



Petroleum Refining Process Waste Listing Determination Notice of Availability (NODA) Response to Comments Document; Part II

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II. Clarifications and Corrections

II.A. Headworks Exemption

Comment 1: EPA Has Correctly Expanded the Proposed Headworks Exemption to Cover Water Associated with Catalyst Management.

The proposed exemptions are consistent with EPA's listing criteria in 40 CFR Section 261.11(a)(3). These criteria allow EPA to list only those wastes shown to pose substantial hazards to human health or the environment and require EPA to consider the risk reducing effects of other regulatory programs. EPA correctly points out that the exposure pathways from the management of wastewaters associated with CSO sediment and hydroprocessing catalysts in the refinery wastewater treatment system are sufficiently regulated under the Clean Water Act, the Clean Air Act, and the existing RCRA hazardous waste listing for refinery wastewater treatment sludges (K048, K051, F037, and F038). (NPRA, 00004, pg 5)

Response: The Agency acknowledges the commenter's support.

Comment 2: In 1995, EPA proposed to exempt from regulation CSO sludge (and crude oil tank sludge if EPA listed the waste as hazardous) where the residuals are transported from the point of generation in the refinery by any means and subsequently discharged into the refinery wastewater treatment system.¹ In the NODA, EPA proposes expanding the exemption to the two spent catalysts the Agency intends to list as hazardous in this rulemaking, and solicits comment on risk analyses associated with this practice EPA conducted for CSO sludge and the two spent catalysts. (EDF, 00006)

Response: See following responses to Comments 2.a through 2.c.

Comment 2.a: Prior to addressing the new risk analyses, the most important aspect of the proposed exemption is whether it is limited to dilute wastewaters resulting from the cleanout of tanks or other units containing these wastes, or whether the proposed exemption applies to the listed waste (sludge) itself. The proposed regulatory language would apply the exemption to both the waste and cleanout wastewaters. In addition, the NODA risk assessment EPA conducted for CSO sediment is based on disposal of the waste itself in the wastewater treatment system.

Ironically, the one facility that reported disposing of CSO sludge in 1992 has indicated to the Agency that the practice will not be repeated because of the expense associated with increased

¹ 60 FR 57781 (November 20, 1995).

wastewater treatment sludge generation and subsequent disposal.² Therefore, EPA conducted a risk assessment and proposed an exemption from RCRA for CSO sludge, based upon the Agency's consideration of a waste management practice at one facility covering 250 MT of waste that the facility indicates will never be repeated. The Agency's willingness and ability to perform a risk assessment in this context stands in stark contrast to the Agency's refusal to conduct risk assessments and consider current and potential management practices for larger quantity of wastes, as discussed in Section IV of these comments.

Further, while the NODA contains no new information with respect to crude oil tank sludge potentially subject to the exemption, the CSO experience is instructive. Through the exemption as proposed, by including the actual waste within the scope of the exemption, EPA would likely be encouraging the generation of larger quantities of hazardous wastewater treatment sludge, a result completely at odds with the waste minimization policy and objectives articulated by Congress in Section 1003 of RCRA. Moreover, the experience demonstrates wastewater treatment systems are optimally designed and operated to treat wastewaters, therefore the Agency should not be creating RCRA exemptions that would encourage the suboptimal use of such systems. These fundamental shortcomings in the exemption as proposed can be added to the deficiencies discussed by EDF in its comments on the proposal, including the violation of the dilution prohibition and minimized threat treatment requirements in the LDR program.³

Accordingly, while EDF welcomes the Agency's statement in the NODA preamble that it "was not the Agency's intent to foster the discharge of all CSO sediments to wastewater treatment systems",⁴ the lack of preamble discussion regarding crude oil tank sludge potentially covered by the proposed exemption, the fact that EPA performed the NODA risk assessment on the CSO sludge itself, and the failure by EPA to propose for public comment specific language to limit the potential scope of the exemption, cause the scope issue to remain a matter of great concern.

Insofar as any wastewater treatment system-related exemption is appropriate in this rulemaking, it should be limited to dilute wastewaters associated with specific allowable generation practices, in much the same manner as 40 CFR 268.1(e)(4) is currently drafted.⁵ The express limitation to wastewaters should incorporate the regulatory definition of wastewaters in Part 268. "Dilute" should be expressed as a maximum concentration of contaminants allowed into the facility's

² See NODA Background Document, Chapter 8, p. 2; Chapter 10, p. 1.

³ Indeed, EPA's CSO sludge risk assessment is largely a quantitative exercise in confirming the effect of diluting 250 MT of waste with large quantities of wastewaters. See NODA Background Document, Chapter 8, p. 4.

⁴ 62 FR 16749.

⁵ See 62 FR 26019 (May 12, 1997).

wastewater treatment system.⁶ And the generation practice should be limited to rinsate from the cleaning of tanks or other units containing the specified waste, consistent with EPA's professed intent. Significantly, these limitations should also apply to the existing K050 exemption, because the existing exemption suffers from the same flaws as the proposal. (EDF, 00006)

Response: EPA reiterates its intent, as cited by the commenter, that the headworks exclusion is not meant to serve as an incentive to discharge CSO sediment to the wastewater treatment plant. EPA performed an analysis of this practice as described in the NODA Supplemental Listing Background Document and as cited by the commenter.

The purpose of the NODA exercise was to develop a "what if" scenario, representing the extreme end of CSO washwater loading to wastewater treatment. Such a scenario was evaluated in favor of a much more complex scenario, such as one limiting solids loadings or constituent concentrations in washwaters. EPA concluded that because its "what if" scenario showed negligible risk, then no restrictions on washwater composition would be required. Finally, EPA notes that refineries have no incentive to discharge solids to wastewater treatment since the solids would end up as F037 hazardous waste, and one commenter provides information stating that the quantity of such primary sludge would be much greater than the quantity of solids initially dumped into the system (see comment F-95-PRLP-00014, Chevron Corporation).

EPA presented analysis in the NODA to support the headworks exemption for both wastewater associated with CSO tank cleaning, and the expansion of the exemption to include water discharges from the clean-out and turn around of hydrotreating and hydrotreating catalytic units. After considering all comments on these analyses, EPA has decided to promulgate the expanded headworks exemption. As noted in the proposal (see 60 FR at 57781), EPA intended to include crude oil storage tank sediment in the exemption, if this waste was listed. Thus, EPA is also promulgating the exemption for K169 as well. 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 (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.

