempt to answer the questions posed in your request and provide a list of concerns based on a review of the report.

"According to section (h), because MCLs for the constituents of concern (nitrates, sulfates, lead, zinc) have already been established under the SDWA, EDC does not have an option of developing alternate groundwater protection standards (GWPS) as stated in section (i)." I agree with the statement EDC does not have the option of developing alternate GWPS according to Regulation 22, Section 1205 (i). What EDC can do is follow 1205 (h)(3), which states for constituents for which the background level is higher than the MCL identified under subparagraph (h)(1) of this section, the background concentration can become the GWPS. However, "background" as used in 1205 (h)(3) must be established appropriately and effectively. In discussing this issue of "background" with several co-workers, it has been determined compliance with this subparagraph would indicate EDC has adequately placed their wells and conducted quarterly sampling for a 12 month period. Based on validation and review of this data, a true representative background number for said constituent could be established.

"EDC used section (i) and the EPA protocols listed therein to develop the risk assessment." The report does discuss development of an alternative groundwater protection standard. However, it is mentioned several times throughout the report EDC opted to use the MCL for nitrate in establishing their Target Monitoring Level (TML).

"Have they utilized the proper section of Regulation 22 for implementation of the RA and have they generated the RA by considering all the necessary factors referenced in Regulation 22, 1207(c)?" The section of the CAO provided mandated EDC undertake a monitoring program designed to assess the groundwater quality for the constituents nitrates, sulfates, lead, and chromium in several impacted areas onsite. EDC was to submit a groundwater monitoring work plan describing said monitoring plan. In the event the results of the monitoring plan demonstrate a release of constituents to the groundwater which exceed background, EDC was to establish GWPS pursuant to Section 1205(h) or (i) of Regulation 22. Then, if indicated, EDC shall undertake an Assessment of Corrective Measures, Selection of Remedy and Implementation of the Corrective Action Program (Section 1206, 1207, and 1208). If my understanding of the CAO is correct, EDC is following the phased approach discussed in the CAO. They have attempted to establish GWPS and the next step would be, if indicated, to move into the areas defined in 1206, etc. In reviewing this subject report, it seems EDC is justifying a continuing groundwater monitoring program in lieu of corrective measures.

"Is the RA itself properly prepared and presented? Do the conclusions match the known groundwater data?" The risk assessment report may be prepared according to the approved plan (October 1996) referenced in the introduction. However, the approved plan, which I have not seen or reviewed, may not conform to the typical risk assessment standards the HWD follows. Regulation 22 requires the GWPS be determined for Appendix II constituents unless approval is given. Nitrates were the only constituent assessed. The CAO at least suggested nitrates, sulfates, lead, and chromium. Again, the approved plan may allow for nitrates only being evaluated, but this is an unknown at this time to me. It is impossible to answer whether the conclusions match the known groundwater data because the complete data package was not submitted as part of this report.

The following bullet points outline the concerns based on the review of this report (note: this review is based on typical risk assessment standards followed by the HWD):

Executive Summary

- ▶ Page ES-1, third paragraph: Risk assessment like procedures were utilized in this report, but the report discusses the results of the TML established for nitrates. This paragraph indicates this approach was presented in a workplan subsequently approved by ADPC&E on October 31, 1996. This is not the typical risk assessment standard the HWD would accept in evaluating a site.

- ▶ Page ES-1, fourth paragraph: The receptor population is limited in scope (i.e., only addresses off site child and adult resident).
- ▶ Page ES-1, fifth paragraph: Nitrate is the only COC evaluated. The CAO required an assessment of at least nitrates, sulfates, lead, and chromium. Regulation No. 22 requires GWPS be established for Appendix II constituents.
- ▶ Page ES-2, Ecological Evaluation: This section is limited in scope. The "site evaluation" referenced for Lake Kildeer and the small unnamed creek is not included in the report. The last sentence does not account for possible surface water contamination below the point of outfall 001. The CAO requires Lake Lee, Lake Kildeer, plant drainage system, nitric acid concentration area, and all product loading and unloading areas to be evaluated for potential impact from the process wastewater treatment system. These other areas are not discussed in the body of this report.
- ▶ Page ES-3, last paragraph: The TML was established for the onsite monitoring wells where the nitrate concentration in said wells would be below the MCL at the defined receptor location. The defined receptor used in establishing the TML is offsite. The TML does not account for exposure to an onsite receptor. It seems EDC calculated a TML for as a "not to exceed" point of the MCL at an offsite location. This does not account for onsite exceedance of the MCL. There are other aspects of exposure to groundwater other than a drinking water source. Dependent on the appropriately defined COCs, the groundwater pathway should be evaluated for inhalation, ingestion, and/or dermal exposures to said COCs.
- ▶ Page ES-4, Conclusions and Recommendations: The receptors evaluated are limited in scope. The establishment of TMLs for offsite receptors does not take into account onsite receptors. MCLs were not established to be "risked" away. The suggested 5-year semiannual groundwater monitoring program for nitrate is limited to four wells when EDC reports having 17 wells onsite. This seems limited in scope.

