

## MEMORANDUM

**SUBJECT:** Spent Catalysts from Petroleum Refining Hydrocracking Processes

**FROM:** Elizabeth Cotsworth, Director  
Office of Solid Waste (5301W)

**TO:** RCRA Senior Policy Advisors  
Regions I - X

On August 6, 1998, the Environmental Protection Agency listed as hazardous two types of spent catalysts generated by petroleum refining operations: spent hydrotreating catalysts (K171) and spent hydrorefining catalysts (K172) (63 *FR* 42110). We issued these listings, among others, in accordance with a consent decree in a lawsuit filed by the Environmental Defense Fund (EDF). At that time, the Agency took no action regarding a listing determination for spent hydrocracking catalysts generated by petroleum refineries.

Spent hydrotreating catalysts, spent hydrorefining catalysts, and spent hydrocracking catalysts are three types of spent catalysts generated from refinery processes that are part of a continuum of catalytic hydroprocessing units. Generally, the three processes may be viewed in the following order of increasing degrees of severity of operating conditions and conversion of large hydrocarbons to smaller molecules (Acracking@) and /or feeds: hydrotreating, hydrorefining, and hydrocracking. The Agency listed spent hydrotreating catalysts and spent hydrorefining catalysts as hazardous because we identified substantial risks to consumers of groundwater associated with releases from on-site and off-site Subtitle D landfills due to the presence of arsenic and benzene. As explained in the preamble, EPA determined that the risks associated with benzene and arsenic in these wastes are not adequately controlled under the toxicity characteristic (TC).

Whereas EPA was required by court order to make a listing decision on spent hydrotreating catalysts and spent hydrorefining catalysts, it was not required to do so

for spent hydrocracking catalysts. While we collected data on these wastes, we made a decision, in light of a significant workload of court-ordered listing determinations, that we were unable to invest resources to make a listing determination for this type of spent catalyst. This is not the same as a *Not a list* determination, which reflects a full evaluation of the potential risks presented by a waste and an affirmative decision that a waste either does not merit regulation as hazardous waste or is already adequately regulated by the application of the hazardous waste characteristics.

Information EPA has obtained indicates that spent hydrocracking catalysts may exhibit the characteristic of toxicity or ignitability. Of course, if spent hydrocracking catalysts that are solid wastes exhibit a hazardous characteristic, they have to be handled as hazardous waste. In addition, these wastes may contain hazardous constituents (e.g., benzene) at levels comparable to levels found in the two types of spent catalysts that were listed as hazardous wastes. In the samples of spent hydrocracking catalysts analyzed in EPA's *Study of Selected Petroleum Refining Residuals, Industry Study* (EPA530-R-96-018, U.S. EPA, August, 1996), we found an average benzene concentration of 3.4 mg/L, with a maximum of 10 mg/L. We found the average concentrations of benzene in the spent hydrorefining and hydrotreating catalysts to be 1.5 and 7.9 mg/L, respectively.

EPA's decision to take no action regarding a listing determination for spent hydrocracking catalysts does not eliminate a generator's regulatory obligations to accurately identify the regulatory status of this waste and to handle it in compliance with all applicable solid and hazardous waste management requirements. In addition, because some data indicate the waste can have similar benzene concentrations to the spent catalysts we listed, we hope the industry will give careful consideration to how these wastes are managed, even when the wastes do not exhibit a characteristic. The Agency clarified in the preamble to the final petroleum rule that EPA's decision to list two of the three types of hydroprocessing catalysts does not release generators from determining whether spent hydrocracking catalysts are hazardous wastes due to the hazardous waste characteristics, as required under 40 CFR 262.11, and does not mean EPA decided these spent hydrocracking catalysts do not pose hazards when managed as wastes.

EPA may provide further clarification in the future on the definition of these different categories of catalysts. At this time, however, we would like to clarify that EPA has made no formal decision regarding a listing determination for spent hydrocracking catalysts from petroleum refineries. If you have any questions regarding these issues, please contact Patricia Overmeyer in EPA's Hazardous Waste Identification Division at 703B605-0708.

cc: Association of State and Territorial Solid Waste Management Officials

RO 14393