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V. OPTIONS FOR CONDITIONAL EXEMPTIONS

A. General comments

Comment 1: If listing is required, the commenters support the use of conditional exemptions for CSO sediment [and other wastes] which tailor waste management requirements to more closely relate to risks. This is a common sense approach to listing determinations. Conditional listing approach would encourage recycling. (API, 00046; Atlantic Richfield, 00023; BP, 00019; CMA, 00018; Exxon 00035; MIRC, 00045; Mobil, 00033; NPRA, 00015; Pennzoil, 00053; Phillips, 00055; Safety-Kleen, 00032; Shell, 00047; Valero, 00051)

Response: EPA thanks the commenters for their support.

Based on the substantial risks arising from PAHs in land treatment of this waste, EPA has determined to list this waste as hazardous. At the time of proposal, EPA believed disposal of this waste in nonhazardous landfills did not appear to pose significant risks, and so raised the possibility of a conditional listing that would allow this practice to continue. In response to comments on the proposal and the NODA, the Agency revised the input data for the groundwater pathway analysis as described in the response to comments on the NODA (see "Additional Groundwater Pathway Risk Analyses," 1998 in the docket). The final groundwater pathway analysis showed slightly higher high-end risks (4E-6) and Monte Carlo risks (2E-6 at the 95th percentile) for off-site landfills. The Agency has now decided not to include a conditional listing for this waste, primarily because landfilling of CSO residuals appear also to pose some groundwater risk as a result of the revised risk analysis. Therefore, the Agency has decided not to proceed with this new concept with this waste. Furthermore, EPA is reluctant to encourage the landfilling of wastes with very high carcinogenic PAHs (e.g., up to 230 ppm of benzo(a)pyrene in CSO sediment), which may present risks if mobilized in groundwater under certain conditions. Note that CSO sediment can qualify for the expanded oil-bearing residual recycling exemptions.

Comment 2: EPA has ample legal authority to promulgate conditional listings under RCRA. [See API comments for detailed arguments.] (API, 00046; Amerada Hess, 00027; Chevron, 00050; Phillips, 00055)

Response: EPA in its proposed rulemaking for the Munitions Rule on February 12, 1997 (62 FR 6621) responded to the question of its legal authority to promulgate conditional listings under RCRA.

However, as noted above, the Agency will not be applying a conditional exemption to the CSO sediment (K170) listing and is not pursuing this issue further in this rulemaking.

Comment 3: EPA should consider conditional listings for site specific risks. Under such an option, the facility would substitute its site-specific parameters into multi-pathway risk equations to determine whether its particular management methods for a waste, the toxicity of its waste, or

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the quantities of its waste, pose a significant threat to human health or the environment. (Amerada Hess, 00027; API, 00046; Phillips, 00055)

Response: EPA's approach has been to model as many pathways as current risk assessment techniques allow (i.e., providing results with an acceptable level of uncertainty). EPA performs risk assessments where risks are expected to include: 1) the central tendency (i.e., average or typical) and high end portions of the risk distribution, 2) important subgroups of the populations such as highly susceptible groups or individuals, if known, and 3) population risk. The results provide a reasonable picture of the actual or projected exposures. EPA must rely on this method for developing conditional listings since it would be cost prohibitive to perform risk assessments using parameters specific to each individual site. Because of cost and data limitations, site specific risks could not be established for each petroleum refinery.

Comment 4: Conditional listings are cost effective and environmentally protective. (NPRA, 00015; Valero, 00051)

Response: EPA appreciates the commenters' support. Conditional listings allow appropriate management practices that are environmentally protective (i.e., no or minimal risk) and are more economical than Subtitle C management (i.e., no or low incremental compliance costs). However, as noted above in comment 1, the Agency will not be applying a conditional exemption to the CSO sediment (K170) listing.

Comment 5: EPA expresses some concern that a conditional listings approach may "reduce the incentive for generators to explore pollution prevention opportunities." This concern is unfounded. There are many current incentives for pollution prevention that are independent of the listing process. For example, cleanup requirements for contaminated sites and attendant costs under RCRA, CERCLA, and state remedial programs apply whether a waste is "hazardous" or not. Generators also are under the considerable pressure from public opinion, enhanced by disclosure laws such as the Emergency Planning and Community Right-To-Know Act, to reduce waste generation. As environmental regulation and corporate awareness have matured over the past two decades, many companies have institutionalized policies favoring waste minimization and pollution prevention, without regard to whether such policies are required by law. In many cases, companies are driven by the costs of solid waste management, (including taxes imposed by many states based on the volume of solid waste generated), as well as the cost of raw materials, to search for ways to reduce or eliminate waste generation at the source or to effectively recycle any secondary materials generated. None of these existing incentives will disappear if EPA promulgates a conditional hazardous waste listing. (API, 00046; Chevron, 00050; Phillips, 00055)

Response: EPA thanks the commenters for their insight on the potential effect of conditional listings with regard to pollution prevention incentives. EPA acknowledges that incentives for pollution prevention currently exist; however, EPA must consider all possible outcomes of a conditional listing, including a potential reduction in the exploration of pollution prevention

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opportunities. EPA agrees with the commenters, however, that because many refineries have already implemented recycling and other pollution prevention activities at their facility for regulatory, economic and waste minimization reasons, the overall effect of a conditional listing may not have a negative effect on pollution prevention opportunities.

B. Conditional listing for CSO sediments based on management practice

1. General

Comment 1: EPA's rationale for a conditional listing lacks merit, since the landfilling of CSO residuals poses substantial risks to human health and the environment. Ironically, some of the flaws in EPA's risk assessment would be worsened by a conditional listing. For example, the potential for codisposal would increase substantially, since wastes previously land treated or managed in other ways would be landfilled to take advantage of the exemption from Subtitle C regulation. EPA never addressed baseline codisposal in its risk assessment, much less the increased codisposal that would result from the proposed conditional listing. Therefore, EPA has no basis to conclude a conditional exemption for landfilling CSO residuals poses no significant risks. (EDF, 00036)

Response: EPA modeled the co-disposal of CSO sediment volumes with other waste streams and waste constituents for off-site landfills to determine whether the *other* waste streams would become hazardous. Since CSO sediments are already considered hazardous, this modeling was performed to determine the effect on other waste streams managed with CSO sediments.[115]

EPA has responded to comments related to co-disposal in Section III.I, and this issue is further discussed in responses to comments on the NODA in Section I.A.3 of that document. As noted above in response to comment 1 in Section V.A, EPA agrees that the landfilling of this waste may pose some risk, and has decided not to pursue a conditional listing.

Comment 2: The commenter commends EPA for its proposal for a conditional listing for CSO which recognizes the value of contingent management. (CMA-MCP, 00018)

Response: EPA thanks the commenter for their support.

2. Option 1

Comment 1: The commenters believe that the approach used in Option 1 is most appropriate. (Amoco, 00062; Amerada Hess, 00027; API, 00046; BP, 00019; Heritage, 00010; Mobil, 00033; Phillips, 00055; Shell, 00047; Sun, 00034; Western Independent Refiners Association, 00024)

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[115]See Section 4.2 of EPA's "Supplemental Background Document, Groundwater Pathway Risk Analysis, Petroleum Refining Process Waste Listing Determination," March 1997.

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Response: EPA appreciates the commenters' support of conditional listing alternatives that address management practices that pose a risk to human health or the environment. However, as noted in response to comment 1 in Section V.A above, EPA is not pursuing any of the options for a conditional listing for CSO sediment.

Comment 2: Option 1 is not appropriate because EPA's risk assessment indicates that land treatment units do not pose a significant risk to human health or the environment. Furthermore, such an option would preclude refiners from treating refinery residuals in a low risk, cost-effective manner which is presently being utilized throughout the industry and which is adequately regulated through existing state RCRA Subtitle D programs. (NPRA, 00015; Valero, 00051)

Response: EPA disagrees with the commenters in that EPA's risk assessment does indicate that land treatment units pose a risk to human health or the environment. The risks associated with CSO sediment are above the $1x10^{-5}$ presumptive listing benchmark. In any case, as noted in response to comment 1 in Section V.A above, EPA is not pursuing any of the options for a conditional listing for CSO sediment.

Comment 3: Under Option 1, CSO residuals would be listed only if land treated, thus the waste would not be hazardous if used as road materials, as landfill cover, or in other ways not even assessed by EPA. EPA has no basis for concluding CSO residuals handled in ways not evaluated by the Agency fail to pose risks to human health and the environment when improperly managed. (EDF, 00036)

Response: As noted above in response to comment 1 in Section V.A, EPA is not promulgating any of the conditional listing options for this waste, primarily because the revised groundwater risk analysis showed some risk even in the landfill scenario.

3. <u>Option 2</u>

Comment 1: Under Option 2, EPA proposes that the exemption become effective at the point of generation without ensuring the waste is not land treated or managed in a way other than landfilling. Since many states completely lack land treatment or use constituting disposal regulatory programs and therefore both the jurisdictional and data management capability to ensure compliance with the exemption conditions, Option 2 is fundamentally flawed. (EDF, 00036)

Response: EPA disagrees with the commenter. Facilities affected by the listing of CSO sediment are RCRA-permitted facilities which are regularly inspected to ensure regulatory compliance. Mismanagement of CSO sediment under Option 2 could be discovered during inspection. Facilities could be penalized for mismanagement under existing regulations. However, as noted in response to comment 1 in Section V.A above, EPA is not pursuing any of the options for a conditional listing for CSO sediment.

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Comment 2: Option 2 unnecessarily restricts other options that have low risk such as use for fuel. This is a restrictive option that does nothing to encourage innovation in the management of the residual. (API, 00046; Mobil, 00033; NPRA, 00015; Shell, 00047; Valero, 00051)

Response: EPA acknowledges that by specifically identifying landfilling as an appropriate management practice, petroleum refiners may not seek to go beyond compliance and implement pollution prevention alternatives. EPA wants to clarify that source reduction and recycling are preferred management techniques compared to landfilling. However, as noted above, EPA is not pursuing any of the options for a conditional listing for CSO sediment. Therefore, CSO sediment would not be land disposed, except as hazardous waste subject to treatment and disposal requirements under Subtitle C.

Comment 3: Option 2 is overly broad and unsupported by the rulemaking record -- EPA has determined that the waste stream presents an unacceptable risk only when managed in land treatment units while Option 2 treats the waste stream as hazardous in <u>all</u> management scenarios except landfills. (Amerada Hess, 00027; API, 00046)

Response: As noted in response to comment 1 in Section V.A, EPA is not pursuing any of the options for a conditional listing for CSO sediment.

4. <u>Option 3</u>

Comment 1: The commenters believe that the approach used in Option 3 is most appropriate. Option 3 gives refiners the flexibility to establish performance oriented treatment and disposal options which are cost effective without any additional negative impact on the environment. (NPRA, 00015; Valero, 00051)

Response: EPA appreciates the commenters' support of risk-based management options, but EPA believes that the commenters have misinterpreted the requirements of this option. Performance-oriented treatment and disposal options would be allowed under Option 3. As noted in response to comment 1 in Section V.A, EPA is not pursuing any of the options for a conditional listing for CSO sediment.

Comment 2: The additional requirements under Option 3 are already addressed in existing RCRA regulations (e.g., the generator must identify all appropriate codes for solid wastes and manage them accordingly). (Shell, 00047)

Response: As noted in response to comment 1 in Section V.A, EPA is not pursuing any of the options for a conditional listing for CSO sediment.

Comment 3: Option 3 attempts to address the enforcement problems in Option 2 by requiring that the waste be "consigned to a transporter or disposal facility providing a written commitment to dispose of the waste in an offsite facility identified by name and address." However, since

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neither the transporter nor the disposal facility is subject to the Subtitle C regulatory program, these parties may provide false information on this "written communication" and suffer little or no consequences. Therefore, the enforcement problems caused by triggering the exemption at the point of generation remain. EPA will find it is unable to create an enforceable exemption related to a management option unless the exemption does not become effective until the waste is actually managed in accordance with the exemption condition. (EDF, 00036)

Response: EPA notes there are many RCRA regulatory precedents related to this issue. For example, a recyclable residual destined for recycling in a manner that excludes the residual from the regulatory definition of solid waste is excluded from the point of generation through recycling, provided that the residual actually is recycled in the excluded manner. If the generator first intends to recycle the residual, but does not do so, then the residual is not excluded, and the generator is subject to enforcement action for failing to comply with applicable RCRA requirements starting at the point of generation. However, as noted in response to comment 1 in Section V.A, EPA is not pursuing any of the options for a conditional listing for CSO sediment.

Comment 4: Option 3 is even worse than Option 2 because it would assume worst case management and impose additional regulatory burdens. The purported concerns underlying the additional regulatory requirements appear to be red herrings. [see comments for detailed arguments] (API, 00046)

Response: In 60 FR 57779, EPA asserted that historic approaches to relying on the intent of the generator have proven extremely difficult. Enforcement is difficult when waste management tracking information is not readily available to ensure that proper treatment and disposal have taken place. As noted in response to comment 1 in Section V.A, EPA is not pursuing any of the options for a conditional listing for CSO sediment.

Comment 5: Option 3 would potentially prohibit management practices demonstrated to be acceptable. (Mobil, 00051)

Response: As noted in response to comment 1 in Section V.A, EPA is not pursuing any of the options for a conditional listing for CSO sediment.

5. <u>New Ideas</u>

Comment 1: The conditional listing should allow the use of Subtitle C land treatment units. The modeling that was conducted for the Subtitle D units should be conducted for the Subtitle C units. Because of the existing additional controls for run-on and run-off on Subtitle C units ("Option 4"), these units would not present a risk level of concern and the risks would always be less than the 10^{-6} level. (Shell, 00047)

Response: EPA notes that treatment in Subtitle C units would be allowed under any option, provided the waste met the land disposal restrictions, or the unit has an appropriate no-migration

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variance. As noted in response to comment 1 in Section V.A, EPA is not pursuing any of the options for a conditional listing for CSO sediment.

Comment 2: EPA has not considered an exemption from designation as hazardous for CSO sludges that are de-oiled. De-oiled solids may also be managed similarly to catalyst and catalyst fines from FCC units since they are very similar in composition. This failure is not in keeping with EPA's attempt in the proposed rule to consider the actual risks associated with waste streams as they are managed. Providing a conditional exemption for de-oiled sludges would be a rational and environmentally sound method of managing this waste stream. For example, industry could benefit from establishment of separate Best Demonstrated Available Technology standards for de-oiled sludges; these standards would better tailor the treatment required to the nature of the waste stream. (Amerada Hess, 00027)

Response: EPA did consider whether the data available allow the Agency to distinguish between CSO sediment (as well as crude oil storage tank sediment) before and after de-oiling, especially for use in risk assessment. However, the Agency concluded that distinguishing between the two forms of CSO sediment was inappropriate based on the data available (see *Listing Background Document for the 1992-1996 Petroleum Refining Listing Determination*, 1995, pages 46 and 29). Therefore, EPA disagrees with the commenter's suggestion to only list "non-deoiled" sediment because: 1) available data do not provide a sufficient comparison differentiation of risks between oily and de-oiled CSO tank sludges, 2) the deoiling process may not remove the PAHs of concern, and 3) crafting a definition of de-oiled sludges would be difficult and may cause enforcement problems. Furthermore, as shown by the high PAH content in CSO sediment, the solids appear to be more than just spent FCC catalyst. EPA believes the exclusion for recycled oil-bearing residuals that EPA is promulgating in today's rule is a more effective approach to encouraging the recycling of the material.