In amending the headworks exemptions under 40 CFR 261.3(a)(2)(iv)(C), the Agency intends the exemption to apply to wastewaters from cleaning operations when these wastewaters reach the headworks of the wastewater treatment system. As noted in the proposal, however, the exemption is not intended to allow the discharge of the entire wastestream (i.e., tank sediments or

⁶ Table 2 of Chapter 8 provides estimated rinsate contaminant concentrations that EPA believes overstate actual PAH levels found in tank rinsate. EPA should revise these estimates to reduce inappropriate values, and then promulgate the concentrations as maximum levels allowed in exempt rinsate.

spent catalysts), but rather dilute waters generated during tank or unit clean-outs and dewatering operations.

Finally, EPA notes that the existing exemption for heat exchanger bundle cleaning sludge (K050) was not explicitly reopened for comment, therefore the Agency is not considering any modification of this exemption in this rulemaking.

Comment 2.b: By promulgating these limitations, EPA would address EDF's strongest objections to the proposed exemption. However, a major deficiency in the NODA risk assessments warrants comment. In the risk assessment, EPA entirely ignored the contaminants in other wastes and wastewaters that are codisposed with the potentially exempt waste in the wastewater treatment system. EPA simply and falsely assumed that the exempt wastes were mixed with clean water. However, the reality is the exempt wastes are mixed with many contaminants in the wastewaters, including the particular contaminants in the exempt wastes. The result is a pollutant mixture that bears no relationship to the assessed scenario. Therefore, EPA has not estimated the true risk posed by the exemption, when actual and potential co-disposal is considered. (EDF, 00006)

Response: EPA notes that its analysis was an attempt to gauge the significance of a worst-case discharge into the treatment system to determine if any significant incremental risks would result from the practice. EPA found no such incremental risks and therefore concluded that the exemption was appropriate. In fact, EPA found that risks due to the exempted wastes would be extremely small. EPA disagrees with the commenter's proposed approach. Further discussion of EPA's views on the commenter's co-disposal presumptions are presented elsewhere in this response to comments.

Comment 2.c: Finally, if EPA does not limit the scope of the exemption to dilute rinsate, the CSO risk assessment is flawed because it was based on the waste volumes and characteristics of the one facility reporting waste discharge into a wastewater treatment system in 1992.⁷ Since that facility no longer intends to employ the practice, and other facilities can avail themselves of the exemption, a valid risk assessment must be based on the potential for any refinery generating the waste to take advantage of the exemption, absent a technical or legal bar preventing a refinery from doing so. Certainly, onsite wastewater treatment systems are potentially available for this purpose throughout the refinery industry. (EDF, 00006, pg 67)

Response: As noted above in response to comment 2a in this section, EPA believes that there are significant disincentives for refineries to discharge high solids content waste to their wastewater treatment system. Certainly, on-site wastewater treatment systems are available for this purpose throughout the refinery industry. EPA based its evaluations on the actual waste

⁷ Refinery wastewater treatment systems vary greatly in terms of size and quantity of wastewater processed, from less than 0.01 to 14 MGD. See API 1994 Residual Report, p. 8.

quantities used in this rarely practiced management scenario. EPA has no reason to believe, for example, that a quantity of waste destined for land treatment would be managed in a wastewater treatment system. EPA points out that a significant fraction of the wastes being listed must already be handled as hazardous, because they exhibit the TC or other characteristics. Yet despite this apparent incentive to avoid costly Subtitle C management, the disposal of tank sediment directly into the wastewater treatment system was extremely rare (i.e., only once each for CSO and crude oil storage tank sediments).

Comment 3: EPA's Expansion of the Proposed Headworks Exemption To Cover Water Associated with Catalyst Management Is Appropriate

In response to comments, EPA proposes to expand the proposed headworks exemption to include water associated with the management of spent hydrotreating and hydrotreating catalysts. 62 FR 16749 (April 8, 1997). EPA is correct that the same rationale applies to water associated with catalyst management as applies to the original proposed exemption for waters associated with the management of CSO sediment. *See Id.* In the absence of the proposed exemption, if CSO sediment (or spent catalyst) are listed as hazardous waste, the entire volume of refinery wastewater that comes into contact with water used to manage those residuals could potentially be labeled "hazardous waste" under the "derived from" and mixture rules. This result could not be justified on the basis of reducing any incremental risk to human health or the environment. (API, 00009, pg 26)

Response: The Agency acknowledges the commenter's support. The results of EPA's analysis show that little risk is likely to be incurred by this practice. The use of water during the catalyst changeout process provides a number of benefits, including lowering emissions of volatile organics, lowering the risks associated with the catalysts' potential self-heating nature, and minimizing risk to workers entering the confined space of the catalytic reactors during changeouts. EPA, therefore, has concluded that it is appropriate to include this low risk, beneficial practice under the headworks exemption.

Comment 4: The Headworks Exemption Is Amply Supported by Regulatory Precedent, the Listing Criteria, and the Case Law⁸

The concept of the headworks exemption is now very old and well-accepted. EPA introduced the concept in 1981 in recognition that the mixture and derived-from rules, if applied literally and without exception, could wreak havoc on wastewater treatment systems with no benefit to human health and the environment. *See* 46 Fed. Reg. 56582 (Nov. 17, 1981). The Agency promulgated several exemptions from the mixture rule for mixtures of listed hazardous wastes and wastewater treated in a system subject to regulation under the Clean Water Act, including mixtures of

⁸ The following discussion assumes the proposition that any of the residuals under consideration warrant listing, a proposition that, as discussed above, API vigorously disputes.

wastewater and heat exchanger bundle cleaning sludge in the petroleum refining industry (K050). See 40 CFR § 261.3(a)(2)(iv). The proposed exemptions in the present rulemaking are merely logical extensions of those long-standing exceptions to the mixture rule.

Moreover, the proposed exemptions are consistent with EPA's listing criteria in 40 CFR § 261.11(a)(3). In particular, those criteria allow EPA to list only those wastes shown to pose *substantial* hazards to human health or the environment, and require EPA to consider the risk-reducing effects of other regulatory programs. 40 CFR § 261.11(a)(3) and (a)(3)(x). In *Dithiocarbamate Task Force v. EPA*, 98 F.3d 1394 (1996), the D.C. Circuit made clear both that EPA must give serious consideration to each of the factors enumerated in the listing criteria, including the risk reducing effects of other regulatory programs, and that EPA must tailor its listing descriptions to avoid regulating wastes or classes of wastes that do not pose substantial risk.

Here, EPA correctly points out that exposure pathways from management of wastewaters associated with CSO sediment and hydroprocessing catalysts in the refinery wastewater treatment system are already regulated under the Clean Water Act, the Clean Air Act, and the existing RCRA hazardous waste listings for refinery wastewater treatment sludges (K048, K051, F037, and F038). Listing Support Analyses § 8, p. 1. Moreover, the Agency specifically assessed the risks posed by management of those residuals in a worst case scenario and found only insubstantial risks.⁹ *Id.* at §§ 8, 9.

