MEMORANDUM

SUBJECT: Spent Catalysts from Petroleum Refining ADual Process@ Units

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

TO: RCRA Senior Policy Advisors
Regions I - X

On August 6, 1998, EPA listed as hazardous waste spent hydrotreating catalysts (K171) and spent hydrorefining catalysts (K172) generated in petroleum refining operations (63 FR 42110). The Agency took no action regarding a listing determination for a third type of spent petroleum hydroprocessing catalyst, spent hydrocracking catalysts.

Since promulgation of the final rule, questions have been raised with regard to the regulatory status of spent catalysts removed from Adual purpose@ reactors. Such reactors process refinery streams by both treating the feed to remove contaminants, such as sulfur, nitrogen and metal compounds (*i.e.*, hydrotreating), in addition to converting petroleum molecules to lighter fractions (*i.e.,* hydrocracking). In addition, it has come to the Agency=s attention that some affected parties may believe that the definitions provided for catalytic hydrotreating and catalytic hydrocracking processes in the final Petroleum Rule, as well as the listing descriptions for spent hydrotreating catalysts (K171) and spent hydrorefining catalysts (K172), allow petroleum refineries to self-classify spent catalysts from dual purpose hydroprocessors as hydrocracking catalysts (which are not listed hazardous wastes), even in cases where such spent catalysts are functioning, at least in part, as hydrotreating (or hydrorefining) catalysts.

As explained in the preamble to the final rule, definitions for petroleum hydrotreating, hydrorefining, and hydrocracking operations are not universally established. After considering all relevant materials in the rulemaking record, EPA decided that the simplest way to differentiate between hydrocracking and the other two petroleum hydroprocessing operations is to rely on definitions provided in the Department of Energy=s (DOE) Petroleum Supply Annual (PSA). The PSA contains operational definitions of hydrotreating and hydrocracking for purposes of submitting form EIA-820 to DOE. EPA rejected reliance on other methods of differentiation, such as specific percentages of the feed that are reduced in molecular size for each of the operations.

The Agency=s interpretation of the final listing determinations for spent hydroprocessing catalysts is that spent catalysts from petroleum hydroprocessors

performing hydrotreating or hydrorefining operations are captured by the listings, regardless of whether hydrocracking also occurs in a dual purpose unit. This is because the final rule, as well as the PSA, defines a spent catalyst as hydrotreating or hydrocracking on the basis of the type of hydroprocessing operation in which the catalyst was used. This is consistent with the intent of the listing to identify wastes containing the hazardous constituents that are removed by catalytic hydrotreating or hydrorefining, regardless of whether hydrocracking also is occurring.

In addition, there may be a misunderstanding involving whether refineries may self-classify spent catalyst from dual purpose hydroprocessors as hydrocracking catalyst, by merely identifying a unit as a hydrocracking unit when reporting to DOE. The final rule should not be interpreted as allowing petroleum refineries to classify Adual purpose@ units as hydrocracking units and in doing so claim that the spent catalysts removed from these units are spent hydrocracking catalysts (which are not listed hazardous wastes). In the preamble to the final rule, EPA explained that relying on the PSA is the Asimplest@ way to differentiate among the processes and that, if a refinery has been classifying its hydroprocessor as a hydrocracker, the unit would generally not be covered by K171 or K172. Rather, as noted above, EPA relied on the PSA definitions because they are operational definitions. Thus, the rule does not permit refineries to avoid identifying spent catalysts from dual purpose units as listed hazardous wastes simply because they classified (or reclassified) the unit from which the catalyst is removed as a hydrocracking unit, based solely on the fact that some hydrocracking takes place in the presence of the catalyst. Catalysts that perform a hydrotreating function, regardless of whether hydrocracking is performed in the same unit, are listed hazardous wastes, when spent. Consequently, as explained above, the Agency=s position with regard to spent catalysts removed from dual purpose reactors is that these spent catalysts are listed hazardous wastes.

As you know, in addition to correctly classifying spent catalysts as solid and/or hazardous wastes, generators also are required to determine if spent catalysts that are hazardous wastes (either because they meet the definitions of listed wastes K171 or K172 or because the spent catalyst exhibits a characteristic of hazardous waste) have to be treated to meet the land disposal restrictions standards before being land disposed. Please note that treatment of spent catalysts that are listed hazardous wastes K171 and K172 may require a combination of thermal treatment (to oxidize sulfides and vanadium), vanadium recovery, and stabilization (without improper dilution) to achieve the applicable land disposal restrictions.

Should you have any questions with regard to this issue, please feel free to contact Patricia Overmeyer of my staff at (703) 605-0708.

cc: Mr. Ralph Colleli, American Petroleum Institute
Mr. John W. Hilbert III, The Ferroalloys Association
Association of State and Territorial Solid Waste Management Officials