Under this exclusion, hazardous oil-bearing CSO tank sediment or filter/separation solids that are inserted into the petroleum refining process (including owned coking units) would be excluded from regulation as a petroleum refining process under amended 261.4(a)(12). This exemption allows refineries to continue current practices where clarified slurry oil laden wastes or oil recovered from clarified slurry oil tank sediment or filter/separation solids are returned to the refinery operations. CSO sediment, before and after de-oiling, would remain a hazardous waste if discarded.

6. <u>Other Requests for Comments</u>

a. EPA requested comments on the potential impact that changes in waste management (encouraged by conditional listings) might have on the risks associated with CSO residuals. EPA also requested comment on whether the internal records typically kept by solid waste generators would be adequate; whether Subtitle C record keeping and manifest requirements should apply; or if some other mechanism for documenting the destination of the waste is desirable. The Agency

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requested comment on the appropriateness of adding conditions for the landfill exemption for CSO residuals to the listing description for K170.

b. The Agency also requested comments on whether a generator of K170 also should be required to file a one-time notification with EPA or an authorized state or whether maintaining on-site documentation is sufficient. Comments were solicited on if on-site documentation and/or notification certifying the ultimate disposal of the waste is an adequate guarantee that the waste is actually managed in a landfill.

No specific comments were received on these issues.

C. The regulatory status of the waste between the point of generation and disposal

Comment 1: A recyclable material destined for recycling in a manner that excludes the material from the regulatory definition of solid waste is excluded from the point of "generation" through actual recycling, provided the material is actually recycled in the excluded manner. (API, 00046)

Response: EPA generally agrees with the commenter on this issue, however, as noted in response to comment 1 in Section V.A of this response to comment document, EPA is not pursuing any of the options for a conditional listing for CSO sediment.

Comment 2: The commenter suggested the following outline:

1. Residuals that are actively being managed as non-waste (constantly used or designated for use in a process) should have the status of a feedstock, commodity or intermediate. This non-waste status would allow these residuals to be managed as other materials that are used in the manufacturing process. The toxicity and physical hazard of these residuals are usually the same as the toxicity and physical hazard of the products being produced. The management of these residuals is based on the inherent toxicity and physical hazard as with any other material in the manufacturing process.

2. Residuals that are not being managed as a potential waste (stored pending a decision or future activity) should be allowed a grace period similar to the speculative accumulation time period. One year should be adequate time to utilize the residuals. Storage after one year could be subject to hazardous waste management standards. Additional storage time as a hazardous waste would allow a facility to continue to attempt to manage the material as a non-waste in a process. The requirement to upgrade the storage (assuming the material is not already stored under strict hazardous waste standards) would further encourage a facility to promptly identify a use for the material.

3. Residuals that are stored for more than two years (one year nonhazardous, one year hazardous) should be considered a waste and disposed of within 90 days. An extension of an additional year should be available from the State or Regional Administrator if a showing can be

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made by the generator that a use for the material is probable within that time. (Shell, 00047)

Response: In the final rule, an the Agency is finalizing an exclusion for refinery-generated oil-bearing hazardous secondary materials, provided that these materials are to be inserted into a petroleum refinery (either the same refinery where generated, or sent directly to another refinery), are not speculatively accumulated, and are not placed on the land. These conditions are to ensure that such secondary materials do not become part of the waste disposal problem. All de-oiled residuals are subject to Subtitle C regulation if they are disposed or intended for disposal. In addition, to ensure that residuals from recycling these refinery-generated secondary materials are properly managed (where these residuals would otherwise have been listed via the derived-from rule were it not for today's exclusion), today's rule also amends the listing description for F037 to include them.

To meet the definition of no "speculative accumulation," generators must demonstrate that 75 percent of the amount of the material accumulated is recycled within a calender year. In other words, during the calender year, the amount of the material that is recycled or transferred offsite for recycling must equal at least 75 percent by weight or volume of the amount of the material accumulated at the beginning of the calender year (see 40 CFR §261.1(c)(8)).

Parties may petition the EPA Regional Administrator to request a variance from classification as solid waste for materials that are accumulated speculatively without sufficient amounts of the material being recycled. When requesting such a variance, the petitioner should demonstrate that his situation fits within the criteria provided in 40 CFR §260.31(a).

D. Possible prohibition against placement on the land (prior to landfill disposal)

No specific comments were submitted on these issues.

E. Distinguishing between landfills and land treatment units

Comment 1: Given the longstanding definitions in 40 CFR 260.10, and the lengthy experience of EPA, the states, and industry in working with those definitions, the commenter believes the difference is well understood and does not require further clarification. (API, 00046)

Response: The Agency appreciates the commenter's response regarding the regulatory clarity of the definitional differences between landfills and land treatment units.

F. Possible conditional exemption for CSO residuals based on specific management standards

Comment 1: The commenters support the conditional listing of the clarified slurry oil storage tank sediment and/or in-line filter/separation solids (K170) to apply only to land treatment units <u>without appropriate run-on/run-off controls</u>. (Amoco, 00062; API, 00046; Exxon, 00035; Mobil,

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00033; Shell, 00047; Texaco, 00049)

Response: As discussed in Section III.G of this response to comment document, EPA's approach to considering the potential for erosion and runoff is reasonable, evaluating both no controls and partial controls. While it is certainly true that many refineries employ at least some level of run-on and run-off controls, there are no national standards requiring and guaranteeing controls. EPA notes that while some states have established minimum standards for Subtitle D units, such as the controls required by the state of Washington, many states do not have regulations on run-on/run-off controls.[116] Further, there are a variety of conditions that can contribute to the failure of most controls, including extreme weather conditions, operator mismanagement, equipment failure (pumps, liners, berms, etc.). For these reasons, EPA did not originally propose Option 4. EPA eliminated this option from consideration for several reasons including, (1) regardless of whether erosion and runoff controls are in place, there are still air pathway risks of concern; (2) it is not readily legally enforceable because of the problems associated with inspecting the run-on/off controls (i.e., it would be too difficult for the inspectors to determine whether or not their run-on/off controls are adequate); and (3) land treatment units would need to have run-on/run-off controls that are extremely effective to reduce high end risks to below 1×10^{-6}.

Comment 2: The commenter suggests the following modification to Option 1:

> K170 - Clarified slurry oil (CSO) storage tank sediment and/or in-line filter/separation solids from petroleum refining operations if the sediment and filter/separation solids are applied to the land in a land treatment unit. CSO sediment and filter/separation solids managed in a land treatment unit having run-on/run-off controls equivalent to 40 CFR 264.273 (b-d) are exempted from this listing. (Amoco, 00062)

Response: See Response to Comment 1 above in this section.

Comment 3: The commenter suggests the following modification to Option 1:

> K170 - Clarified slurry oil storage tank sediment and/or in-line filter/separation solids from petroleum refining operations if the sediment and filter/separation solids are applied to the land in a land treatment unit *without Subtitle C runoff controls.* (Exxon, 00035)

Response: See Response to Comment 1 above in this section.

G. Run-off control measures and unit design

No comments were submitted on these issues.

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[116]"Communications with State Authorities on Requirements for Land Treatment Units," EPA, 1995 (F-95-PRLP-S0019).

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H. Other conditional exemption comments

1. Catalysts

Comment 1: The commenters requested that the Agency consider conditional exemption for the regeneration/reclamation/recycling of spent catalyst. The catalysts would be listed only if it is disposed of in a landfill (or [alternatively] not recycled). (Amerada Hess, 00027; API, 00046; ARCO, 00023; BP Oil, 00019; Chevron, 00050; CMA - Metal Catalyst Panel, 00018; CRI, 00030; CRI-MET, 00031; CRLA, 00029; Eurecat, 00021; GCMC, 00042; Mobil, 00033; Phillips, 00055; Valero, 00051; WIRA, 00024)

Response: Through the engineering site visits, RCRA §3007 surveys and risk assessments, EPA determined that spent hydrotreating and hydrorefining catalyst pose significant risk to human health and the environment. These risks arise from the high levels of toxic constituents (benzene and arsenic) and the pyrophoric characteristics exhibited by the wastes. While EPA encourages the recycling of these materials, the Agency believes that the risks posed by these materials indicate that they should be managed as hazardous until they are effectively treated. Thus, EPA did not consider the type of conditional listing suggested by the commenter.

Comment 2: The commenters proposed a conditional listing that would define the catalyst residuals as hazardous when going to land disposal. The residuals would not be hazardous if recycled or reused. The conditional listing would require that;

- the residual is sent to metals reclaiming, catalyst regeneration, or other recycling or reuse provided the use is not a "use constituting disposal."
- records are kept to show the material was properly recycled or reused.
- the self-heating residual is shipped in DOT bins approved for self heating materials or treated on site in a RCRA permitted unit to reduce the self-heating characteristic as measured using the DOT test for self heating substances (49 CFR 173.124, Div 4.2) prior to shipment.

The RCRA characteristics would still be applicable. (Chevron, 00050; Phillips, 00055)

Response: See response to comment 1 above.

Comment 3: A contingent listing for the spent catalysts would be a far stronger encouragement to recycling than the proposed listing while significantly discouraging landfilling. The conditions for exclusion from the listing will encourage pollution prevention practices that will minimize the hazard potential of the residual prior to shipping. It will also minimize the cost of transportation and handling of the residual when going to recycling. By keeping these costs down, existing recycling capacity will be retained while encouraging other recyclers to enter the market. (Chevron, 00050; Phillips, 00055)

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Response: See response to comment 1 above.

Comment 4: Excluding the catalyst for recycling will create significant incentives to recycling. Sending the waste to disposal would require that it be managed as hazardous from the point of generation. This would require many hazardous waste manifests, LDR forms, etc. All personnel involved in the dump, including operators, maintenance, and contractors may have to be HAZWOPER trained and annually recertified. All debris and waste generated during the dumping, including decon water, coveralls, cartridge respirators, scaffolding, gaskets, etc. will have to be sent to a hazardous waste landfill for disposal. All reactor internals that are replaced could be considered hazardous waste debris and have to be cleaned or treated per 268.45 before being shipped out of the refinery. Potentially, all catalyst samples pulled during the run of the unit could be considered hazardous waste and would have to be lab packed to a hazardous waste landfill. (Chevron, 00050; Phillips, 00055)

Response: Since industry already recycles greater than 80 percent of hydrotreating and hydrorefining catalysts, the Agency believes their incentives to recycling already exists and will continue after the listing. As with all hazardous wastes, reporting is required and is figured into the economic impact of the listing and the Agency has closely considered the economic impact of this rule.

Additional training requirements (i.e., HAZWOPER) would only be required if the facility chose to become a TSD facility. However, many of the training requirements under OSHA for hazardous materials handling (e.g., HF acid, caustic, nickel, arsenic) and industrial activities (e.g., confined space entry) are already conducted at these facilities and required by all contractor personnel. Modifying the existing training programs at petroleum refineries to include any additional HAZWOPER requirements would be minimal.

The Agency agrees all debris and waste generated during the dumping would be considered hazardous under the mixture rule. However, if the debris was cleaned or treated per §268.45 or if determined by the Regional Administrator to be uncontaminated (§261.3(f)) then the “debris” (e.g., scaffolding, Nomex) could be reused or disposed of as non-hazardous. See response to comment 1 above concerning a conditional listing for these wastes.

Comment 5: The commenter urges the Agency to limit the catalyst listings by conditioning them to apply only to volumes of spent hydrotreating/hydrorefining catalyst not sent to third party reclaimers/recyclers. Such a conditional listing would prevent disposal of these residuals on land where EPA's overly conservative risk assessments suggest the risk to human health and the environment becomes marginally of concern, but would encourage the "environmentally sound alternative" of constructive reclamation and recycling without distorting the catalyst reclamation marketplace. (Mobil, 00033)

Response: See response to comment 1 above.

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Comment 6: EPA should clarify the status of recycled catalyst and catalyst regenerated in situ. Verbal discussions with EPA suggested that the returned catalyst would no longer be a listed waste since it is returned for direct reuse. However, this position is not confirmed in the proposal. The commenter requests that EPA positively affirm that such direct reuse of regenerated spent hydrotreating / hydrorefining catalyst is exempt from RCRA regulation if a listing determination of some kind for K171/172 is finalized. (Mobil, 00033)

The commenter requests that EPA clarify the regulatory status of spent hydrotreating and hydrorefining catalyst regenerated in situ and then removed from the process unit. First, the Agency should clarify that such catalysts are not listed wastes if destined for direct reuse as hydrotreating/hydrorefining catalyst in the same or another refinery or processing facility. Second, EPA should clarify that such regenerated catalysts would not be listed or precluded from land disposal if they pass the TC. As a practical matter, such in situ regenerated catalysts would not be subject to benzene or self-heating concerns. While arsenic is not removed by regeneration, it can be adequately screened by the TC test so that no listing is warranted, conditional or otherwise, for spent hydrotreating or hydrorefining catalysts regenerated in situ. The instances when refiners might utilize such in situ regeneration are not frequent as economics currently tend to favor transfer to off-site reclaimers for regeneration or reclamation in order to preserve process stream time. (Mobil, 00033)

Response: In requesting clarification from EPA on the regulatory status of spent catalysts regenerated in-situ (i.e., within the refinery process unit), the commenter appears to be referring to "in-situ regeneration" both in terms of recycling (i.e., prior to 'direct reuse' as hydrotreating/hydrorefining catalyst either on-site or in another refinery or processing facility), and in the context of treatment prior to disposal. First, the Agency would not view as "spent" any hydrotreating/hydrorefining catalyst that continues to be used for its intended purpose, that is, as a hydrotreating/hydrorefining catalyst. In this case the catalyst would not be listed hazardous waste because it would not yet be defined as a solid waste. See discussion of spent material in 50 FR at 624 (Jan. 4, 1985). The Agency notes that if a catalyst is removed from the process unit and sent to a regeneration facility (or is regenerated in other than the refinery process unit), or is otherwise treated and/or disposed, the catalyst would of course be a waste even if it is capable of being used further as a catalyst. The generator's decision to either regenerate (i.e., reclaim, as defined in 40 CFR 261.2) a spent material, or dispose of it, are the overriding criteria the Agency would use for defining the catalyst as a solid waste, and if listed, a hazardous waste. Once regenerated for reuse as a catalyst, however, the regenerated catalyst is no longer a waste and the listing would not apply. See 40 CFR 261.3(c)(2)(i) regarding reclaimed materials. Second, the EPA regards the in-situ regeneration described by the commenter as a normal part of the refining process, such that if the catalyst continues to be used as a refinery catalyst, it is not a solid (or hazardous) waste. Finally, to reiterate, the Agency would not view in-situ regeneration as changing the regulatory status of a spent catalyst that is going to be sent to a regeneration facility (or otherwise be recycled outside of the refinery process unit) or to treatment and disposal. In both of these instances the catalyst meets the definition of spent material, and is a solid waste, and thus meets the listing.