EPA's risk assessment for the headworks exemption clearly indicates that disposal of water from washing of storage tanks containing CSO sediment or hydrotreating or hydrotreating catalysts does not result in significant risks to off-site receptors. In both cases, conservative assumptions in the risk assessment indicate that EPA has not underestimated potential risks. For example, in the case of CSO sediment, EPA evaluated risks assuming that CSO sediment, not just the water, was discharged directly to the wastewater treatment facility. (See N.61 Supra) Even under these extreme conditions, total risks from consumption of aggressive biological treatment (ABT) effluent released directly into groundwater are less than 4×10^{-9} and total risks from exposure to ABT sludge are expected to be 800 to 79,000 times less than the risks from landfilling of untreated CSO sediment.

⁹ In assessing the risks associated with CSO sediment wastewaters, EPA assumed the worst case scenario, reported to have occurred at one refinery in 1992, in which the entire volume of the storage tank sediment is flushed to the wastewater treatment system. The likelihood of this scenario occurring again at any refinery is remote, given the enormous expense associated with managing the resulting increased volume of listed wastewater treatment sludge (e.g., API separator sludge, primary sludge that would result from deposition of the sediment into the wastewater treatment system. See N.8, infra).

Similarly, for hydroprocessing wastewaters, EPA conservatively used the maximum concentration reported in drill waters, assumed that the dissolved concentration of inorganic chemicals was equal to measured values, and evaluated direct exposure to wastewaters exiting the treatment facility. Again, these conditions resulted in noncarcinogenic hazards from direct consumption of wastewaters less than 0.1. In the case of exposure to ABT sludge, EPA has correctly calculated that risks from landfilling would be 20,000 to 9 million times less than those calculated for untreated waste.

Thus, the proposed headworks exemption is necessary to avoid unnecessary regulation of demonstrably insubstantial risks. (API, 00009, pg 27)

Response: The Agency acknowledges the commenter's support.

Comment 5.a: EPA Should Clarify the Scope of the Exemption in the Final Rule

As EPA is aware, water is used in any number of different ways in the proper handling of CSO sediment and spent hydroprocessing catalysts. For example, water can be used merely to flush loose material, or (under high pressure) to drill out hardened material, or, in-situ, to steam strip or water wash material to remove volatiles. In the NODA, EPA seems to suggest that the exemption might be limited to waters used to "wash the tanks out to remove the last residues and make the tanks suitable for inspection." 62 FR 16749 (April 8, 1997). Any such limitation would render the exemption of little practical utility, given the many ways in which water contacts the residuals during their management. Thus, EPA should clarify in the final rule that the exemption extends to all wastewaters derived from the management of the residuals, as long as the wastewaters are managed in a system subject to the Clean Water Act.

Response: EPA is aware of the following uses of water associated with the generation of K170 to K172. In reference to K170, water is generated (1) from centrifuging sludge removed from the tank, and (2) as a "final rise" as mentioned by the commenter. In reference to K171 and K172, water is generated from (1) drilling the catalyst, (2) steam stripping or washing, (3) pad drainage. In the April 8th notice, EPA proposed to expand the exclusion to include drill water.

EPA believes that the headworks exemption is appropriate for waters generated from all of these practices, because these aqueous residuals would be dilute and contain low levels of the original listed wastes. Therefore, the Agency is finalizing the exemption for all the wastes that are being listed: CSO sediment, crude oil sediment, spent hydrotreating catalysts and spent hydrotreating catalysts. As noted in the proposal, however, the exemption is not intended to allow the discharge of the entire wastestream (i.e., tank sediments or spent catalysts), but rather dilute waters generated during tank or unit clean outs and dewatering.

Comment 5.b: On a related matter, API recognizes the concern of one commenter that in the absence of expressly limiting the exemption to dilute wastewaters, it could be lawful to discharge

the entire volume of a residual, such as CSO sediment, to the refinery sewer. *See* 62 FR 16749-50 (April 8, 1997). Assuming such a practice were legal under the exemption, such wholesale dumping is clearly not within the intent of the exemption and would be effectively precluded for very practical reasons. There are major disincentives to such a practice, in particular the huge expense that would be required to manage the increased volume of listed wastewater treatment sludge.¹⁰ Similarly, such a practice would be directly contrary to the waste minimization programs that have long since become institutionalized in the petroleum refining industry.

Moreover, EPA has determined that even in such a worst case scenario -- one that occurred once in 1992, but is highly unlikely to recur -- the risks presented are insubstantial. This, coupled with the impracticality of crafting a definition of "dilute wastewaters" that reasonably covers all situations, militates against any express limitation on the headworks exemption.

Indeed, the *Dithiocarbamate* decision strongly suggests that where a management practice is unlikely to be used in the future, even though it may have been used once or twice in the past, it is improper to list a material based on the mere possibility that it *could* be used again.¹¹ *See* 98 F.3d 1404. Based on that principle, and based on the absence of any substantial risk posed by management of the residuals in the wastewater treatment system, the Agency should not further limit or qualify the headworks exemption. (API, 00009, pg 28)

Response: The Agency acknowledges the commenter's support.

Comment 6: The proposed headworks exemption are necessary to avoid regulation of demonstrably insubstantial risks. As EPA is aware, water is used in any number of different ways in the proper handling of CSO sediment and spent hydroprocessing catalyst. For example, water can be used merely to flush loose material, or (under high pressure) to drill out hardened material, or, in situ, to steam strip or water wash material to insure safe removal. In the NODA, EPA seems to suggest that the exemption might be limited to wastes used to "wash the tanks out to remove the last residues and make the tanks suitable for inspection." 62 FR 16749 (April 8, 1997). Any such limitation would render the exemption of little practical utility, given the many ways in which water contacts the residuals during their management. Thus, EPA should clarify in the final rule that the exemption extends to all wastewaters derived from the management of the residuals, as long as the wastewaters are managed in a system subject to the Clean Water Act.

¹⁰ As discussed in Chevron's comments on the NODA, it is not unusual for the addition of one pound of residual to a wastewater treatment system to create as much as ten pounds of additional wastewater treatment sludge. API incorporates Chevron's comments by reference.

¹¹ API does not believe its members will use such a management practice in the future. Rather, API supports the exemption as a practical accommodation for the wastewaters that are inevitably produced in managing these residuals, as described above.