Introduction

- ▶ Page 1-1, first paragraph: The language indicates EDC's objective was to establish a human health risk-based target monitoring level (TML) for nitrate. No onsite receptors were evaluated nor were all COCs related to the areas of the site defined in the order evaluated. This report did not represent

a risk assessment for all pathways of concern nor all of the COCs of concern for the site; only nitrates in the groundwater for off site receptors. The result does not tell the risk the nitrates in the groundwater pose to current and/or possible future receptors. It only conveys what level is not to be exceeded onsite to avoid an excess of the MCL for nitrate in the offsite receptor well(s).

- ▶ Page 1-2, last paragraph: This sentence comments an ecological evaluation was conducted, but the evaluation is not included in the report. The HWD requests, at a minimum, a survey for Federal and State endangered and threatened animals and plants are conducted. Once this has been accomplished, the HWD recommends a facility follow the EPA guidance for conducting ecological risk assessments (June 1997). This guidance lays out the procedures for conducting problem formulation, toxicity evaluations, exposure estimates, and risk calculations for ecological aspects. Appendix A of this guidance document contains a checklist for conducting an ecological screening and sampling event.

Data Evaluation and Identification of Constituents of Concern

- ▶ Page 2-1, second paragraph: The Phase II Groundwater Assessment Report is referenced as containing the comparison of the COCs to published health criteria, including primary MCLs and EPA proposed corrective action levels. What about secondary MCLs? What is meant by EPA proposed corrective action levels?

Exposure Assessment

- ▶ Page 4-1, Section 4.1, first paragraph: The third sentence states "*Because the current land use is industrial, there is no realistic exposure potential for on-site receptor population to groundwater.*" The zoning of the site has no impact on the receptor population unless there is specific language in the deed prohibiting groundwater use onsite. A preliminary assessment conducted on EDC in 1992 indicated EDC had onsite wells used for potable, process water and fire fighting events. In addition, other contaminated media, such as the soil exposure pathway, could impact the groundwater; groundwater migration pathway can impact the surface water migration pathway. This report is centered around the use of groundwater for drinking water purposes. However, dependent on the COCs there are other routes of exposure to groundwater besides ingestion (i.e., inhalation, dermal). The statement "no use of groundwater from the shallow aquifer for drinking

water" does not account for process water or fire fighting events use. This needs to be more clearly addressed in a risk assessment.

- ▶ Page 4-1, Section 4.1, second and third paragraphs: The scope of the receptors is too limited. The evaluation of groundwater for drinking water only is limited in scope based on other possible exposures to groundwater.
- ▶ Page 4-2, Section 4.1: The well survey has not been submitted as part of this report. There seems to be a lot of assumptions made as to the current use of these wells based on the fact city water is available. The survey to support these assumptions should be part of the risk assessment report.
- ▶ Page 4-3, Section 4.2.1: "*The migration of nitrate in the groundwater of the Cockfield formation to a water well used for drinking water is the pathway of concern.*" Is the focus of the "risk" to determine unacceptable exposure for drinking water purposes only or to determine whether groundwater poses a risk to the defined receptors? This report is focused on drinking water exposure solely and does not account for other potential exposures related to groundwater.
- ▶ Page 4-5, first bullet item: The same comment as issued previously. There are other ways to be exposed to groundwater besides drinking water consumption.
- ▶ Page 4-5, second bullet item: Discussion is focused on the probability of a current city of El Dorado resident installing a private water well for drinking water consumption. What about the residents outside the city limits? What about the receptors onsite?
- ▶ Page 4-6, Section 4.3.1: The equations presented in this section represent intake factors. These factors do not take into account the concentration of the chemical in the media being evaluated.
- ▶ Page 4-7, Section 4.4: Lake Kildeer, the discharge (outfall 001) and the creek receiving said discharge are the only areas mentioned for being evaluated. What about the other areas onsite which are listed in the CAO? There is no mention of a survey being requested by the Arkansas Natural Heritage Commission (ANHC) on the existence of endangered and/or threatened species or plant life on or near the site.