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Comment 7: The commenter requested that the Agency consider an additional exemption for the regeneration operations conducted at the commenter's facilities, which involve the minimal alteration of a commercially-viable partially used product prior to its reinsertion in the original manufacturing process. The rationale for such an exemption is to provide regulatory relief for legitimate manufacturing activities which result in waste minimization, and therefore, are part of the Agency's solution to the land disposal of petroleum refining residuals, not a part of the problem identified by the listing determination. [see comment for detailed arguments]

The following proposed regulatory language is recommended:

> 40 CFR 261.4 Exclusions
> (a) Materials which are not solid wastes. The following materials are not solid waste for the purpose of this part:
> * * * * *
> (Number to be assigned) Spent hydrorefining and hydrotreating catalysts from petroleum refining operations which are regenerated and reinserted for beneficial use in hydroprocessing operations unless the material is accumulated speculatively as defined in §261.1 (C) of this chapter. (CRI, 00030; CRLA, 00029)
> * * * * *
>
> CRI-MET proposed slightly different arguments and exclusions:
>
> (Number to be assigned) Spent hydrorefining and hydrotreating catalysts from petroleum refining operations used as a feedstock to produce primary metal products unless the material is accumulated speculatively as defined in §261.1(c) of this chapter. (CRI-MET, 00031)

Response: The proposed exclusions for spent hydrorefining and hydrotreating catalysts are beyond the scope of this rulemaking. The Agency reminds the commenters that once a spent material has been "regenerated" (i.e., 'reclaimed,' as defined by 40 CFR 261.2) for beneficial use it is no longer a solid waste. This is analogous to spent solvents that are defined as solid and listed hazardous wastes until reclaimed (in this case, distilled to produce clean solvent and still bottoms), after which the clean solvent is now a product and not a waste, while the discarded still bottoms remain a solid and hazardous waste.

Comment 8: The commenter suggests the following listing description for spent hydrotreating and hydrorefining catalysts. Material not meeting the definition would continue to be regulated under existing hazardous waste regulations.

> K171- spent hydrotreating catalysts from petroleum refining operations which are not sent to a reclamation or regeneration facility.
>
> K172 - spent hydrorefining catalysts from petroleum refining operations which are not

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sent to a reclamation or regeneration facility.

The commenter suggests a requirement be placed on the generator to provide the Administrator with a one time notification of the generation of conditionally exempt spent catalyst material. (CMA-MCP, 00018)

Response: See response to comment 1 above.

Comment 9: The Agency's proposed unconditional listing of spent hydrotreating and hydrorefining catalysts will require RCRA Subtitle C management standards for all management activities after the point of generation. As such, the proposed unconditional listing does not acknowledge or promote the merits and benefits of waste minimization, recycling, and reuse management practices currently demonstrated by the industry and documented by the Agency. In addition, such regulation will mandate the application of the "mixture" and "derived from" rule for all management activities after the point of generation, placing additional regulatory burdens on environmentally sound management practices. (CRI-MET, 00031; CRLA, 00029)

Response: See response to comment 1 above. EPA cannot know precisely what the ultimate costs will be for refineries to recycle or dispose of spent catalysts. The Agency points out that, because of the listing, the recycling/ disposal cost differential may arguably be reduced or reversed, because Best Demonstrated Available Technology (BDAT) and Subtitle C disposal costs will greatly increase the costs of disposal over the current practice of Subtitle D landfills. Thus, recycling is likely to continue to be an effective management option for these residuals.

2. <u>Crude Oil Storage Tank Sediment</u>

Comment 1: If EPA determines that COST sediment should be listed, EPA should only consider conditional listing, preferably a simple conditional listing that would only classify crude tank sediment as hazardous if managed in an [off-site] Subtitle D landfill, the only management scenario that posed any risk of concern. (Amerada Hess, 00027; BP Oil, 00015; Exxon, 00035; Mobil, 00033; Sun, 00034)

Response: Through the engineering site visits, RCRA §3007 surveys and the revised risk assessments, EPA determined that crude oil tank sediment poses significant risk to human health and the environment. This risk arises from the high levels of benzene in the wastes. The Agency believes that the risks posed by these materials indicate that they should be managed as hazardous until they are effectively treated. Thus, EPA did not consider the type of conditional listing suggested by the commenter. Therefore, the Agency will not be applying a conditional exemption to the crude oil storage tanks sediment (K169) listing.

3. <u>Other</u>

Comment 1: The commenter believes that the conditional exemption concept could be

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particularly useful in the case of wastes managed by injection in Class I or Class I equivalent injection wells. [see comments for detailed comments] (ARCO, 00023)

Response: EPA did not assess exposure pathways based on underground injection wells. Therefore, the Agency did not consider this management pathway for a conditional exemption.

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VI. COMMENTS REGARDING IDLED UNITS

A. Clarification of the 90 day storage rule

Comment 1: The commenters support the interpretation change that the accumulation period for hazardous waste in an idled manufacturing process unit begins on the 91st day after the unit ceases to be operated. (API, 00046; Coastal, 00048; Mobil, 00033; NPRA, 00015; Pennzoil, 00053; Valero, 00051)

Response: EPA appreciates the commenters' support, and notes that the interpretation described in the proposed rule (60 FR at 57779-80 (Nov. 20, 1995)) remains the Agency's position.

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VII. THIRD PARTY REGENERATION OF SPENT CATALYSTS

A. Proposal to exempt recycling units from the BIF regulations.

Comment 1: The commenters support the proposal, however they recommend that the Agency's proposed regulatory language for Section 266.100(b)(5) be amended to reflect their view that only regeneration facilities require exemption under this rule, and that metals recovery furnaces are already exempt as smelting, melting and refining furnaces under 40 CFR 266.100(c). Suggested changes are as follows:

> *(5) Catalyst regeneration furnaces if the only hazardous wastes burned are spent hydrotreating catalyst from petroleum refining operations (EPA Hazardous waste No. K171), and/or spent hydrorefining catalyst from petroleum refining operations (EPA Hazardous waste No. K172).*

[See comments for detailed discussion.] (CRI-MET, 00031; CRI, 00030; CRLA, 00029)

Response: EPA is deferring to a later day any final decision on whether or not to exempt these units from RCRA Subtitle C air emission standards. The timing of this decision depends, in large part, on the gathering and submittal of additional data describing the design and operation of these thermal devices and most important and the characterization of air emissions from these metal regeneration/reclamation operations; especially, the types and levels of hazardous air pollutant emissions from these units and the adequacy of air pollution controls for these emissions. In the interim, EPA reiterates that nothing in today's rule (or indeed the proposed rule) changes the current RCRA status of facilities managing these hazardous wastes.

Comment 2: The commenters support the proposal to exclude catalyst recovery furnaces from regulation as hazardous boilers or industrial furnaces. (Amerada Hess, 00027; Caufield, 00009; CMA - MCP, 00018; Eurecat, 00021; NPRA, 00015; WIRA, 00024)

Response: The Agency appreciates the support of the commenters. However, EPA is not finalizing its proposal to exempt from permitting requirements under Part 266.100(b) third party units regenerating and reclaiming hydrotreating and hydrorefining spent catalysts. EPA is deferring to a later day any final decision on whether or not to exempt these units from RCRA Subtitle C air emission standards. In the interim, EPA reiterates that nothing in today's rule (or indeed the proposed rule) changes the current RCRA status of facilities managing these hazardous wastes.

Comment 3: As EPA considers these furnaces with regard to the BIF regulations, the commenter supports efforts to consider the inherent differences associated with the regeneration and reclamation processes in comparison with other furnace applications. (CMA - MCP, 00018)

Response: The Agency appreciates the support of the commenter for this proposal. However, EPA is deferring to a later day any final decision on whether or not to exempt these units from RCRA Subtitle C air emission standards. In the interim, EPA reiterates that nothing in today's

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rule (or indeed the proposed rule) changes the current RCRA status of facilities managing these hazardous wastes.

Comment 4: The regeneration of spent petroleum catalysts constitutes legitimate recycling because of the benefits of regeneration provide strong incentives for proper handling and management. (CRI, 00030; CRI-MET, 00031; CRLA, 00029; NPRA, 00015; Valero, 00051)

Response: EPA is deferring to a later day any final decision on whether or not to exempt these units from RCRA Subtitle C air emission standards. In the interim, EPA reiterates that nothing in today's rule (or indeed the proposed rule) changes the current RCRA status of facilities managing these hazardous wastes.

B. Control technologies currently being used in thermal treatment of spent petroleum catalysts.

Comment 1: The commenter provided a description of emissions control process and general logistics of their regeneration operation. (CRLA, 00029)

Response: The Agency appreciates the commenter's submission of data on their emissions control process and general logistics of operation. The commenter, a catalyst regenerator, provided a copy of its state air permit, as well as a description of it emissions control devices. The control technologies included an afterburner, used to destroy volatile organics, and a wet scrubber and baghouse, used to control SO_2 and particulates. The state air permit contained operating parameters and data on PM, SO_2, NO_x, CO, and VOC emissions.

As noted in the preamble to this final rule, EPA feels that these submitted data and other information in the administrative record for this rule is simply not sufficient to support a final decision one way or the other. Given the current state of the administrative record and the other circumstances discussed in the preamble of today's final rule, EPA is deferring to a later day any final decision on whether or not to exempt these units from RCRA Subtitle C air emission standards. In the interim, EPA reiterates that nothing in today's rule (or indeed the proposed rule) changes the current RCRA status of facilities managing these hazardous wastes.

C. The "commodity-like" nature of metals reclaimed from spent petroleum catalysts

Comment 1: Two commenters provided copies of data of hazardous waste analyses of "commodity-like products" produced from spent catalyst and extensive arguments to demonstrate the inert nature of the material and the safe handling practices followed by the cement kilns. [see comments for details] (GCMC2, 00058; CPC, 00059)

Response: In the preamble to the proposed rule, EPA requested information relevant to determining the "commodity-like" nature of metals reclaimed from spent petroleum catalysts as

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defined under 40 CFR 260.30(c). The Agency thanks the commenters for the data that was submitted to EPA. However, the Agency did not receive sufficient data to evaluate the merits and consequences, per the variance factors set forth in 40 CFR 260.31(c), of developing a generic commodity-like exclusion for these metals. Therefore, the Agency believes that a generic exclusion for partially reclaimed metals derived from third party reclamation of hydrorefining and hydrotreating catalysts is not warranted at this time.

The Agency points out that residuals generated from the reclamation of petroleum catalysts and used as ingredients to produce cement would not be eligible for the "commodity-like" exclusion for partially-reclaimed materials. This is because the exclusion in 40 CFR 260.30(c) applies to situations where partial reclamation has occurred, and additional reclamation is required. The variance is meant to cover situations where the partially-reclaimed material is deemed "commodity-like" despite the additional reclamation needed. In contrast, when reclaimed residuals are used as ingredients in a manufacturing process (such as in making cement), the manufacturing process would not be viewed as "additional reclamation" and thus would not fit within the construct of this variance.

As the Agency explained in the preamble to the proposed rule (see 60 **FR** 57781), cement produced from hazardous waste used as an ingredient (e.g., alumina residuals from catalyst recycling) is subject to regulation as a waste-derived product, per 40 CFR 266.20. Under RCRA, products produced from legitimately recycled hazardous wastes that are used in a manner constituting disposal must meet applicable land disposal restrictions treatment standards and the incorporated hazardous constituents must be inseparable by physical means before the product may be marketed and used. EPA did not propose any changes to these existing regulations. However, as mentioned in the preamble to the proposed rule, the Agency may propose changes to the regulations pertaining to waste-derived products that are land applied as part of future revisions to the RCRA regulations.

Comment 2: The proposed rulemaking will impose substantial unnecessary burdens upon catalyst recycling. The RCRA derived-from and mixture rules would be applied blindly to alumina residuals and partially reclaimed metals. As it stands, the proposed rule would unduly increase the costs for generators of spent catalysts, jeopardize or eliminate legitimate markets for alumina residuals and partially reclaimed metals, and require reclamation facilities to incur disproportionate capital costs to store and handle derived-from materials which no longer exhibit any of the risks attributed to spent catalysts. (GCMC, 00042)

Response: EPA's analyses indicate that catalyst wastes present several risks, including pyrophoric properties and significant levels of benzene and arsenic. See response to comment 1 above.

Comment 3: The commenters use alumina from spent catalyst as a feedstock to cement kilns. EPA should acknowledge that legitimate commercial feedstocks produced by or partially reclaimed from spent catalyst are not subject to the derived-from rule, or are entitled to a commodity-like exclusion. (CPC, 00059; GCMC, 00042)

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Response: EPA's analyses indicate that catalyst wastes present several risks, including pyrophoric properties and significant levels of benzene and arsenic. The hazardous constituents present in the waste also are present in the residuals derived from the waste when reclaimed. Given the hazardous nature of these constituents, the Agency believes that it is entirely appropriate for the wastes and derived-from residuals to be transported and stored as hazardous wastes before recycling or reuse.

The Agency points out that residuals generated from the reclamation of petroleum catalysts and used as ingredients to produce cement would not be eligible for the "commodity-like" exclusion for partially-reclaimed materials. This is because the exclusion in 40 CFR 260.30(c) applies to situations where partial reclamation has occurred, and additional reclamation is required. The variance is meant to cover situations where the partially-reclaimed material is deemed "commodity-like" despite the additional reclamation needed. In contrast, when reclaimed residuals are used as ingredients in a manufacturing process (such as in making cement), the manufacturing process would not be viewed as "additional reclamation" and thus would not fit within the construct of this variance.

As the Agency explained in the preamble to the proposed rule (see 60 **FR** 57781), cement produced from hazardous waste used as an ingredient (e.g., alumina residuals from catalyst recycling) is subject to regulation as a waste-derived product, per 40 CFR 266.20. Under RCRA, products produced from legitimately recycled hazardous wastes that are used in a manner constituting disposal must meet applicable land disposal restrictions treatment standards and the incorporated hazardous constituents must be inseparable by physical means before the product may be marketed and used. EPA did not propose any changes to these existing regulations. However, as mentioned in the preamble to the proposed rule, the Agency may propose changes to the regulations pertaining to waste-derived products that are land applied as part of future revisions to the RCRA regulations.