Response: As noted in response to Comment 5.a, EPA believes that the headworks exemption is appropriate for waters generated from all of these practices, because these aqueous residuals would be dilute and contain low levels of the original listed wastes. However, the exemption is not intended to allow the discharge of the entire wastestream (i.e., tank sediments or spent catalysts), but rather dilute waters generated during tank or unit clean outs and dewatering.

Comment 7: EPA is Correct in Expanding the Headworks Exemption to Cover Water Associated with Catalyst Management.

As EPA has stated, sufficient controls are in place within refineries to manage minor residuals that are drained to the refinery sewer systems. These residuals will be removed in the system and become listed hazardous wastes. Without these exemptions, refiners would be forced to either use more costly or more dangerous methods in managing catalyst or be forced to collect and ship these wash waters off-site. This off-site management method would not only be costly, but could lead to some potential spill events during handling and transportation that could have an impact on the environment. (Sun, 00008)

Response: See response to Comment 5.a.

Comment 8: EPA has appropriately noticed its intent to grant the headworks exemption for water used to remove hydrotreating and hydrorefining catalyst from the reactor. We believe the data previously submitted and EPA's analysis supports this conclusion and we strongly support this action. The use of water reduces the potential rate of oxidation of the catalysts as it is exposed to and during its removal and handling. Use of water facilitates the safe handling of these materials and is an important part of our operations. If these catalysts were listed and these waters considered derived from hazardous, the costs and risks associated with alternative management methods would be significant and without environmental benefit.

The EPA asks how to ensure that the headworks exemption is not a loophole to dump catalyst or CSO sludge in the sewer. Chevron does not believe a loophole exists for two important reasons.

First, there is a significant economic penalty for this action. Any solid material dumped in the sewer will emerge again as hazardous waste as all wastewater treatment sludges upstream of biological treatment are already listed as hazardous waste (F037, F038, K051 and K048). Solids in these wastewaters would be settled out prior to biological treatment. These solids must then be periodically removed from the system and managed as hazardous waste. The wastewater sludge that these solids generate is likely to be many times the original weight of the solids in the water (studies have shown that one pound of solids entering a sewer will generate as much as ten pounds of sludge due to the oil water-bacteria emulsion that forms around these solids). In addition to the increased costs associated with increased volumes, these sludges are particularly difficult to manage due to these emulsions. Thus, there already is a severe economic penalty

associated with allowing solids into a sewer. The refinery in EPA's case study confirms the reality of this economic penalty.

Secondly, sewers are critical to a refinery's operation. Placement of waters with significant solids content into a sewer runs the risk of plugging the sewer. Not only will the sludge still be hazardous when removed, but the refinery operations run the risk of being interrupted with astronomical costs. Even if the sewer is not plugged, a refinery's wastewater treatment system could be adversely impacted if it were overlooked with solids, endangering CWA compliance.

Thus, there is no need or justification for EPA to further define allowable wastewater solids content. To do so would create unneeded analytical, record keeping, and related compliance burdens. It is not appropriate to penalize all refineries for this one refinery's "ill advised" act. (Chevron, 00014)

Response: The Agency agrees with this commenter that there are financial disincentives to discharging excess solids to the refinery wastewater treatment system. Furthermore, the Agency observes that many refineries conduct deoiling of tank contents and sediments prior to disposal and tank inspection. This practice reduces sediment quantities by an average of 40 percent, with a substantial savings of raw materials (i.e., oil recycled back to the refining operations) and disposal costs. Upon promulgation of today's listings and the exclusion for oil-bearing hazardous residuals, EPA believes even greater amounts are likely to be subjected to oil recovery and waste minimization. Any water in the tank clean out material will likely be separated as a part of the deoiling process, and would be discharged to the wastewater treatment plant. Thus, with respect to some commenters' concerns regarding impacts on the wastewater treatment system, these recycling activities will likely increase and further reduce the load on the treatment system.

Comment 9: Texaco supports the clarification that the headworks exemption proposed for 261.3(a)(2)(iv)(C) will also include wastewater containing the two spent catalyst wastes (K171 and K172), as well as the CSO sediment (K170). However, EPA placed this exclusion in 40 CFR Section 261.3 (a)(2)(iv)(C) as an extension of that exclusion. 40 CFR 261.3(a)(iv) exempts wastewater, the discharge of which is subject to regulation under section 402 or section 307(b) of the Clean Water Act, but this exemption does go on to exclude 'wastewater facilities which have eliminated the discharge of wastewater'. Texaco requests EPA to clarify that the headworks exemption does extend to zero discharge facilities which have Clean Water Act equivalent wastewater treatment units as explicitly provided for in other RCRA rulemakings associated with wastewater discharge exemptions for CWA or CWA-equivalent wastewater treatment system discharges (e.g. 40 CFR 268.1(c)(4)(iii) and 40 CFR 268.3(b)). This clarification is justified because the CWA-equivalent wastewater treatment systems meet a standard of treatment the same as the CWA discharge systems, but simply are not explicitly included in the current regulatory language of 40 CFR 261.3. (Texaco)

Response: As the commenter noted, 40 CFR 261.3(a)(iv) specifically includes “wastewater facilities which have eliminated the discharge of wastewater” in the exclusion. EPA clarifies that this exemption will include zero discharge facilities which have Clean Water Act equivalent wastewater treatment units.

II.B. Jurisdictional Explanation of Off-Specification Product and Fines from Thermal Processes Used as Product (see also Section III.A below)

Comment 1: The NODA Provides Additional Support for the Prompt Promulgation of the Exclusion for Oil-Bearing Residuals Inserted into the Refining Process

In the original proposal, EPA proposed to expand the recovered oil exclusion in 40 CFR 261.4(a)(12) to exclude from the definition of solid waste any oil-bearing residuals produced in the petroleum industry (including petrochemical industry) and inserted into the petroleum refining process, including the coking process. In the NODA, EPA responded to the concerns raised by comments objecting to the proposed exclusion and therefore has a sounder basis for finalizing the proposed exclusion. NPRA urges EPA to promulgate this exclusion without further delay. (NPRA, 00004, pg 6)

Response: See response to comment 2 below.