- ▶ Page 4-9, Section 4.4.1: The same comments apply to this section as mentioned previously in relation to the potential ecological receptors and the flow rate of the creek.

Fate and Transport Modeling of Contaminants

- ▶ Page 5-1, Section 5.1: This section discusses the horizontal transport of nitrate. The model has simulated the TML or the MCL of nitrate would not be exceeded for the nearest downgradient receptor domestic well in about 7,250 years nor to the nearest downgradient receptor commercial well in about 3,000 years. What about the condition of the water at the site and the interim points between?

Target Monitoring Level Development

- ▶ Page 6-1, Section 6.0: Show all the data inputs for deriving the Chronic daily intake, target hazard quotient, and reference dose (i.e., show your work).
- ▶ Page 6-1, Section 6.0, third paragraph: Nitrates were the only COC evaluated in this report. Therefore, the only source of noncarcinogenic toxicity data should be obtained from IRIS. The HWD sets the priority for obtaining toxicity information in the following order: IRIS, HEAST, and then other EPA references.
- ▶ Page 6-2, Section 6.2: MCLS at all receptor points, whether onsite or offsite, should be used. The language for comparing TMLs with modeling results is confusing. The last paragraph of this section (6.2) on page 6-3 indicates MCLS were utilized to be conservative, since the MCL is lower than the calculated TML. MCLS should not be exceeded.
- ▶ Page 6-4: EDC has applied an attenuation factor (AF) to the maximum onsite nitrate concentration and the maximum concentration simulated to reach an offsite receptor. In summary, EDC has stated the MCL times the Nitrate AF (MCL x AF) yields an acceptable monitoring level for onsite wells. This is a step to establish action levels for their groundwater protection program as related to the onsite monitoring wells. This is not how a human health or ecological risk assessment (baseline) would be conducted. In addition, these onsite TMLs are back calculated from an offsite receptor standpoint and do not account for onsite potential exposure.

Conservative Risk Factors

- ▶ Page 7-1, Section 7.1: There is a statement the amount of nitrate present was estimated using conservative interpretations of the data. The data should be presented as part of this report to allow a quality review of the data to take place.
- ▶ Page 7-3, second paragraph: Again, there is mention of individuals within the city limits installing private wells. The installation should not be limited to city limits. Secondly, there is reference to primary source of the groundwater. What about secondary uses?
- ▶ Page 7-3, third paragraph: The survey for private wells was limited to use within the city limits. What about installation of private wells outside the city limits?

Project Conclusions and Recommendations

- ▶ Page 8-3: EDC has proposed to conduct a five year groundwater monitoring program for four wells. There were ten of the seventeen monitoring wells sampled which exceeded the nitrate MCL. Why only propose sampling for these four locations and not of at least the 10 wells that exceeded the MCL or the seventeen monitoring wells? After all, EDC comments in this report the data contained "gaps".

Tables

- ▶ Table 3.1: Footnote (A) is defined as USEPA Region IX PRGs for obtaining the oral and dermal reference dose for nitrate. IRIS is the appropriate reference for obtaining this information. Where Region IX has the RfDs listed in their table, the most current RfD obtained from IRIS should be used (note: the 1.6 is the most current IRIS number).

Figures

- ▶ Figure 4.1: If onsite wells are located EDC property for potable use, process use, and/or fire fighting events, these wells should be identified.
- ▶ Figure 4.2: What about onsite receptors (i.e., workers)? The Air Pathway may be incomplete in relation to volatilization of nitrate, but what about any other COCs? What about soil to groundwater releases? What about groundwater to surface water releases?

Appendix C

- ▶ Page C-16: The last sentence on this page tells how far the waste can travel and not exceed the MCL at a defined receptor location. How is this protective of the entire human health and ecological population? The objective of the CAO is to monitor and determine if further assessments are needed. This report seems to try and "risk" away established numbers such as MCLs.

In summary, the document entitled "Development of Risk-Based Target Monitoring Levels (December 1997)" does not follow the typical risk assessment strategy used by the HWD. However, it may adhere to the approved work plan mentioned in the text of this report (ADPC&E approved October 31, 1996). There are additional pathways and receptors which should be addressed in a site specific risk assessment to aid in determining the full potential for protection of human health and the environment.

If I can answer any further questions or help in any other way, please contact me at X-20856.

Jammie

cc: Mike Bates
Joe Hoover