Comment 4: EPA should either: (a) promulgate a conditional listing under which catalysts sent to RCRA-regulated recycling facilities need not be handled as hazardous unless they exhibit a hazardous characteristic, or (b) grant in its final rulemaking an exclusion for commodity-like materials. This exclusion should cover materials that require further processing by others and materials that are necessary ingredients in products made by others. (GCMC, 00042)

Response: EPA's analyses indicate that catalyst wastes present several risks, including pyrophoric properties and significant levels of benzene and arsenic. Based on the assessment of the risks posed by spent catalysts from hydrorefining and hydrotreating the Agency determined that these wastes meet the hazardous waste listing criteria. The hazardous constituents present in the waste also are present in the residuals derived from the waste when reclaimed. Given the hazardous nature of these constituents, the Agency believes that it is entirely appropriate for the wastes and derived-from residuals to be transported and stored as hazardous wastes before recycling or reuse.

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In conducting the risk assessment for the listing determination, EPA assessed the management practices of most concern (e.g., off-site and on-site landfilling). EPA did not evaluate other types of management (e.g., land treatment, recycling). However, these practices also may present risk. Given the data available to the Agency and the manner in which the risk assessment was conducted, the Agency does not view catalyst wastes as a good candidate for a conditional listing. See response to comment 1.

Comment 5: The commenter agrees that residuals should be managed in a responsible manner and that the "mixture" and "derived from" rule should apply in applications where residuals are inserted into cement. The commenter requests that the Agency clarify their definition regarding metals that are partially reclaimed within the preamble of the final rule, to assure that legitimate manufacturing applications are not interpreted to require regulation under RCRA Subtitle C management standards. The utilization of metals products which have been demonstrated to be commercially viable within interstate and international markets are no different from the thousands of other industrial chemicals and intermediate products used as feedstocks with which to make other products. (CRI-MET, 00031)

Response: See response to comment 1.

EPA points out that any party may petition the EPA Regional Administrator for a case-by-case exclusion from the definition of solid waste for materials that have been reclaimed but must be reclaimed further before the materials are completely recovered (see 40 CFR 260.30(c)). Applications for a case-by-case variance must address the standards and criteria for variances provided in 40 CFR 260.31(c).

D. The exclusion of catalyst support media

Comment 1: The commenters support EPA's proposal not to list ceramic support media used with hydrotreating and hydrorefining catalysts. (Amerada Hess, 00027; ARCO, 00023; BP, 00019; Caufield, 00009; CMA - MCP, 00018; CRI-MET, 00031; CRLA, 00029; CRI, 00030; Crystaphase, 00052; Dakota, 00044; Eurecat, 00021; Mobil, 00033; NPRA, 00015; Pennzoil, 00053; Total, 00039; Valero, 00051)

Response: The Agency thanks the commenters for their support.

Comment 2: EPA's definition of "Ceramic Support Media" needs expansion to encompass all the types and shapes of materials currently being employed as "Inert Support Media." (CRI, 00030; CRI-MET, 00031; Crystaphase, 00052; Mobil, 00033; NPRA, 00015; Pennzoil, 00053; Total, 00039; Valero, 00051)

Response: The proposed exemption placed no constraints upon the shape of the support media. As there are similar support media comprising materials in addition to ceramics, the Agency has amended the exemption to read “Inert support media . . . ”

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Comment 3: The commenter recommended that employee clothing be exempt from the proposed listings. (Amerada Hess, 00027)

Response: The Agency's proposal did not address employee clothing. Such clothing worn for employee safety may become contaminated due to incidental contact with listed hazardous products or wastes and if destined for disposal may be regulated by §261.3(a)(iv). Generators will be able to submit delisting petitions if they believe the material is not hazardous. The commenter may petition for such a rulemaking in accordance with §260.20 and §260.22.

Comment 4: EPA should state that the application evaluated by the agency for separating support from catalyst was screening using reasonable efforts. This will eliminate any confusion in various agencies as to what "removed from the catalyst" means. 40 CFR 261.3(c)(2)(ii)(E) should be modified to read as follows:

> (E) ~~Ceramic~~ Inert support media separated by screening or equivalent physical separation from one of the following wastes listed in 261.32 - Spent hydrotreating catalyst used in the refining of petroleum (EPA Hazardous Waste No K171), and Spent hydrorefining catalyst used in the refining of petroleum (EPA Hazardous Waste No. K172). (Crystaphase, 00052; NPRA, 00015; Valero, 00051)

Response: EPA agrees to the clarification for inert support media. In the proposal, the Agency indicated that the listings would not include ceramic support media that is separated from the spent hydrotreating or hydrorefining catalyst prior to catalyst disposal or recycling, because these support media are inert, separate from the catalyst, and commonly reused or sent for cleaning prior to reuse. (See 60 FR 57780). EPA now recognizes that other media other types of inert materials are used, such as stainless steel. Therefore, EPA agrees that the commenters' language better reflects the Agency's intentions, and is modifying the exemption language in 40 CFR 262.3(c)(2)(ii)(E) to reflect this replacement of the term "ceramic" with the word "inert".

EPA does not agree with the other change suggested by the commenter, however. This exemption applies to the support media itself, not to any specific separation process. Thus, EPA does not see any need to revise the language to refer to screening or any other process.

Comment 5: The relief offered by the proposal to exempt catalyst support media will be negated if the standards of 40 CFR Parts 264 and 265, Subparts CC are applied to the K171 and K172 waste streams. At some facilities, the ceramic media are separated from the catalyst using a "shaker" or a screen. The commenter requests confirmation from EPA that neither of these processes involve management of hazardous waste in a tank or container so that the standards of Subparts CC would not be applicable to this operation. (Amerada Hess, 00027)

Response: Subpart CC air regulations are applicable to Subtitle C hazardous waste that is managed in tanks, containers, or surface impoundments. There is no distinction made regarding the waste code of the hazardous waste; all RCRA hazardous waste is subject to the standards if it

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is managed in one of these unit types. In addition, waste that is transferred between any affected tanks and impoundments must be transferred through enclosed piping. Thus, the CC air rules would only apply to this shaker operation if (1) the shaker is considered by the facility's RCRA permitting authority to be a tank or container, or (2) the shaker is a process located between two other units that are subject to Subpart CC (e.g., the shaker is situated at a point where the hazardous waste is being transferred between CC-regulated tanks and impoundments.

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VIII. HEADWORKS EXEMPTION

Comment 1: The commenters support the headworks exemption for residuals (CSO) managed in refinery oil recovery sewers prior to primary separation. (Amerada Hess, 00027; BP Oil, 00019; Caufield, 00009; Chevron, 00050; CRI-MET, 00031; Mobil, 00033; NPRA, 00015; Pennzoil, 00053; Texaco, 00049; Valero, 00051)

Response: The Agency thanks the commenters for their support.

Comment 2: The commenter requests that EPA clarify that the headworks exemption does extend to zero discharge facilities which have Clean Water Act equivalent wastewater treatment units. (Texaco, 00049)

Response: The exemption would extend to facilities subject to regulation under section 402 or section 307(b) of the Clean Water Act and would include facilities that have eliminated the discharge of wastewater. This clarification is already included in the regulations in 261.3(a)(iv) and specifies that wastewaters at facilities that have eliminated discharges are included.

Comment 3: The commenters requested clarification that the headworks exemption to include the spent hydrotreating and hydrorefining catalysts, allowing refiners to continue the practice of using water to cool and wash these spent catalysts prior to further management. (API, 00046; Amerada Hess, 00027; BP Oil, 00019; Chevron, 00050; CRI-MET, 00031; Mobil, 00033; NPRA, 00015; Pennzoil, 00053; Phillips, 00055; Texaco, 00049; Valero, 00051)

Response: As described in the April NODA, EPA has considered the commenters request and conducted an assessment to determine the appropriateness of expanding the proposed headworks exemption. The results of this analysis show that little risk is likely to be incurred by this practice. It is the Agency's understanding that the use of water during the catalyst changeout process provides a number of benefits, including lowering worker exposure risk to and emissions of volatile organics, lowering the risks associated with the catalyst's potential self-heating nature, and minimizing the need for worker entry into the confined space of the catalytic reactors during changeouts. EPA therefore has concluded that it is appropriate to exempt this low risk, beneficial practice under the headworks exemption.

Comment 4: The commenter provided characterization of reactor drilling water and requested that EPA note the similarity between inlet drill water and water from the catalyst oxidation pad and provide an exclusion to include all waters discharged before primary oil/water/solids separation. (API, 00046; Chevron, 00050)

Response: The commenter's data and EPA's assessment of these data are presented in the docket to the April NODA. This analysis showed these discharges are not likely to cause any increase in risk. Without the exemption, these drill and pad drainage waters would be derived from hazardous wastes, such that facilities that had chosen to wet dump, would face the choice of

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managing a dry or oiled catalyst dump, or risk having all down stream wastewater treatment solids be considered "derived from" hazardous wastes should these wastes be discharged to the treatment system. Given the low levels of risk predicted and the beneficial nature of the described practice, EPA has granted the commenter's request for an expansion of the headworks exemption.

Comment 5: If crude tank bottom sediment is listed, the commenters support EPA's plans to modify the headworks exemption to §261.3(a)(2)(iv)(C) to avoid unnecessary costs for residuals that can easily and effectively be managed in refinery wastewater systems. (API, 00046; Mobil, 00033; Sun, 00034)

Response: The Agency thanks the commenters for their support.

Comment 6: EPA's proposal to exempt from regulation previously listed refinery wastes (K050), CSO residuals, and crude oil storage tank sludge, where it is transported from the point of generation in the refinery by any means and discharged into the refinery wastewater treatment system must be reconsidered and rejected, because it encourages waste constituent volatilization and dilution, rather than pollution prevention and superior waste management. The sole justification for the proposal is the Agency's "belief" that the hazardous constituents in these wastes would wind up in RCRA regulated wastewater treatment sludges. Yet EPA offers absolutely no proof for this belief, and completely fails to address why significant concentrations of hazardous constituents would not be released through volatilization into the air before they reach the sludge, or remain in the wastewater and bypass the primary sludge only to settle in the unregulated treatment sludges further down the treatment train. No fate and transport analysis is provided, and no risks to human health and the environment were assessed.[117] (EDF, 00036)

Response: First, EPA notes that K050 is currently exempt under the previously existing provisions of 261.3(a)(2)(iv)(C). EPA proposed to exempt K170 waste in the same manner. As noted earlier in response to comments on spent caustic in Section IV.E.2, EPA does not believe that discharges to wastewater treatment systems are likely to present significant risks. EPA also notes it did not find air releases of volatiles, such as benzene, to be a significant risk for any of these wastes for any disposal practice evaluated. Thus, EPA does not believe that any air releases from a much more dilute waste generated during tank or unit clean outs are likely to present significant risk. The Agency notes that the benzene NESHAP (55 FR 8292; March 7, 1990)

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[117]EDF notes that in the Phase IV LDR rulemaking, less information was provided on the fate of hazardous constituents in petroleum refinery wastewater treatment systems than for other industrial sectors. See Summary of Data Needs for Phase IV LDR Rulemaking, August 23, 1995, at 6 (data on the petroleum refinery sector is "particularly scarce"). In testimony before the Congress, EPA officials indicated a preference for evaluating risks posed by unregulated wastewater treatment impoundments and sludges as part of the listing determination process. Yet in this rulemaking, even though EPA did not evaluate those risks, the Agency proposed an exemption certain to worsen the current situation.

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provides significant control of emissions from the wastewater conveyance system and that the reported amount of sediments managed in this manner is small relative to the total volume waste being given this exemption.

Discharges of tank cleaning waters are infrequent and are expected to generate relatively small volumes of water in comparison with the typical wastewater flow through a refinery treatment system. These tank cleaning are used to facilitate tank inspections, which are critical to ensuring tank integrity and to avoiding catastrophic tank failure. Without this exemption, tank washing will become much more difficult because of the need to find alternative Subtitle C disposal methods for these wastewaters. Also, the tank washings are different in nature from the sediments characterized for the listing determination. While these washes are primarily water, the sediments are primarily solid, subject to land disposal methods such as the landfilling and land treatment evaluated in EPA's risk assessment.

As a point of clarification described in the NODA, the proposed rule does, in fact, provide justification for this exemption in the *Risk Assessment* section III.F.2.(c). Specifically, in section III.F.2.(c)(2) entitled "*Disposal in Wastewater Treatment Plants,"* EPA discusses reasons why such disposal was not considered to warrant risk modeling, primarily due to existing regulatory coverage and the treatment and dilution that occurs in wastewater treatment plants (see *60 FR 57759)*. To respond fully to this commenter, EPA presented a further analysis in the NODA to illustrate the magnitude of treatment and dilution that would occur at the headworks of a refinery for both CSO tank sediment and spent hydrotreating/hydrorefining catalysts. (See Sections 8 and 9 in Supplemental Background Document--Listing Support Analysis, March 1997). EPA notes that it completed a similar analysis for crude oil storage tank sediment to respond to the commenter's concerns expressed about this waste also (see Additional Listing Support Analysis, 1998 in the docket). EPA concluded from these analyses that any impact on the downstream wastewater treatment sludge or wastewaters would be negligible.

The Agency observed that many refineries conduct de-oiling of tank contents and sediments prior to disposal and tank inspection. This practice appears to reduce sediment quantities by an average of 40 percent, a substantial savings of raw materials (i.e., oil recycled back to the refining operations) and disposal costs. Upon promulgation of this listing, EPA believes even greater amounts are likely to be subjected to oil recovery and waste minimization. With respect to the commenter's concern regarding impacts on the wastewater treatment system, these recycling activities will further reduce the load on the treatment system below current levels.

Refineries are unlikely to increase discharges of toxicants and oily materials (i.e., the wholesale flushing of sludges) to their wastewater treatment because of existing stringent regulatory controls, as well as physical limitations of treatment capacity. Refinery wastewater treatment systems are currently subject to air emission controls via the Benzene NESHAPs and effluent limitations via the CWA. Refineries avoid overloads to their biological treatment trains in order to maintain their effectiveness.

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Because of the existing NESHAP and effluent guideline controls on these materials, as well as the existing sludge listings, and the inherent differences between the sediments modeled and the tank washings, EPA believes that it is appropriate to finalize the headworks exemption.

Comment 7: Even if EPA could conclusively demonstrate that the currently regulated wastewater treatment sludge would capture most of the concentration of hazardous constituents in the listed hazardous wastes, the proposed exemption would nevertheless violate the land restrictions program of RCRA and encourage dilution at the expense of pollution prevention. Dumping the listed wastes down the wastewater treatment system and eventually into surface impoundments is not BDAT for these wastes as proposed by EPA. Therefore, through this exemption, EPA would be encouraging the further land placement of wastes in wastewater surface impoundments using a practice that bears no relationship to the treatment standards sought by Congress in Section 3004(m) of RCRA. In addition, EPA would be encouraging the dilution of the wastes that was neither necessary nor related to achieving BDAT. (EDF, 00036)

Response: The Agency does not believe it is a common sense approach to require the management of the washwaters from a tank cleaning in the same manner as the bulk of the material. The proposal is consistent with the Agency's prior exemption language of K050 wastes (§261.3(a)(2)(iv)(C)). In the case of K050, power washing was the manner in which most waste was separated from the heat exchanger bundle. As noted in response to comment 7 above, EPA does not believe that this exemption will encourage the discharge of concentrated material to the wastewater treatment system, thus the impact on downstream surface impoundments will be negligible.