Comment 2: EPA Should Promulgate the Exclusion as Soon as Possible

The promulgation of the expanded recovered oil exclusion is long overdue. The process of reforming the definition of solid waste in the context of legitimate refinery production of fuels, which began no less than nine years ago, has inappropriately become hostage to the delays in finalizing the proposed listing determinations.¹² Because of this, and because the record amply supports the proposed exclusion, EPA should promulgate the exclusion without further delay. (API, 00009, pg 26)

Response: In today’s final rulemaking, EPA is promulgating an exclusion from the definition of solid waste for oil-bearing secondary materials generated within the petroleum refining sector and returned to the refining process. As finalized, the exclusion from the definition of solid waste for oil-bearing residuals from specified petroleum refining sources is expanded to allow the use or reuse of a broader array of residuals from petroleum refining operations by inserting the materials into any part of the refinery process, including the coking process. The Agency

¹² The resulting delays in promulgating the necessary amendments to the solid waste definition are all the more frustrating since there is no substantive reason why the two rulemakings should be linked together, and because, as API has repeatedly commented, none of the refinery residuals at issue warrants listing under RCRA and EPA’s regulations.

notes that the exclusion is conditioned on there being no storage or placement of the secondary materials on the land and no speculative accumulation. In addition, the recycling of oil-bearing secondary materials can not result in coke products that exhibit any of the characteristics of hazardous waste.

In addition, in the final rule, EPA clarifies that the exclusion for oil-bearing secondary materials returned to the refining process only extends to the materials actually re-inserted into the refinery process. In cases where oil-bearing secondary materials are reclaimed prior to re-insertion, any residuals that may result from the reclamation process and that are not returned to the refinery process retain the hazardous waste listing and must be managed as hazardous wastes. In the final rule, the Agency modifies the proposed listing descriptions for listed refining wastes to include any residuals from the processing of listed hazardous wastes.

Comment 3: Phillips must call to your attention several disturbing aspects of this particular rulemaking. First is EPA's failure to promulgate the proposed exclusion from the definition of solid waste [60 FR 57747, November 20, 1995] for oil-bearing residual from certain petroleum sources that are reinserted into the petroleum refining process. This issue has been in front of EPA since 1988 and unfortunately has been arbitrarily coupled to this rulemaking. As a result, its promulgation is currently hostage to the series of delays that has extended this rulemaking deadlines from October 1996 until May 1998. Phillips urges EPA to fast-track the promulgation of the oil-bearing residual exclusion. Considering the previous record of negotiated delays orchestrated by EPA and EDF, we have little confidence in even the current promulgation schedule. If EPA is able to commit the resources to conduct additional studies in order to extend deadlines for this and other "Mega-deadline" rulemakings (See EDF vs. Browner, Civ. No. 89-0598 D.D.C), it is certainly has the ability to complete the work and promulgate a final rule resolve this long-standing issue. (Phillips, 00014)

Response: EPA acknowledges the commenter's concerns regarding the rulemaking schedule. In today's final rule, the Agency is promulgating an exclusion from the definition of solid waste for oil-bearing secondary materials generated by the petroleum refining section and returned to the petroleum refining process by inserting the materials into any part of the refinery process, including the coking process. The Agency notes that the exclusion is conditioned on there being no storage or placement of the secondary materials on the land and no speculative accumulation. In addition, the recycling of oil-bearing secondary materials can not result in coke products that exhibit any of the characteristics of hazardous waste.

Comment 4: EPA Should Clarify the Scope of the Exclusion by Correcting Misleading and Inadvertent Statements In The Background Document

In its Listing Support Analyses, EPA makes the following apparently inadvertent statement which could be misinterpreted if not clarified properly:

The scope of the proposed exemption is limited to the petroleum refining, such that the oil-bearing materials to be considered would be raw material-like and not contaminated prior to being recycled. Listing Support Analyses § 4, p. 1.

Mobil is concerned that this statement could be misinterpreted to limit the exclusion to hydrocarbon-bearing materials generated at a refinery. While it is true that the proposed exclusion is limited to "petroleum refining" from the standpoint that the hydrocarbon-bearing residuals must be inserted into the petroleum refining process (including the coker), the hydrocarbon-bearing materials being processed may be produced at facilities throughout the petroleum industry, including co-located or commonly owned petrochemical operations. See 60 FR 57756, 57796 (Nov. 20, 1995). No information is presented in the NODA that suggests there is any reason to limit the exclusion to hydrocarbon-bearing materials generated at the refinery site. The final rule and any accompanying preamble should make clear that the exclusion extends to hydrocarbon-bearing residuals produced throughout the petroleum industry that are inserted into the refining process, including the coker.

In addition, to avoid misunderstanding and misinterpretation, the apparent inadvertent reference to the hydrocarbon-bearing residuals not being "contaminated prior to being recycled" also needs correction/clarification. Hydrocarbon-bearing residuals, such as tank sediments or sludges from wastewater treatment, contain some contaminants and EPA is well aware of this fact. It is for this reason that the current recovered oil exclusion includes the condition that the recovered oil be inserted into the refining process at or before a point where some contaminants are removed. 40 CFR § 261.4(a)(12). When the exclusion is finalized, EPA should confirm that its statement that the excluded materials are not contaminated was incorrect. (Mobil, 00002, pg 5)

Response: The Agency agrees that the statement from the Background Document cited by the commenter is confusing. The preamble discussions included with today's final rule clarify the scope of the final exclusion from the definition of solid waste for oil-bearing secondary materials reused in the petroleum refining process. Generally, the Agency has decided to limited the exclusion from the definition of solid waste to oil-bearing secondary materials generated by the petroleum refining sector (i.e., SIC code 2911) and inserted into any part of the petroleum refining process, including the coker. Due to the limited amount of data available to the Agency, EPA is not extending the exclusion to hazardous secondary materials generated at petrochemical plants or other industry sectors outside of the petroleum refining sector.

The Agency clarifies that the exclusion from the definition of solid waste promulgated today for oil-bearing secondary materials is limited to only those oil-bearing hazardous secondary materials that are generated within the petroleum *refining* sector (SIC 2911). (However, *recovered oil* from the broad petroleum industry, as well as recovered oil from certain petrochemical facilities, is also excluded.) In the context of oil-bearing hazardous secondary materials being used in the quenching process, this limitation to the exclusion is entirely consistent with the information evaluated in making this determination (i.e., data representing secondary materials currently used in the quenching process -- F037, F038, and K048-K052).

EPA made its determination to limit the exclusion for oil-bearing secondary materials based on a review and analysis of information on the types of secondary materials used by the industry, their constituent components and the fact that the coke product remains basically unchanged when such secondary materials are used.

The fact that the Agency only evaluated oil-bearing secondary materials that were generated by the refining sector in its determination is sufficient reason to limit the exclusion to only refinery-generated secondary materials. However, a further reason relates to the concept that oil-bearing secondary materials that are generated by the refining process and continue to be processed in the coker (by use in the quenching process) is more akin to an on-going production process than would be the case for secondary materials generated outside the refining sector. The Agency maintains that the quenching process is an ancillary activity that is somewhat removed from the overall production process; however, the fact that the secondary materials are generated and used in another production process (i.e., the overall coking operation) within the same industry, imparts a closer association with the concept of an on-going production process than would be the case for secondary materials generated by a different industrial sector. The Agency has no information on which to base a finding that the use of oil-bearing hazardous secondary materials originating in a non-refinery sector of the petroleum industry in the coke quenching process would be anything other than the management of wastes (e.g., hazardous waste recycling) from that non-refinery sector.