Comment 8: While EPA has issued headworks exemptions in other contexts, those exemptions apply to discharges of <u>wastewaters</u> incidentally co-disposed with other wastewaters as a result of facility design and piping systems, and for which concentration limits are established. Similarly, when finalized, HWIR would provide a risk-based exit level for mixtures of wastes in wastewater treatment systems. In this context, EPA would apply the exemption to tank sludge and cleaning sludge that are emptied from the units in which they are generated, segregated from the wastewater treatment system, and capable of being managed like any other listed wastes in accordance with the land disposal restrictions. Moreover, the exemption would apply irrespectively of contaminant concentration in the wastes. Simply because several refineries currently choose to manage their tank sludges in wastewater treatment systems does not justify creating a new precedent potentially applicable to other sectors that would encourage dilution at the expense of meeting BDAT. (EDF, 00036)

Response: See the response to comment 6 above for EPA's rationale for granting the exemption. The commenter is incorrect in the assumption that the entire wastewater treatment is a management field for tank cleaning sludges. Refinery wastewater treatment systems are unique in that they contain process units (such as the API separator) that remove solids up front. This prevents high loadings of tank solids in the rest of the wastewater treatment system and provides for the solids to be managed as hazardous wastes upon their removal. It also provides for

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separation of these organics in an area of less occupational risk to refinery employees.

The Agency has conducted analyses of the wastewater treatment sludges when various solids are washed from tanks and subsequently separated. Given the low risk that has been determined by these analyses, the Agency finds it difficult in this case to justify regulating these processes, particularly when use of alternatives, on the balance, have the potential to present more human health risks as well as impose additional regulatory costs for no additional environmental benefit.
Comment 9: Many refineries may elect to manage their wastes in this manner, if by doing so they are rewarded with an exemption and can thus avoid the price of complying with BDAT. EPA did not analyze whether or how the creation of this exemption would affect the behavior of refineries not currently using this practice. (EDF, 00036)

Response: Electing to generate solids in API separator sludge rather than at the tank being cleaned may not necessarily "avoid" any compliance with BDAT standards. In addition, facilities able to take advantage of the exemption must comply with Land Disposal Restrictions regulations at 40 CFR 268.7(a)(6), which states, "If a generator determines that he is managing a restricted waste that is excluded from the definition of hazardous or solid waste or exempt from Subtitle C regulation, under 40 CFR 261.2 through 261.6 subsequent to the point of generation, he must place a one-time notice stating such generation, subsequent exclusion from the definition of hazardous or solid waste or exemption from Subtitle C regulation, and the disposition of the waste, in the facility's file." Clearly, the LDR program anticipated that certain wastes may qualify for an exemption of some kind, and the program contains this requirement so facilities can show that the process by which the waste qualifies for the exemption is technically feasible and, in fact, is taking place as the facilities may claim. The argument that facilities "can avoid the price of complying with BDAT" seems to imply that any hazardous or solid waste exemption or exclusion provides avoidance with BDAT and thus should not exist.

EPA can only speculate, like the commenter, on the behavior of refineries after the exemption is effective. However, the Agency refers to Section II.A in the NODA Comment Response Document in the docket for more discussion concerning why refineries are unlikely to do as the commenter fears. For example, comment 8 in that section provides arguments why such wholesale discharge of concentrated wastes in the wastewater treatment system are highly unlikely for refineries, given the economic impact.

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IX. WASTE MINIMIZATION

A. Source reduction and recycling techniques for residuals of concern

No specific comments were submitted in response to this request, however, the importance of waste minimization and various associated incentives and disincentives are discussed in detail in the context of other issues (e.g., the need for contingent management exclusions for spent catalysts).

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X. LAND DISPOSAL RESTRICTIONS

A. The Agency's approach to developing Land Disposal Restrictions.

1. Constituents of Concern

Comment 1: If these materials were to be listed, the LDR constituents of concern should be limited to benzene and arsenic, since these are the only two compounds which have significant risk associated with the management of the material. Inclusion of the PAH compounds and other metals is not warranted and will require additional cost to characterize the material prior to management. Their inclusion may prevent beneficial recycling practices due to unnecessary LDR requirements on reclaimer residuals as discussed above. (Texaco, 00049)

Response: The Agency disagrees. EPA is required to set ". . . levels or methods of treatment, if any, which substantially diminish the toxicity of the waste or substantially reduce the likelihood of migration of hazardous constituents from the waste so that short-term and long-term threats to human health and the environment are minimized" (RCRA Section 3004(m), 42 U.S.C. 6924(m)). It is well-established that to satisfy this requirement treatment standards must address the hazardous constituents present in wastes at levels which could pose threats when the wastes are land disposed, and that treatment is to minimize these threats. See e.g. Chemical Waste Management v. EPA, 9076 F.2d 2,15-17 (D.C. Cir. 1992). The Agency is not precluded from regulating additional constituents in the waste.

While the commenter is correct in that for K171 and K172 only benzene and arsenic were given as the basis of listing, treatment standards were also proposed for additional metals and polycyclic aromatic hydrocarbons (PAHs). In the case of toxic heavy metals, the metals remain in the treatment residue and may be concentrated to levels of concern during treatment. The additional metals (antimony, nickel and vanadium) proposed in addition to arsenic are each present at significant concentrations in the K171 and K172 wastes and if not adequately treated would present risks to human health or the environment. As for PAH compounds, the hazardous constituents of concern for K170 are aromatic organic and PAH compounds. PAH compounds such as benzo(a)pyrene are highly carcinogenic even at low concentrations, and are present at significant concentrations in the petroleum residuals. Although, these constituents were not modeled to show significant risks through the pathways considered for K171/K172, their presence in the wastes remain a potential treat to human health and the environment. The Agency also notes that treatment standards for PAHs and nickel are currently required for other similar listed petroleum wastes (F037, F039, and K048-K052) and that damage cases associated with these wastes have noted environmental effects due to both metals and PAHs. (See Background Document to Support Listing of Primary Oil/Water Separation Sludges, August, 1990.) The Agency is therefore promulgating treatment standards for all the constituents that were proposed to be regulated.

Comment 2: The commenters support the application of a concentration based treatment

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standard for the catalyst materials that are listed. (CMA - M.P., 00018; CRI, 00030; CRI-MET, 00031; CRLA, 00029)

Response: The Agency acknowledges the commenter's support of the proposal.

2. Sulfides

Comment 1: The commenter recommended that if a new treatment standard for K171 and K172 is adopted it must include a concentration level. EPA is proposing to regulate the sulfide reactivity in these wastes via a treatment standard expressed as Deactivation to Remove Reactive Sulfides. The level of 500 ppm for reactive sulfides has been used as the level below which a waste is not considered as Reactive. This level should be specified as an exit level for land disposal restrictions. The level is referenced in SW-846. The level has been provided as guidance by the EPA's RCRA Hot Line for years. The level has been used by the commenter as a cutoff for the Reactivity classification.

Reactive Sulfide "Regulated Hazardous Constituent" should not be equated with the RCRA Characteristic of Reactivity as specified in 40 CFR 261.23. Removal of the Reactive Sulfide by (1) deactivation or (2) reduction below 500 ppm, should be considered only in the context of meeting the Land Disposal Restrictions. K171 and K172 Catalyst will not normally fail the characteristic for Reactivity, however if the catalyst did contain greater than 500 ppm reactive sulfide it should not be classified as a characteristic waste since the sulfide is an identified constituent of the hazardous waste listing. Without clarification of this issue the regulated community may be held to a double standard of a Listed Waste and a Characteristic Waste. Underlying Hazardous Constituents of a characteristic waste should not be an issue for a listed waste which (1) not managed as a waste and/or (2) treated for the regulated hazardous constituents. (Shell, 00047)

Response: Listed wastes may also exhibit one or more characteristics of a hazardous waste. For the reactive sulfides subcategory based on §261.23(a)(5), the Agency has set Deactivation (DEACT) as the applicable land disposal restriction. Listed wastes which also exhibit characteristics of a hazardous waste must comply with all applicable treatment standards for characteristic wastes (unless the treatment standard for the listed waste contains a standard for the constituent that causes the waste to exhibit a characteristic. See 268.9 (b)). Because the K171 and K172 wastes each frequently contain reactive sulfides and as a result may exhibit self-heating pyrophoric properties, the Agency specifically proposed to apply DEACT to these wastes although sulfides are not hazardous constituents (since they are not listed in 40 CFR Part 261 Appendix VIII). See 60 FR 57783-5. Therefore, the newly listed K171 and K172 wastes would have to comply with the UTS levels for the specified hazardous constituents and DEACT for reactive sulfide prior to land disposal.

Under current guidance, the DEACT treatment standard would only apply to wastes that are greater than 500 ppm sulfide at the point of generation. 40 CFR 261.24 (a)(5) defines a reactive

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sulfide bearing waste to be any waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment. While threshold concentrations have not yet been promulgated, the Agency has provided the concentration of 500-mg/kg total available sulfide as an interim action level. (See OSWER Directive 9443.1985(04)). Any waste that yields sulfide values at or above the action level is considered to be hazardous, as a guide but not as a rule. Some individualized determination needs to be made in each case. Deactivation of the reactive sulfide characteristic may be demonstrated through the application of proven treatment technologies such chemical oxidation (CHOXD) or combustion (CMBST), or any other treatment that removes the characteristic by reducing the sulfide concentration to below the action level, other than through impermissible dilution.

3. Underlying Hazardous Constituents

Comment 1: EPA should not subject listed hazardous wastes to LDR regulations regarding Underlying Hazardous Constituents. (Heritage, 00010)

Response: The Agency wishes to clarify that listed wastes are not subject to UHCs *per se.* UHCs are regulated in characteristic wastes (40 CFR 268.1). Listed wastes are regulated for the constituents which caused the waste to be listed and any other hazardous constituents specified in the specific treatment standard that are found to be present at levels where they could possibly cause harm to human health and the environment when the wastes are land disposed. (See also discussion in response to comment 1 in Section X.A.1 above.) The basis for the distinction is that EPA has already studied the listed wastes to determine the hazardous constituents that are typically present, but is unable to do so for characteristic wastes, since as a class, they are much more diverse. The Agency is promulgating treatment standards for each of the proposed hazardous constituents.

4. HTMR

Comment 1: The commenter endorses the designation of High Temperature Metal Recovery as BDAT. (Dakota, 00044)

Response: The Agency has finalized numerical standards for the newly listed wastes. Treaters may use any method they choose to achieve those standards, so long as the treatment is not considered impermissible dilution.

Comment 2: The commenter recommends that metal alloy products obtained using High Temperature Metal Recovery (BDAT) processes be exempted from a hazardous designation where a known market for these end products exists. (Dakota, 00044)

Response: The commenter states that EPA should exclude from the definition of hazardous waste, metal alloy products obtained from high temperature metal recovery. In 1985 (50 F.R.

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614, 634; January 4, 1985), EPA promulgated the final rule on the definition of solid waste including jurisdictional limits and regulatory requirements for waste-derived products. In that rule, the Agency addressed the issue of reclaimed metals directly:

> "...reclaimed metals that are suitable for direct use, or that only have to be refined to be usable are products, not wastes." 50 F.R. 614, 634 (January 4, 1985).

Furthermore, materials that are reclaimed from solid wastes and that are used beneficially are not solid wastes and hence are not hazardous wastes. (See 40 CFR 261.3(c)(2).) Therefore, metal alloy products extracted from metal-bearing hazardous wastes through high temperature metal recovery are not solid wastes or hazardous wastes provided that they are not used on the land, burned for energy recovery, or reclaimed further.

5. Vanadium

Comment 1: The proposed UTS for vanadium is not feasible and appropriate. EPA erroneously concluded that vanadium in spent catalysts could be treated to 0.23 mg/l in non-wastewaters and 4.3 mg/l in wastewaters because those levels were achievable with respect to other wastes. Unfortunately, EPA failed to note that these other wastes either contained no vanadium to begin with, or at most contained vanadium at orders of magnitude below the levels found in spent catalysts. Furthermore, the wastes used to justify the vanadium UTS for spent catalysts were not ultimately subjected to a concentration-based vanadium UTS. (Data provided.) (CMA - M.P., 00018; CRLA, 00029; GCMC, 00042)

Response: In response, EPA evaluated additional data from the stabilization of wastes containing vanadium at levels below which metals recovery is feasible and, based on this data, calculated a standard of 1.6 mg/L TCLP for nonwastewaters. The Agency proposed that this higher standard replace the 0.23 mg/L TCLP standard originally proposed and believes that this standard is readily achievable (see 62 FR 26047, May 12, 1997). A facility unable to comply with the treatment standard may apply for a treatability variance under 40 CFR 268.42 (assuming the waste has been treated using the properly-operated technology on whose performance the treatment standard is based and still is unable to meet the treatment standard).

Vanadium is not an underlying hazardous constituent of hazardous wastes that requires treatment in all characteristically hazardous wastes. See 268.48 note 5. However, vanadium in the form of ammonium vanadate or vanadium pentoxide are underlying hazardous constituents (since they are included in Appendix VIII of Part 261). In the course of the combustion of coke residues on the spent catalysts, vanadium compounds adsorbed on the catalysts are converted to vanadium pentoxide and the wastes are typically subjected to metals recovery for the vanadium pentoxide. Because the presence of vanadium pentoxide would impart acute toxicity to the wastes and can be readily measured as the vanadium metal, the Agency proposed treatment standards for vanadium as a constituent of concern in K171 and K172 as a surrogate measure to limit the presence of vanadium pentoxide in the wastes and to insure that the toxicity of the waste was diminished prior

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to disposal. See also 60 FR 57784, November 20, 1995. Without reduction of their vanadium content, the K171 and K172 wastes would contain significant levels of vanadium in the form of toxic vanadium pentoxide.

The commenter correctly notes that the Agency has not imposed vanadium UTS standards in K061 wastes. This does not prevent the Agency's transference of treatability data to K171 and K172, because of the similar form and concentrations between reclaimed catalysts and K048-K052 and K061. See EPA's response to comment 2 below. The Agency maintains that following such reclamation the treated waste would be very comparable to K046-K052, and K061 in vanadium content.

During calcination vanadium would be raised to a higher oxidation state (V) which is routinely removed via acid leaching by the catalyst reclaimers. To undergo stabilization vanadium (V) like chromium (VI) would require reduction to a lower oxidation state. Without reduction or prior extraction of the vanadium, it would be unlikely high vanadium wastes, like K171/K172, could be stabilized without significant dilution, as shown in the commenter's data. However, the data provided attempted no extraction or reduction to make the vanadium amenable for stabilization.

As noted above, vanadium is of such high concentration in the K171/172 wastes that they are typically reclaimed and serve as the ore from which vanadium is extracted for vanadium pentoxide production. Because of the oxidative conditions the spent catalyst has been subjected to burn off coke deposits prior to disposal, the form of the vanadium residue in the spent K171/K172 catalysts is likely to be various oxides of vanadium including the highly toxic form vanadium pentoxide, which is listed on 40 CFR 261 Appendix VIII. As a measure of the presence of the potential concentration of toxic vanadium pentoxide present, the concentration of total vanadium is used as a surrogate, because of the lack of analytical methods to speciate metals. The Agency is therefore promulgating treatment standards based on the total vanadium measurement.

Comment 2: The Agency assumed that spent catalysts and their residuals are physically and chemically similar to K048-K052 and K061 wastes. The chemical composition of K048-K052 and K061 wastes is quite different than that of spent catalysts. The principal difference is that spent catalysts have higher concentrations of vanadium than K048-K052 and K061 wastes. The commenter identified other physical differences between spent catalysts and K048-K052 and K061 wastes. Such differences apparently prevent the stabilization of Vanadium in spent catalysts. (GCMC, 00042)

Response: The commenter is correct in that the residuals are chemically and physically quite different at their respective points of generation. However, both K061 and K171/K172 wastes contain similar metals that are largely metal oxides once K171/K172 is deactivated. Data assembled by the commenters show that K048-K052 contain 1-350 ppm vanadium, and that K061 concentrations range from 0-830 ppm, while vanadium in K171 ranges from 10-3300 ppm and in K172 vanadium ranges from 25-31000 ppm. The commenter also states that K172 has been observed as high as 150,000 ppm vanadium and notes that after deactivation to remove the

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D003 characteristic the vanadium present is highly leachable. However, the commenter presents data that then attempts to stabilize the deactivated waste with cement and lime, rather than proceeding through the reclamation of a vanadium pentoxide product normally produced by both GCMC and CRI-MET (GCMC page 2). The Agency maintains that following such reclamation the treated waste would be very comparable to K046-K052, and K061 in vanadium content as little vanadium would remain. Confidential data from the metal recovery industry indicate that these processes recover over 90% of the vanadium present. Without such reclamation, it would be unlikely that high vanadium wastes, like K171/K172, could be stabilized to the UTS level. The vanadium UTS level can be achieved, therefore, through proper treatment which includes a reclamation step. Data on stabilization alone for high vanadium wastes does not reflect proper treatment and the Agency therefore is not compelled to modify the level based on this data.

The Agency has further evaluated additional data from the stabilization of wastes containing vanadium at concentrations below which metals recovery is feasible and based on this data calculated a new UTS standard of 1.6 mg/L TCLP for nonwastewaters. The Agency has proposed that this higher standard replace the 0.23 mg/L TCLP standard originally proposed and believes that this standard is readily achievable. Should a facility be unable to comply with the UTS standards, the facility may apply for a treatability variance under 40 CFR 268.42 (assuming the waste has been treated using the properly-operated technology on whose performance the treatment standard is based and still is unable to meet the treatment standard).

Comment 3: The UTS for vanadium could not be rationally based on International Mill Service K061 data, and to the extent that the UTS for vanadium could be based on INMETCO's K061 waste, the UTS cannot be automatically transferred to spent catalysts because those standards are not feasible. (GCMC, 00042)

Response: The Agency has further evaluated additional data from the stabilization of wastes containing vanadium at concentration below which metals recovery is feasible and based on this data calculated a new UTS standard of 1.6 mg/L TCLP for nonwastewaters. The Agency has proposed (60 FR 57783) that this higher standard replace the 0.23 mg/L TCLP standard originally proposed and believes that this standard is readily achievable. Should a facility be unable to comply with the UTS standards, the facility may apply for a treatability variance under 40 CFR 268.42.

The prior treatment standard for vanadium was based on data obtained from IMS's HTMR facility. As revised in the recent Phase Four LDR Rule, the vanadium standard is derived from stabilization data. The performance levels promulgated were achievable by the other facilities from whom the Agency had also collected data (See 59 FR 47980, September 19, 1994). The Agency believes the residuals following vanadium metal recovery of the K171 and K172 wastes can achieve the treatment standards measured on the basis of vanadium and provide protection against the a significant presence of acutely toxic vanadium pentoxide in the land disposed waste.

As noted in the proposal, EPA has determined that it is technically feasible to apply UTS to the

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K171 and K172 spent catalysts. K061 and the spent K171 and K172 are both largely inorganic matrixes with similar chemical and physical characteristics. Each has demonstrated use as a source for metals recovery. While the catalyst's do initially contain significantly higher levels of vanadium, reclamation has been shown to recovery over 90% of the vanadium. With this recovery, residual vanadium levels are analogous to those contained in K061. The Agency believes the residuals from vanadium recovery, if any, would achieve the UTS level. The commenter has provided no data demonstrating that UTS can not be met when metals recovery has been performed. The commenter's data does demonstrate that without metals recovery vanadium levels would exceed UTS levels with stabilization alone.

Comment 4: The commenter suggests using the proposed Subtitle C exit levels for vanadium established under HWIR. Since the Agency's proposed HWIR exit limit values represent conservative, industry-wide criteria for exiting substantive Subtitle C management requirements, i.e., self-determined delisting, these values would be appropriate to substitute as LDR/UTS treatment standards that conflict with technical limitations based on practical management experience. (CRI, 00030; CRI-MET, 00031; CRLA, 00029)

Response: In the HWIR proposal, proposed HWIR exit levels (vanadium-wastewater 10 mg/L; nonwastewater 250 mg/kg total & 4 mg/L leachate; 60 FR 66451, December 21, 1995) would "cap" existing technology-based LDR standards, where the exit levels are less stringent than the current LDR values should the HWIR proposal be finalized as proposed. (See 60 FR 66408, December 21, 1995.) The Agency continues to review public comment on the HWIR proposal and the modeling therein. It would be premature of the Agency to adopt the proposed HWIR levels as LDR standards at this time.

B. Applicability of other thermal and non-thermal treatment or recovery technologies to petroleum refining wastes

Comment 1: After extensive testing, the commenter has determined that the proposed UTS method for vanadium does not result in achievement of the proposed 0.23 mg/l concentration in treated spent catalysts. When the commenter subjected spent catalysts to this treatment method, the results were quite different that those expected by the agency. First, although calcination at high temperature (DEACT) removed the reactivity (D003) and ignitability (D001) characteristics, it also promoted the leachability of vanadium, nickel, and arsenic. Second, stabilization (STABL) of the deactivated material with cement and lime failed to reduce the vanadium concentration in the TCLP leachate below 120 mg/l. In fact, the proposed vanadium UTS of 0.23 mg/l could not be met even when the amount of cement and lime was equivalent to 115 percent of the weight of the spent catalyst. Thus, if one were to follow this treatment, the amount of waste would more than double without attaining the proposed UTS for vanadium. (GCMC, 00042)

Response: The commenter is correct in that deactivation and stabilization alone would not result in waste leachate levels likely to meet the proposed UTS treatment standards when starting with a high vanadium waste. However, these two treatment steps alone do not constitute the normal

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treatment applied to the spent catalyst wastes K171 and K172, and is not considered BDAT by the Agency. In normal metals recovery operations, the commenter specifically processes the deactivated wastes to recover vanadium, nickel/cobalt, and molybdenum. Without such metals recovery steps, it would be unlikely the waste could be treated to meet the UTS treatment standards. The commenter has provided no data to show that residuals from its normal recovery operations could not be adequately treated to meet the proposed UTS treatment standards. Furthermore, such metals reclamation steps are consistent with RCRA's goals to protect human health and the environment, reduce waste and conserve energy and natural resources, and reduce or eliminate the generation of hazardous waste as quickly as possible.

C. Other comments

No comments were received on these specific issues.

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XI. LDR CAPACITY DETERMINATIONS

EPA received several capacity-related comments on the proposed rule published on November 20, 1995 (60 FR 57747) and on the Notice of Data Availability (NODA) published on April 8, 1997 (62 FR 16747). The following is a summary of the capacity-related comments on both the proposed rule and the NODA and Agency responses. The source of each comment represented is indicated by the commenter name and comment number. Comments from NODA are denoted by NODA and followed by the comment number.

A. Treatment/recovery (e.g., reclamation/regeneration) capacity is not readily available to manage the catalyst wastes; EPA should issue a one- to two-year national capacity variance specific to recycling and reclamation facilities

Comment Summary: One commenter feels that it is imperative that a phase-in period, or a delay in the rule's effective date for the management of spent catalysts be provided in the final rule. Gulf feels that a phase-in period of no less than one year would provide sufficient time to come into compliance with Subtitle C standards. (Gulf Chemicals, 00042)

Two commenters requested a national capacity variance specific to catalyst recycling and reclamation facilities to allow for time for complying with the additional regulatory burdens (e.g., LDR treatment standards, upgrading of storage areas, obtaining permits/variances). (CRI International, 00030; AMEX/CRI-MET, 00031/NODA7)

Response: The LDRs are effective when promulgated, unless the Agency grants a national capacity variance from the statutory date because of a lack of available capacity. RCRA section 3004(h)(2) authorizes EPA to grant a national capacity variance for the waste and to establish a different date (not to exceed two years beyond the statutory deadline) based on "...the earliest date on which adequate alternative treatment, recovery, or disposal capacity which protects human health and the environment will be available." The Agency notes that LDR capacity determination is done on a national basis (*S.Rep. No.284, 98th Cong., 1st Sess. 19)* -- both the capacity of available treatment technologies and the quantity of restricted wastes. For a description of the capacity analysis methodology, please see the discussion in the Background Document for Capacity Analysis for Land Disposal Restrictions (Final Rule), June 1998.

Based on the results of the Agency's capacity analysis, adequate commercially-available treatment or recovery capacity does currently exist for all wastes regulated under this rule, including K171 and K172 wastes. Furthermore, granting a national capacity variance only exempts the waste from treatment standards prior to land disposal during the variance period, but does not exempt the waste from other Subtitle C requirements, such as the requirement to have a permit for storage of hazardous waste at a generator's site for greater than 90 days. EPA believes that six months is sufficient for facilities to handle logistical problems associated with complying with the new LDR standards. Also, there are treatment/recovery facilities available to accept K171 and K172 wastes to comply with Subtitle C requirements when the listing determinations and LDR

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become effective (e.g., See Appendix 1 of the Background Document for Capacity Analysis for Land Disposal Restrictions (Final Rule), June 1998 for telephone logs for interviews with treatment/recovery facilities). Therefore, LDR treatment standards will become effective when the listing determinations become effective for the wastes covered under this rule. See RCRA 3004(h)(1) (land disposal prohibitions must take effect immediately when there is sufficient protective treatment capacity for the waste available). [Regarding extending the overall effective date of the listing, the Agency notes that RCRA section 3010(b) requires the effective date of all rules to be established no later than six months after rulemaking publication in the Federal Register.]

B. Required capacity changes due to promulgation of unconditional listings vs. Listing exemptions

Comment Summary: A number of commenters suggested that EPA use some system of conditional listings/management exemptions or exclusions which tailor waste management requirements more closely with risk. These proposed and suggested exemptions include:

- making the listing conditional upon the management of the residual
- exempting spent catalysts from the listing definition if the catalyst is sent to regeneration/reclamation/recycling
- exemption for oily wastes returned to the refining process
- exemption for recovered oil generated at non-refining facilities sent to the refining process
- exempting the regeneration of spent catalysts performed in situ
- exemption from BIF regulations for catalyst recycling units
- a generic exclusion as “commodity-like” for metals reclaimed from spent catalysts
- exclusion of catalyst support media
- exclusion of spent caustic used as feedstock
- a headworks exemption

Specifically related to comments received by EPA on a headworks exemption, commenters claim that some derived-from residuals generated by the management of these wastes were not included within the scope of the Agency’s capacity analysis conducted for the proposed rule. A commenter provided characterization data for reactor drilling water (a waste not accounted for in the capacity analysis for the proposed rule) and requested that EPA note the similarity between inlet drill water and water from the catalyst oxidation pad and based upon the data submitted, provide an exclusion to include all waters discharged before primary oil/water/solids/separation. (API, 00046/NODA9; Amerada Hess, 00027; Amoco, 00062; Atlantic Richfield, 00023; BP, 00019/NODA11; Caufield, 00009; Chevron, 00050/NODA14; CMA, 00018; CPC, 00059; CRI, 00030; CRI-MET, 00031/NODA7; CRLA, 00029; Crystaphase, 00052; Dakota, 00044; Eurecat, 00021; Exxon, 00035; GCMC, 00042; Heritage, 00010; INMETCO, NODA3; Marathon, NODA10; MIRC, 00045; Mobil, 00033/NODA2; NPRA, 00015/NODA4; Pennzoil, 00053; Phillips, 00055/NODA12; Safety-Kleen, 00032; Shell, 00047; Sun, 00034/NODA8; Texaco, 00049/NODA13; Total, 00039; Valero, 00051; Western Independent Refiners Association,

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00024)

Response: In the final rule, the Agency is finalizing some of the exemptions and exclusions presented above. These exemptions and exclusions include the following:

- a headworks exemption (section IV.C.4 of the preamble)
- exclusion for oily wastes returned to the refining process (section IV.A.1)
- exclusion for recovered oil generated at non-refining facilities sent to the refining process (section IV.A.2)
- exemption of catalyst support media (section IV.C.2)
- exclusion of spent caustic used as feedstock (section IV.A.3)

Although not all exemptions and exclusions proposed and suggested were finalized, these decisions resulted in a decrease in the total quantity of waste requiring treatment (i.e., this reduces the demand for treatment capacity for these wastes). Additionally, the Agency received no comments from generators expressing concern about the availability of treatment capacity. Given that sufficient treatment capacity exists, the LDR standards will become effective for these wastes when the listings become effective.

C. Ability of facilities to treat the wastes and meet treatment standards

Comment Summary: EPA received several comments regarding the ability of facilities to treat the newly-listed wastes to the proposed LDR treatment standards (e.g., the proposed UTS level for vanadium is not reasonably achievable). EPA also received comments on the appropriateness of the proposed LDR treatment standards (e.g., LDR constituents of concern should be limited to benzene and arsenic, since these are the only two compounds which have significant risk associated with the management of the material), and suggestions for establishing an alternative LDR treatment standard (e.g., specifying a concentration level for reactive sulfides which would serve as an exit level for land disposal restrictions). (CMA, 00022; CRI, 00030; CRI-MET, 00031; CRLA, 00029; GCMC, 00042; Heritage, 00010; Shell, 00047; Texaco, 00049)

In addition, three commenters noted that spent catalysts can meet the LDR standards for organic constituents as generated, but would require further treatment for metals. (API, 00046; Chevron, 00050; Phillips, 00055)

In response to the NODA, one commenter stated that the proposed UTS nonwastewater standard for antimony, nickel, and vanadium are achievable using the HTMR process at their facility. (INMETCO, NODA3)

Response: Information available to the Agency indicates that the LDR standards can be achieved for spent catalysts through incineration of the wastes followed by stabilization. For wastes that contain a high metals content, the UTS for the constituents of concern also can be achieved through recycling or metals reclamation, as described by some commenters to the proposed rule

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(GCMC, 00042; CRI-MET, 00031) and the NODA (INMETCO, NODA3). EPA does not preclude the use of any other treatment technologies or treatment trains for treating the wastes, as long as the established treatment standards are met (except that waste handlers are precluded from employing treatment or reclamation practices that constitute land disposal or impermissible dilution).