In one sense, the exclusion for recovered oil (as opposed to "oil-bearing secondary materials"), which spans the scope of the broad petroleum industry, reflects the Agency's assessment that only those hazardous secondary materials that are comparable to normal feedstocks (i.e., oil) used in typical production processes should be excluded from RCRA without attention to how they are processed. Oil-bearing secondary materials (as opposed to "recovered oil") originating from a non-refinery sector have the potential to be more waste-like and thus do not warrant an exclusion, especially if their ultimate use is in the quenching process. Therefore, the Agency is today promulgating an exclusion for secondary materials that are: 1) similar to normal refining feedstocks, even if generated by a non-refinery petroleum industry sector (i.e., recovered oil) and 2) both generated and used in any refinery production process, including the coking operation (i.e., refinery-generated oil-bearing hazardous secondary materials).

The further Agency notes, however, that non-refinery generated oil-bearing secondary materials that are used in the quenching process (i.e., hazardous wastes) may nevertheless be legitimately recycled by use in the quenching process, depending on there being oil recovered during the quenching process and no adverse impact on the coke product. The coke product produced from such hazardous wastes, as well as the fuels produced from the oil recovered during the quenching, would be subject to the exemptions found at 40 CFR 261.6(a)(3).

The Agency clarifies that the phrase "and not contaminated prior to being recycled" should not have been included in the cited statement from the background document. The Agency is restricting the exclusion for oil-bearing materials to situations where the materials are not placed

on the land prior to reuse and to situations where there is no speculative accumulation of the materials. The Agency understands that oil-bearing secondary materials destined for reuse may not be free of all contamination and that some level of contamination may be removed during the refinery process.

In addition, the Agency is clarifying that the exclusion for oil-bearing secondary materials returned to the refining process only extends to the materials actually re-inserted into the refinery process. In cases where oil-bearing secondary materials are reclaimed prior to re-insertion, any residuals that may result from the reclamation process that are not returned to the refinery process, and therefore may be discarded, retain the original hazardous waste listing and must be managed as hazardous wastes. In the final rule, the Agency modifies the proposed listing descriptions for refining wastes to include any residuals from the processing of listed hazardous wastes.

Comment 5: EPA Should Promulgate The Exclusion As Soon As Possible.

Finalization of the expanded recovered oil exclusion is long overdue. A process which began over nine years ago to clarify the definition of solid waste within the context of refinery production of fuels, from raw material and recycled hydrocarbons, is still being held hostage to the proposed listing determinations. The expanded exclusion is long overdue and fully justified by the record that EPA has established. EPA should promulgate the exclusion without any further delay. (Mobil, 00002, pg 6)

Response: See response to Comment 2 (above).

Comment 6: EPA's proposed exemption from RCRA regulation for any "oil-bearing residuals" inserted into the coking process suffers from a variety of serious shortcomings, including the lack of storage standards prior to insertion, the lack of a definition of "oil-bearing residuals", and the inadequacy of the toxicity characteristic as the sole check against toxics along for the ride.

In response to these concerns, the NODA materials contain what EPA claims is a "worst case" assessment of petroleum coke content if all the refinery sludges currently listed as hazardous were inserted into petroleum cokers throughout the United States. EPA claims the analysis demonstrates the contaminant levels in the hypothetical coke product would not be significantly different from the concentrations in actual coke product as reported in several literature sources.¹³

However, the NODA analysis is fundamentally flawed because:

- Wastes that may be listed as hazardous in the instant rulemaking, and characteristic refinery wastes, were not reflected in the analysis, therefore the metal content of these wastes were not considered;

¹³ NODA Background Document, Chapter 4.

- EPA assumes all cokers uniformly receive an evenly allocated volume-weighted distribution of wastes, thereby unrealistically spreading the metal contaminants throughout the industry;
- The mere dilution of the metals from the wastes in the larger quantities of coke does not demonstrate the hazardous constituents in the waste contribute to the value of the product (see discussion below); and
- The nickel content in EPA's hypothetical coke product is almost three times lower than the Mobil coke (without waste added) included in EPA's data, indicating that the baseline level of contaminants used by the Agency is not truly indicative of product coke.¹⁴

The nickel content of petroleum coke produced from waste is particularly important since the toxicity characteristic does not include nickel, therefore EPA's proposed exemption provides no protection against the handling of nickel as a toxic along for the ride. Table A.3 of the NODA Groundwater Risk Assessment provides the nickel concentration for some of the refinery wastes in this rulemaking. As this table and the 1995 Listing Background Document indicate, the nickel content of refinery waste often exceeds several hundred parts per million, and can reach almost 5,000 ppm in unleaded storage tank sludge, 25,000 ppm in hydrotreating catalyst, and 14,000 ppm in hydrotreating catalyst.¹⁵ Given the open-ended nature of the term "oil-bearing residuals" in the proposed exemption, any of these wastes may be inserted into the coking process regardless of the resulting nickel content of the coke, as long as there is a scintilla of oil in the waste. (EDF, 00006, pg 63)

Response: The Agency is finalizing the proposed exclusion from the definition of solid waste for oil-bearing secondary materials generated by petroleum refineries and returned to the refinery process with several conditions:

- The secondary materials may not be stored or placed on the land prior to being re-inserted into the refinery process.
- The secondary materials may not be accumulated speculatively.

¹⁴ See NODA Background Document, Chapter 4, Table 2. See also Chapter 5, Table 2, indicating the nickel content of petroleum coke ranges up to 580 ppm. In contrast, the proposed non-wastewater exit level for nickel in the recent HWIR rulemaking was 110 ppm. See 60 FR 66448 (December 21, 1995). It is also important to note that EPA has never verified the metal contaminant levels in petroleum coke (produced with or without waste) reported by the industry.

¹⁵ 1995 Listing Background Document, Tables 3.3.7, 3.3.14.

- Use of the secondary materials in the refinery process must not result in the coke product exhibiting one or more of the hazardous waste characteristics.

The Agency clarifies that the exclusion, as promulgated, is limited to oil-bearing secondary materials generated within the petroleum refining sector (i.e., SIC 2911) and inserted into the petroleum refining process.

The Agency notes that the main purpose of the petroleum coking unit is to recover hydrocarbons from the oil contained in the feedstocks for further refining. Similarly, the main purpose of using the secondary materials in the coke quenching process is the energy-efficient recovery of hydrocarbon from the residual oil in the oil-bearing secondary materials. The Agency also notes that coke product produced using hazardous secondary materials in the quenching process is basically similar to coke produced without using secondary materials in the quenching process. Further, EPA notes that the making of anode-grade coke, the most high-valued coke with the most stringent product specifications, is likewise able to meet the product specifications while using these secondary materials in the quenching process.

In considering whether the fact that the coke product produced using secondary materials in the quenching process continues to meet the product specifications (and, in fact, demonstrates little change in the levels of contaminants compared with coke produced without hazardous secondary materials) is simply a result of dilution, the Agency acknowledges that such dilution does occur. However, there are several other considerations. For example, the primary product of the petroleum coking process is the hydrocarbon fraction recovered for use as feedstock in the production of high-value fuel products, with the coke product being a co-product of the coking process. The Agency is convinced that such recovery occurs when oil-bearing secondary materials are used in the quenching process. Given that the recovered hydrocarbon is the primary product of using the secondary materials in the quenching process, the simple fact that the coke product (i.e., the co-product) continues to meet the applicable product specifications and shows no appreciable increase in risk carries more weight in the Agency's evaluation. In other words, demonstrating hydrocarbon recovery is the key test in determining whether the hazardous secondary materials actually serve a useful role in the overall coking operation, rather than demonstrating a net contribution to the coke (as opposed to no degradation of the coke). Acknowledging that there is a potential for some degradation of the coke product, depending on the constituent make-up of the particular secondary materials used in the quenching process, the Agency believes that economic forces, driven by product specifications and competition for markets, will serve to ensure that the quenching process is not simply a means of indiscriminately disposing of hazardous wastes. However, in cases where there is sufficient degradation of the product (or co-product) such that it no longer meets product specifications or otherwise becomes unmarketable, the Agency would question the legitimacy of using the secondary materials in the quenching process. Similarly, if there were no hydrocarbon recovery stemming from the use of the hazardous secondary materials in the quenching process, the Agency would question the legitimacy of the activity. (The Agency knows of no such cases.)

With regard to the commenter's concern regarding the potential for metals contained in hazardous secondary materials to be "toxics-along-for-the-ride," the hazardous metals found in the hazardous secondary materials generally can be traced back to the metals found in the original crude oil feedstock and so do not represent contaminants introduced through means other than the continued processing of the raw material feedstocks. EPA's traditional concern regarding unnecessary hazardous constituents being processed and ending up in a product is mitigated in this case because the Agency views this activity as the continual processing of a raw material that contains the hazardous constituents, with concentrations of constituents found in the feedstock streams varying dependent on the point in the overall production process. In the context of a multi-step production process, there is much less of an element of discard of the hazardous constituents inherent in the original raw material than there would be had these secondary materials been generated by another industry or had the hazardous constituents not been inherent to the original raw material.

Comment 7: EPA Should Correct Certain Inadvertent Statements in the Background Document About the Scope of the Exclusion

In the Listing Support Analyses, EPA makes the following apparently inadvertent statement:

"The scope of the proposed exemption is limited to the petroleum refining, such that the oil-bearing materials to be considered would be raw material-like and not contaminated prior to being recycled."

Listing Support Analyses § 4, p. 1. It is true that the proposed exclusion is limited to "petroleum refining" in the sense that the oil-bearing residuals must be inserted into the petroleum refining process (including a petroleum coker). However, the oil-bearing materials may be produced at facilities throughout the petroleum industry. See 60 Fed. Reg. 57796 (Nov. 20, 1995). This is consistent with the existing recovered oil rule in 40 CFR § 261.4(a)(12), and no information presented in the NODA suggests that there is any reason to limit the exclusion to oil-bearing materials generated on the refinery site. The final rule and any accompanying preamble should make clear that the exclusion extends to oil-bearing residuals produced throughout the petroleum industry that are inserted into the refining process.

EPA's reference to the oil-bearing residuals' not being "contaminated prior to being recycled" also appears to have been inadvertent. EPA is well aware that the oil-bearing residuals, such as wastewater sludges, contain some contaminants. In fact, it is for this reason that the current recovered oil exclusion includes the condition that the recovered oil be inserted into the refining process at or before a point where some contaminants are removed. 40 CFR § 261.4(a)(12). It may be that EPA meant to say that the oil-bearing materials would be "raw material-like and not *discarded* prior to being recycled," which clearly would be more accurate. In any event, EPA should confirm that its statement that the excluded materials are not contaminated was incorrect. (API, 00009, pg 26)

Response: See response to Comment 4 (above).

Comment 8: On page 4-1 of the *Listing Support Analyses*, it says that:

“1. The scope of the proposed exemption is limited to the petroleum refining, such that the oil-bearing materials to be considered would be raw material-like and not contaminated prior to being recycled.”

We believe that this statement was unintentional since the wording of the proposed exclusion clearly includes materials generated by facilities in a number of SIC codes representing operations throughout the petroleum industry (60 FR 57796). The preamble language indicates (60 FR 57753) that the exclusion covers “...oil-bearing secondary materials that are generated on-site at refineries, transported intracompany from off-site, or received from any off-site facilities (intercompany transfers) in the following SIC codes:...” The current recovered oil rule in 40 CFR 261.4(a)(12) includes non-refinery materials, and the preamble language to this rule (59 FR 38536, July 28, 1994) is clear that non-refinery materials are included in the scope of the exclusion. The Agency should retain the proposed wording for the new oil-bearing residuals exclusion and again clarify that it extends to oil-bearing residuals produced throughout the petroleum industry which are inserted into the refining process. This will eliminate continuing and unnecessary uncertainty on the scope of the exclusion.

We also believe that the reference in the statement to oil-bearing residuals not being “contaminated” prior to being recycled is inadvertent. Oil-bearing residuals, such as refinery wastewater sludges (K/F wastes), do contain contaminants. As EPA has concluded in the *Listing Support Analyses*, however, product coke composition is not substantively affected, even under a worst-case calculation, by the presence of these contaminants in residuals being inserted into the refining process. (BP, 00011)

Response: See response to Comment 4 (above).