The Agency has further evaluated additional data from the stabilization of wastes containing vanadium as discussed in Section X.A.5 of this response to comment document.

In addition, the Agency has determined that there is adequate incineration, HTMR, and stabilization capacity to manage all of the newly-identified petroleum refining wastes. Also, adequate national capacity exists to treat K171 and K172 to meet the DEACT standard (40 CFR 268.40) by using one of several available technologies, including roasting as practiced by catalyst recyclers. Other thermal processes such as incineration are available to remove the characteristic of reactivity from these wastes.

D. Information on current and future waste management practices for residuals

EPA requested information on current and future waste management practices for all residuals, including volumes and types of wastes recycled; and wastes that are mixed or co-managed with other waste. EPA requested data on the annual generation volumes and characteristics of waste by each waste code, including wastewater and non-wastewater forms, soil and debris contaminated with these wastes, and waste that is stored, treated, recycled, or disposed due to any change in management practices. EPA solicited data on the current treatment capacity of facilities capable of treating these wastes, facility and unit permit status, and any plans to expand or reduce existing capacity. EPA also requested comments from companies that may be considering developing new hazardous waste treatment capacity; specifically, information on the determining factors involved in making decisions to build new capacity. EPA requested data and comments on waste characteristics that might limit or preclude the use of any treatment technologies. The Agency solicited information on current and future waste management practices and volumes managed for K170-K172 (and K169, if listed). EPA requested updated or additional information pertinent to the determination not to grant a national capacity variance for these wastes, as well as information on other commercially available thermal and non-thermal treatment or recovery capacity to meet UTS for the proposed listings. The Agency solicited comments and data on hazardous soil contaminated with K170-K172 (and K169, if listed) that may be managed off-site. EPA requested information pertinent to the determination not to grant a national capacity variance for mixed radioactive waste (radioactive waste mixed with the proposed listed wastes).

No specific comments were submitted that addressed these issues.

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XII. ENVIRONMENTAL JUSTICE

A. Information relevant to the environmental justice concerns associated with this rulemaking.

Comment 1: The commenter believes that socioeconomic considerations, such as environmental justice are, in and of themselves, insufficient to justify listing a waste as hazardous. (API, 00046)

Response: EPA clarifies that the Agency did not use socioeconomic considerations as a basis to justify any of the listings in this rulemaking.

Comment 2: For purposes of estimating population risks for consumers of groundwater, the Agency selected a radius of up to one mile down-gradient of the site to estimate concentrations over the width of the plume. The one mile down gradient distance from the source of ground water contamination used by EPA is excessive. (API, 00046)

Response: For responses to comments estimating population risks, see Section IV.B of the NODA Response to Comment Document in the docket.

Comment 3: The Agency should use a receptor-based air population model as HAPEM (Hazardous Air Pollution Exposure Model) when predicting pollution risks from air pollutants. This model takes into account the movement of individuals in affected populations. (API, 00046)

Response: For responses to comments estimating population risks, see Section IV.B of the NODA Response to Comment Document in the docket.

B. Other request for comments

No information was submitted in response to these issues.

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XIII. CERCLA DESIGNATION

A. RQ Adjustment Methodology for Waste Streams

Comment 1: Twelve (12) commenters supported use of the alternative RQ adjustment method to adjust the RQs for the petroleum refining wastes. (Amerada Hess, 00027; API, 00046; CRI, 00030; CRI-Met, 00031; CRLA, 00029; DuPont, 00016; Sun, 00034; WIRA, 00024; Mobil, 00033; Shell, 00047; Ashland, 00020; and Heritage, 00010)

Response: See response to comment 2, below.

Comment 2: In giving this support, several commenters asserted that the alternative method:

- Considers the actual concentrations of the hazardous substances in the waste stream and, thus, results in an RQ that is much more representative of the actual risks posed by the waste stream (Amerada Hess, 00027);
- Is still conservative because the maximum concentration levels observed were used in calculating the RQ (WIRA, 00024); and
- Adjusting RQs upward to reflect actual constituent concentrations is a more rational, common sense approach (DuPont, 00016; Sun, 00034).

Response: EPA acknowledges the commenters' support for the alternative RQ adjustment methodology described in the November 20, 1995, proposed rule, and agrees with the commenters' assertion that reporting for the four petroleum refining wastes should be based on actual concentration levels observed in each of these wastes. The Agency, however, believes that introduction of a second methodology (i.e., the alternative method), in addition to the standard method already in use, may be difficult to implement and unnecessarily confuse the public and the regulated community.

The Agency considered three specific implications of adopting the alternative RQ adjustment method in making its determination to retain the standard method. First, promulgation of RQs based on the alternative methodology for the four petroleum refining wastes would have introduced a potentially confusing situation in which RQs for currently listed hazardous waste streams would be based on two different methodologies. Second, since EPA's initial RQ adjustment rulemakings were first published in 1983, EPA has consistently applied the standard methodology to adjust the RQs for all previously listed RCRA waste streams. Members of the public and the regulated community understand and are complying with this methodology and related reporting requirements. Third, the reduced reporting burden expected from the application of the alternative method (i.e., reporting based on constituent concentrations) to the four petroleum refining wastes can be achieved by applying the mixture rule (as described below), without creating a second, different RQ adjustment methodology.

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Based on these considerations, the Agency has decided to use the standard methodology, rather than the alternative method, to adjust the RQs for the petroleum refining wastes in this final rule. In response to the commenters' concerns, however, EPA is modifying its interpretation of the mixture rule to allow facilities to use the maximum observed concentrations of the constituents within K169, K170, K171, and K172 in determining when to report releases of these wastes.

For K169, K170, K171, and K172, where the person in charge does not know the actual concentrations of the hazardous constituents, that person will have the option of reporting on the basis of the maximum observed concentrations that have been identified by EPA (see the table included below). The change in EPA's interpretation of the mixture rule that will allow use of these maximum concentrations is being codified in 40 CFR 302.6(b)(1) as a new subparagraph (iii). Thus, although the person in charge lacks actual knowledge of constituent concentrations, constructive knowledge of the EPA-identified maximum concentrations is assumed. This assumption is reasonable and conservative because the sampling data presented in the Technical Listing Document in support of this rulemaking accurately identify the maximum observed concentrations of the hazardous constituents in each of the petroleum refining wastes. The maximum observed constituent concentrations for these wastes are as follows:

Waste	Constituent	Maximum Concentration, ppm
K169	Benzene	220
K170	Benzene	1.2
	Benzo(a)pyrene	230
	Dibenz(a,h)anthracene	49
	Benzo(a)anthracene	390
	Benzo(b)fluoranthene	110
	Benzo(k)fluoranthene	110
	3-Methylcholanthrene	27
	7,12-Dimethylbenz(a) anthracene	1200
K171	Benzene	500
	Arsenic	1600
K172	Benzene	100
	Arsenic	730

For example, if waste stream K171 is released from a facility and the person in charge does not know the actual concentrations of the benzene and arsenic constituents, the person may assume that the concentrations of benzene and arsenic in the waste are 500 and 1600 ppm, respectively. Thus, by applying the mixture rule, 625 pounds of the K171 waste would need to be released (assuming the maximum concentrations indicated in the table above) to reach the RQ for arsenic in this waste.

Where the person in charge knows the concentration levels of all the hazardous constituents in a

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particular petroleum refining waste, the traditional mixture rule can be applied. Under this scenario, reporting would be required only when an RQ or more of any hazardous constituent is released. As applied to the petroleum refining wastes in this rule, EPA's overall reporting approach reduces the burden of notification requirements for the regulated community and adequately protects public health and welfare and the environment. In addition, EPA believes that the approach described above is consistent with the view expressed by the commenters that reporting for the four wastes should be based on actual concentration levels.

Comment 3: Additional commenters, in supporting the alternative method, asserted that it:

- Is more scientific than the standard method (API, 00046; Mobil, 00033);
- Is reasonable and reflects common sense (API, 00046; Heritage, 00010; Mobil, 00033; Sun, 00034);
- Would reduce the burden on the regulated community and the National Response Center in handling reports of *de minimis* release quantities (DuPont, 00016); and
- Would simplify reporting requirements and remove an element of doubt over setting the RQ for a waste at a specific location (Shell, 00047).

Response: All of the advantages listed above by the commenters are equally applicable to the use of the mixture rule as described in the previous response. Because the mixture rule takes into account the maximum observed concentrations identified by the Agency for these four petroleum refining wastes (as did the alternative method), application of the mixture rule is no less "scientific" or "reasonable" than the alternative method.

In fact, EPA's use of the standard RQ adjustment methodology, along with the use of the mixture rule as described above, may result in even greater reductions in the reporting burden on the regulated community and NRC than does the alternative method. This is the case because the alternative method, in determining the RQs for K169, K170, K171, and K172, would involve a more conservative approach than does the mixture rule. Unlike the mixture rule, the "concentration-weighted" RQ that is determined under the alternative method is lowered further (i.e., made more conservative) to the next closest RQ level (i.e., 1, 10, 100, 1,000, or 5,000 pounds). Thus, where the person in charge does not know the actual concentrations of the hazardous constituents of a release of one of the four petroleum refining wastes, the alternative method would have required reporting at a lower RQ than does the mixture rule.

Using the example described in the first response in this section, if waste stream K171 is released from a facility and the person in charge does not know the actual concentrations of the benzene and arsenic constituents, the person may assume that the concentrations of benzene and arsenic in the waste are 500 and 1600 ppm, respectively. Using the mixture rule, 625 pounds of K171 waste would need to be released before a report to the NRC would be required; however, the alternative method would have required such a report after only 100 pounds (i.e., the next RQ level lower than 625 pounds) of the same waste were released.

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Comment 4: Commenters opposed to use of EPA's standard methodology in adjusting the RQs for the four petroleum refining wastes, asserted that the standard method:

- Is unnecessarily stringent and unrealistic (Sun, 00034);
- Only focuses on the RQs of the constituents of concern (API, 00046; Mobil, 00033);
- Results in inappropriately low RQs because the constituents are often not present in high concentrations (DuPont, 00016);
- Produces RQs that bear no relationship to the actual risks posed by the petroleum refining wastes and that effectively nullify the value of the reporting requirement (Amerada Hess, 00027); and
- Fails to meet the CERCLA statutory requirement that RQs address releases that 'may present a substantial danger to the public health or welfare or the environment' (Amerada Hess, 00027).

Response: As noted in the first response in this section, the Agency has decided to use the standard methodology, rather than the alternative method, to adjust the RQs for the petroleum refining wastes in this final rule. In response to commenters' concerns (such as those expressed above), however, EPA is modifying its interpretation of the mixture rule to allow facilities to use the maximum observed concentrations of the constituents within K169, K170, K171, and K172 in determining when to report releases of these wastes. The Agency believes that this overall reporting approach reflects common sense, adequately protects public health and welfare and the environment, and is consistent with the view expressed by the commenters that reporting for the four wastes should be based on actual concentration levels.

Comment 5: Two commenters also urged the Agency to revisit past RCRA hazardous waste listings and apply the alternative RQ adjustment method to these wastes. (DuPont, 00016; and Heritage, 00010)

Response: The Agency is not using the alternative method to adjust the RQs for K169, K170, K171, and K172 in today's rule, nor does EPA plan at this time to apply the alternative method to other RCRA hazardous wastes. The methodology for establishing RQs for and applying the mixture rule to any wastes other than those listed today is beyond the scope of this rulemaking.

B. Application of the Mixture Rule

Commenter 1: One commenter asked the Agency to clarify whether the generator of a waste could still set a higher (or lower) level for a waste if they had data on the constituents of concern and those data indicate a higher level of the waste could be released prior to releasing an RQ of a constituent of concern. (Shell, 00047)

Response: If, by the statement included above, the commenter is asking whether a waste generator has the option of applying the mixture rule to releases of the four petroleum refining wastes, the Agency agrees. Specifically, this would allow the generator to report when a larger

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quantity of the waste is released if the generator knows: (1) the concentrations levels of all the hazardous constituents in a petroleum refining waste; and (2) that these concentrations are lower than the maximum observed concentrations identified by EPA.

Comment 2: Another commenter noted its understanding that "...once the RCRA listing code is no longer attached to the waste, the mixture rule would apply for each CERCLA hazardous substance in the mixture." The commenter asked for clarification of this point. (DuPont, 00016)

Response: EPA assumes that the commenter is asking about reporting requirements for releases of mixtures that are not listed as RCRA hazardous wastes (e.g., mixtures that fall outside the RCRA listing definitions for K169, K170, K171, or K172 hazardous wastes). It is important to note that an unlisted waste may still be a CERCLA hazardous substance if it exhibits one or more of the characteristics of a RCRA hazardous waste (i.e., ignitability, corrosivity, reactivity, or toxicity), as defined in 40 CFR 261.21 through 261.24. Unlisted wastes characteristic of ignitability, corrosivity, or reactivity (i.e., ICR wastes) each have an RQ of 100 pounds; toxicity characteristic wastes (i.e., TC wastes) have various RQs, as listed in Table 302.4.

The mixture rule can be applied to releases of these unlisted characteristic wastes as follows. Where the person in charge knows the quantity of all the hazardous constituents in an ICR or TC waste, reporting would be required only when an RQ or more of any hazardous constituent in the waste is released. However, if the quantity of one or more of the hazardous constituents of the ICR or TC waste is unknown, reporting is required where the total amount of the waste released equals or exceeds the RQ for the waste (i.e., 100 pounds for ICR wastes or the specific RQs listed in Table 302.4 for TC wastes).

C. Maximum Observed Constituent Concentrations in K170 Waste

Comment 1: Three commenters stated that the maximum concentration of 7,12-dimethylbenz(a)anthracene observed by EPA in its sample of K170 waste is not indicative of the concentration that would normally be expected. The average concentration of this substance in the four record samples was 330 ppm, or 27 percent of the 1200 ppm maximum observed concentration reported by EPA. The commenters asked EPA to "eliminate this outlier" (i.e., the 1200 ppm concentration) and urged the Agency not to base the RQ for the waste on this one sample result. (API, 00046; Mobil, 00033; and Sun, 00034)

Response: See response to comment 2, below.

Comment 2: Two of these commenters also noted that, if EPA does not eliminate the 1200 ppm concentration of 7,12-dimethylbenz(a)anthracene as an outlier, the Agency should at least adopt the more conservative approach of using the upper limit of the 90 percent confidence level to establish a concentration level for 7,12-dimethylbenz(a)anthracene in K170 waste. The commenters imply that an 805-ppm concentration for 7,12-dimethylbenz(a)anthracene would result from this suggested approach. (API, 00046; Mobil, 00033)

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Response: EPA disagrees with the commenters' assertion that the 1200-ppm concentration for 7,12-dimethylbenz(a)anthracene observed by the Agency in one of the four samples of K170 waste should be eliminated as an "outlier." As noted in a previous response, EPA's interpretation of the mixture rule in this rulemaking will allow facilities to use the *maximum observed concentrations* of the constituents within K170 in determining when to report a release of this waste. EPA does not believe that use of either an average concentration or a concentration based on the upper limit of the 90 percent confidence level (as the commenters suggest) would be sufficiently conservative in determining when to report a release of K170 waste. Also, the commenters' suggestions would unnecessarily complicate application of the mixture rule by establishing a unique set of reporting requirements applicable only to K170.

Comment 3: Two commenters also questioned the reliability of the data used to support the 230-ppm maximum observed concentration reported for benzo(a)pyrene in K170 waste. Rather than using the maximum observed concentration, the commenters again suggest using the upper limit of the 90 percent confidence level, which they imply would result in a 200-ppm concentration for this constituent in K170. (API, 00046; Mobil, 00033)

Response: EPA disagrees with the commenters' assertion that the upper limit of the 90 percent confidence level should be used to establish a concentration level for benzo(a)pyrene in K170 waste (see previous response).

D. "Self-Heating Solid" as a Constituent of K171 and K172 Wastes

Comment 1: Two commenters disagreed with the Agency's use of the term "self-heating solids" and indicated that most K171 and K172 wastes do not demonstrate the RCRA characteristic of ignitability. The few wastes that do exhibit this characteristic will already be subject to the 100-pound RQ that applies to ignitable characteristic wastes. The commenters also stated that EPA's use of the term "self-heating solid" as a constituent of K171 and K172 wastes would unfairly lower the RQ for those wastes that do not possess the RCRA characteristic of ignitability. Based on these reasons, the commenters urged EPA to drop the term "self-heating solid" as a constituent of K171 and K172. (API, 00046; Mobil, 00033)

Response: EPA agrees with the commenters and has removed the term "self-heating solids" from the list of constituents of K171 and K172.

Comment 2: Three commenters criticized the 100-pound RQ identified for the "self-heating solid" constituent, noting that a concentration value cannot be determined for a physical characteristic. The three commenters asked that EPA instead consider the established RQs and maximum concentration values of arsenic and benzene, the two constituents identified for K171 and K172 wastes. (CRI, 00030; CRI-Met, 00031; CRLA, 00029)

Response: See response to comment 3, below.

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Comment 3: One commenter stated that the propensity for K171 and K172 wastes to heat up and smoke is a condition that warrants careful handling, but does not warrant setting an RQ based on the ignitability characteristic. (Shell, 00047)

Response: As noted above, the Agency has removed the term "self-heating solids" from the list of constituents of K171 and K172. Thus, as the commenters requested, the RQs for these two wastes are based only on the arsenic and benzene constituents.

Comment 4: The same commenter also noted that K171 and K172 catalysts are often removed from the processing unit and "weathered" on an apron next to the unit to remove or reduce the self heating potential. The commenter describes these as controlled releases that should not be considered accidental, and asked that EPA clarify that such controlled releases of these catalysts are not subject to CERCLA section 103 reporting requirements. (Shell, 00047)

Response: EPA disagrees with the commenter's assertion that releases that might result from removal of catalysts from a processing unit for weathering on an apron would not be subject to CERCLA section 103 reporting requirements.

CERCLA section 103 and implementing regulations provide that a person in charge of a facility is required to immediately report to the NRC as soon as that person has knowledge of a release of a hazardous substance from the facility in a quantity equal to or greater than its RQ during a 24-hour period. CERCLA establishes five conditions that must be met for a release to be reportable: there must be a release (i.e., a discharge into the environment); the release must be of a CERCLA hazardous substance; the release must come from a facility, as defined in CERCLA section 101(9); the release must go into the environment, that term is as defined in section 101(8) of CERCLA; and, the amount of the release must be equal to or greater than the RQ for that substance.

For the purpose of this response, EPA assumes that an amount of K171 or K172 discharged in a "controlled release" (or dumping from a processing unit) exceeds the RQ for the catalyst (as determined through application of the mixture rule described in the first response in this section). EPA also assumes that the deactivation apron where the catalyst is weathered is not Federally permitted so that releases to it would constitute Federally permitted releases within the meaning of CERCLA section 101(10) (E). Federally permitted releases are not subject to the reporting requirements of CERCLA section 103 (nor to the liability provisions of CERCLA section 107).

The key question, then, presented in the comment, is whether a dumping or "controlled release" from a processing unit is a discharge into the environment, thus constituting a "release" as that term is defined by CERCLA section 101(22). CERCLA section 101(22) defines "release" in part as "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment...." Whether or not such a discharge is into the environment would in turn depend upon the level of containment provided by the apron where the catalyst is placed. EPA understands that many such aprons where catalysts would be

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weathered would provide a level of containment that might prevent the material from entering the environment directly into the land surface and that the process might not involve discharge into the air by volatilization during weathering. However, determining whether a release has resulted from the activity would depend upon case specific factors such as the level of containment provided by the apron and the nature of the process. EPA cannot determine in advance that in every case there would be no release, as that term is defined by the statute, that would be reportable under the provisions of CERCLA section 103.

A separate issue, not raised in the comment, is whether catalysts which have been removed from a processing unit for weathering on an apron might subsequently enter the environment by one of the processes listed in the definition of release in CERCLA section 101(22) (e.g., spilling, leaking, escaping, leaching, etc.). Each such subsequent discharge would constitute a new release subject to the reporting provisions CERCLA section 103.

EPA notes also that if a discharge from a facility into the environment qualifies as a “release” under the statute, then that release is subject to the reporting requirements of CERCLA section 103. It is not relevant, in determining the applicability of reporting requirements, whether the release is accidental or controlled and intentional.

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XIV. ECONOMIC ANALYSIS

EPA solicited comments on the benefits associated with the proposal to expand the ability of refineries to recycle currently listed petroleum wastes back into the refining process.

Comment 1: The commenter was concerned with EPA's suggestion that some potential "benefits" of the proposed rule "offset" the actual costs that would be imposed. EPA does not have any authority to justify one proposed cost-generating decision by reference to another, unrelated cost-saving decision (e.g., potential savings on management of previously listed wastes from revising the solid waste definition have no bearing on the listing of additional wastes). (API, 00046)

Response: EPA, in discussing the potential benefit from extracting oil content from prior waste listings (i.e., F037, F038, K048, K049, and K051) by proposing to expand the ability of petroleum refineries to recycle back into the process certain currently listed wastestreams, stated in the proposed rule (60 FR 57794) that the economic benefit of this practice, estimated between $13 million and $26 million, could substantially offset any cost associated with this proposed listing. While such a benefit was noted, it was not factored into the compliance cost associated with this listing.

Comment 2: EPA has not recognized the potential increase in the cost to the regeneration businesses.

The cost of regeneration will increase substantially because of the increased cost at the few facilities capable of managing listed hazardous waste.

When EPA assessed the potential cost for compliance with this proposal, it considered that the costs for compliance would only be borne by the petroleum industry. The catalyst manufacturers, catalyst regenerators, and the catalyst reclaimers are also expected to be impacted. (Eurecat, 00021)

Response: The commenters expressed concern that EPA had not estimated the cost and economic impacts associated with managing the newly listed metal catalyst wastestreams (K171, K172) by off-site catalyst manufacturers, regenerators, and reclaimers. Reclamation and regeneration of metal catalysts were frequently reported by refineries as the baseline management practice. Under the proposed waste listing, however, residuals from these practices are "waste-derived" and not exempt from RCRA Subtitle C storage, transportation, and/or management when they are used to produce or contained in products that are applied to or placed on land, involve speculative accumulation of metals, or partial reclamation of metals.

Due to data limitations, EPA was not able to estimate the compliance costs associated with RCRA Subtitle C storage, transportation, and treatment of these newly listed wastes by metal reclamation/regeneration facilities directly. EPA, however, did not ignore the potential cost and

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economic impacts borne by the regeneration industry to manage these waste-derived residuals in our economic analysis of the proposed rulemaking. Because EPA lacked data on the characteristics of metal reclamation/regeneration facilities affected by this proposed waste listing (i.e., number of establishments, waste management practices, economic viability, etc.), it was assumed that the few facilities capable of providing this service to the petroleum industry would pass their compliance costs back to refineries in the form of higher prices. EPA conservatively assumed that a five percent increase in the baseline price would be passed back to refineries for increased Subtitle C storage, transportation, and management costs incurred from waste-derived residuals at metal reclamation/regeneration facilities. A five percent price increase is one economic threshold at which EPA considers whether significant economic impacts will occur at affected facilities (i.e., if prices would have to increase by more than five percent to pass all compliance costs through to consumers, the establishment is considered to have significant economic impacts). Although EPA made a conservative assumption that a five percent price increase would be required by these facilities and passed back to the refineries, the magnitude of such a price increase and the ability of a given facility to pass these compliance costs on in the form of a price increase cannot be estimated without adequate data.

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XV. OTHER COMMENTS/MISCELLANEOUS TOPICS

A. Delisting

Comment 1: EPA's plans to zero out funding of delisting activities makes it imperative that listings be finalized only when the evidence is compelling. (Exxon, 00035)

Response: EPA does not believe that the status of the delisting program is a basis to list, or not to list, a waste as hazardous. The regulatory criteria for listing in 40 CFR 261.11 do not contain any reference to delisting activities. However, EPA notes that the Agency still has a viable delisting program. The Agency has delegated the program to the EPA Regions, and delisting activities are now being funded at the Regional level. Furthermore, the delisting program has also been delegated to numerous States, which are fully authorized to process delistings in their boundaries.

B. Listing determination policy

Comment 1: EPA indicates in its listing policy that waste quantity, persistence, and concentration are inputs that are factored into risk value calculations; yet for this rulemaking, biodegradation has been ignored, quantities disposed in landfills overestimated, and implausible concentrations (i.e., exceeding legal TC thresholds) used to model releases from non-hazardous waste landfills. (Phillips, 00055)

Response: EPA has not ignored the factors cited by the commenter, and comments on these factors are discussed in other sections of this document. See Sections III.B and III.D for consideration of the potential impact of biodegradation in nongroundwater and groundwater pathways, respectively. See Section III.I of this document for issues related to waste volume and waste fraction. Issues related to the impact of the TC regulation on specific wastes in landfills are presented in Sections IV.A.9 and IV.C.2, and further discussion can be found in the NODA Response to Comment Document in Section I.A.4.

Comment 2: Risk, while important, is not the sole determining factor in a listing decision. EPA must also insure that its overall policy goals are not thwarted by disincentives that are an outgrowth of rigid regulatory controls required by unconditional (i.e., "one size fits all") hazardous waste listings. Duplicative regulation must be avoided, especially if, (e.g., as for the spent hydrotreating and hydrorefining catalysts initially proposed for listing) the risk pathway of concern is leachate affected ground water and all constituents of concern are fully regulated by the TC rule. (Phillips, 00055)

Response: EPA’s regulatory criteria for listing are set out in 40 CFR 261.11. The regulations, and the underlying Statute, clearly indicate that listings should be based on the risks presented by the wastes in question. While EPA considers many factors in a “weight-of-evidence” approach to listing wastes as hazardous, the primary goal of listing is to prevent substantial risks to human

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health and the environment. As noted in Section V of this document, EPA has considered various approaches for conditional listings. However, the Agency does not believe the wastes that are being listed in this rulemaking are good candidates for such an approach. EPA agrees that duplicative regulation should be avoided, however, the Agency does not agree that the listing of spent hydrotreating and hydrorefining catalysts are duplicative of regulations under the TC rule. See Section IV.C.2 of this document, and Section I.A.4 of the NODA Response to Comment Document for further responses to this comment.

Comment 3: EPA should withdraw its final rule listing carbamate wastes, at least as it applies to dithiocarbamates, since it relies on the LDP -- a new listing regulation that has, impermissibly, not been the subject of notice and comment and that was not previously applied. The commenter further urges EPA to withdraw the LDP and the proposed listing decisions that rely on it, including the proposed petroleum listings, and if EPA wishes to implement the LDP, to propose it as a rule, subject to notice and comment, and thus to judicial challenge, before applying it. (DTF, 00025)

Response: The proposed rule for petroleum in no way impacts the final rule for carbamates waste cited by the commenter. The listing determination policy (LDP) noted by the commenter was originally described in the Dyes and Pigments Listing preamble (see 59 FR at 66075-66078), and certain aspects of the policy were also discussed in the proposal for the petroleum wastes at issue in this current rulemaking. As EPA noted in the Dyes and Pigments preamble, this policy statement was an attempt to explain to the public the weight-of-evidence approach EPA uses in making listing decisions, and was not a regulatory proposal. Rather, the policy statement explained how EPA implemented the listing regulations. EPA does not agree that this policy needs to be promulgated as regulation, and commenters are free to comment on aspects of the approach used by the Agency in each proposed listing decision.

C. Other comments

Comment 1: The proposal is very difficult to comment upon for many small sources and the public. EPA needs to make clear specific questions with identification numbers for the public and businesses to use in their response. (Caufield, 00009)

Response: EPA recognizes that this rule is complex and presents a challenge for those wishing to comment on it. However, the Agency believes that the proposed rule, and the subsequent NODA, clearly delineated the key issues, and furthermore, the notices did, in fact, provide clear specific issues for which the Agency was soliciting comment. The outline of this comment and response document follows the outline of the proposed rule and specifically cites the issues on which the Agency was seeking comment. EPA has received extensive comments on both the proposed rule and NODA, suggesting that many readers clearly understood the critical issues involved in the rulemaking.

Comment 2: EPA needs to reconsider all its actions in regard to benzene based on the new

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information which demonstrates little risk in soils of benzene for the underground tank regulations. California has frozen cleanups at underground tank sites based on this new data already in EPA's possession. (Ashland, 00020)

Response: This comment relates to the issue of the biodegradation potential of benzene released into the subsurface. See Section III.D of this document for discussion of this issue. EPA fully evaluated the information provided by all commenters on this issue.

Comment 3: The commenter understands that EPA doesn't want comments on the existing listed refinery wastes. However, they were adopted when many refineries still used chromium cooling tower treatments and lead in gasoline (if they even produce any gasoline). This is no longer the case. These current listings should be reconsidered using risk analysis and current test data. (Caufield, 00009)

Response: The proposed rule, as the commenter noted, did not reopen any of the existing listings for petroleum refinery wastes. As such, the Agency is not reconsidering these decisions.

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