Comment 9: The commenter disagrees with EPA’s proposal to allow reinsertion of “any” oily waste material into any part of the refining process, likening the proposal to a “Bevill II” exemption for refineries. The commenter points out that allowing insertion of wastes into the coker, without regard to oil content, will assure that the coker becomes a limitless “black hole” for refinery waste. The commenter contends that the exclusion will: (1) establish a regulatory override to the Sham Recycling Criteria where coking is involved; (2) foster the production of more of the world’s dirtiest fuel by allowing yet additional toxic metals, PNAs, and other toxics to be deposited onto the coke without treatment; and (3) deal a deadly blow to true recycling technologies such as thermal desorption, flexi-coking, and gasification, which produce clean products for direct reuse or reuse within the refinery, rather than create a product with not real market value. (SEA, L0006, L0010)

Response: The Agency is finalizing an exclusion from the definition of solid waste for oil-bearing secondary materials generated by petroleum refineries and returned to the refinery process with several conditions:

- The secondary materials may not be stored or placed on the land prior to being re-inserted into the refinery process.
- The secondary materials may not be accumulated speculatively.
- Use of the secondary materials in the refinery process must not result in the coke product exhibiting one or more of the hazardous waste characteristics.

The Agency clarifies that the exclusion, as promulgated, is limited to oil-bearing secondary materials generated within the petroleum refining sector (i.e., SIC 2911) and inserted into the petroleum refining process.

The Agency notes that the main purpose of the petroleum coking unit is to recover hydrocarbons from the oil contained in the feedstocks for further refining. Similarly, the main purpose of using the secondary materials in the coke quenching process is the energy-efficient recovery of hydrocarbon from the residual oil in the oil-bearing secondary materials. The Agency also notes that coke product produced using hazardous secondary materials in the quenching process is basically similar to coke produced without using secondary materials in the quenching process. Further, EPA notes that the making of anode-grade coke, the most high-valued coke with the most stringent product specifications, is likewise able to meet the product specifications while using these secondary materials in the quenching process.

In considering whether the fact that the coke product produced using secondary materials in the quenching process continues to meet the product specifications (and, in fact, demonstrates little change in the levels of contaminants compared with coke produced without hazardous secondary materials) is simply a result of dilution, the Agency acknowledges that such dilution does occur. However, there are several other considerations. For example, the primary product of the petroleum coking process is the hydrocarbon fraction recovered for use as feedstock in the production of high-value fuel products, with the coke product being a co-product of the coking process. The Agency is convinced that such recovery occurs when oil-bearing secondary materials are used in the quenching process. Given that the recovered hydrocarbon is the primary product of using the secondary materials in the quenching process, the simple fact that the coke product (i.e., the co-product) continues to meet the applicable product specifications and shows no appreciable increase in risk carries more weight in the Agency's evaluation. In other words, demonstrating hydrocarbon recovery is the key test in determining whether the hazardous secondary materials actually serve a useful role in the overall coking operation, rather than demonstrating a net contribution to the coke (as opposed to no degradation of the coke). Acknowledging that there is a potential for some degradation of the coke product, depending on the constituent make-up of the particular secondary materials used in the quenching process, the

Agency believes that economic forces, driven by product specifications and competition for markets, will serve to ensure that the quenching process is not simply a means of indiscriminately disposing of hazardous wastes. However, in cases where there is sufficient degradation of the product (or co-product) such that it no longer meets product specifications or otherwise becomes unmarketable, the Agency would question the legitimacy of using the secondary materials in the quenching process. Similarly, if there were no hydrocarbon recovery stemming from the use of the hazardous secondary materials in the quenching process, the Agency would question the legitimacy of the activity. (The Agency knows of no such cases.)

The Agency considered, as suggested in several comments, setting a minimum oil content to define the scope of "oil-bearing secondary materials" that are excluded when used in the quenching process, or to require a demonstration of hydrocarbons actually being recovered from the excluded secondary materials that is comparable to oil recovery in the conventional coking process. The Agency rejected limiting the exclusion based on a set minimum oil content or a recovery efficiency requirement for several reasons.

As the petroleum industry stated in their comments, the quenching process represents the last possible process in which to recover hydrocarbon from the original crude oil feedstock. The refinery processes and operating procedures are designed to separate and process into products as much hydrocarbon as possible from the crude oil feedstock, in other words, to prevent as much oil from making its way into these secondary materials as possible. The oil that does make its way into these secondary materials is generally considered unavoidable and inevitable, or in some cases, too much oil in these secondary materials is evidence of a problem with some aspect of the overall refining process (which goes towards explaining the wide range of oil contents in these materials). Thus, it would be counter to the overall efficiency of the petroleum refining process to require a minimum oil content in the secondary materials. Conversely, the Agency believes it is fundamental to this exclusion that there actually be oil recovered for further refining when these oil-bearing hazardous secondary materials are used in the quenching process.

Also, the Agency believes that, in this case, a minimum oil content condition would do little to ensure that only those secondary materials from which oil can actually be recovered would be excluded, or in other words, the Agency does not believe that setting a minimum oil content would ensure that secondary materials are legitimately being used in the quenching process. Since most of the secondary materials in question result from wastewater treatment, a minimum oil content requirement would only serve to encourage a refinery to operate the refinery process less efficiently to ensure that these secondary materials contain the minimum oil content and thus avail themselves of an exclusion.

With regard to the commenter's concern regarding the potential for metals contained in hazardous secondary materials to be "toxics-along-for-the-ride," the hazardous metals found in the hazardous secondary materials generally can be traced back to the metals found in the original crude oil feedstock and so do not represent contaminants introduced through means other than the continued processing of the raw material feedstocks. EPA's traditional concern

regarding unnecessary hazardous constituents being processed and ending up in a product is mitigated in this case because the Agency views this activity as the continual processing of a raw material that contains the hazardous constituents, with concentrations of constituents found in the feedstock streams varying dependent on the point in the overall production process. In the context of a multi-step production process, there is much less of an element of discard of the hazardous constituents inherent in the original raw material than there would be had these secondary materials been generated by another industry or had the hazardous constituents not been inherent to the original raw material.

Comment 10: The commenter questions EPA's reliance on industry assurances regarding the protectiveness of the coking process as a recycling operation. The commenter contends that the extent of the Agency's health and environmental assessment consists of the following statement:

Coke is subject to certain limited industry product specifications ...Coke is also subject to product standards established by the ASTM for volatile matters and ash content. Taken together, these controls help to insure the coke product does not contain unsafe levels of toxic contaminants. (60 FR 57755, Emphasis added)

The commenter notes that ASTM is a test methods group, not a health standard setting agency. Further, combustibility criteria do not substitute for a health assessment. The commenter cites petroleum industry personnel who state that contaminants are deposited on coke sludge and sent out with the product.

The Agency must consider the affects of the proposed recycling exemption, including movement of pollutants from one medium to another and the making toxics in wastes more available to the environment. The commenter contends that the only environmental justification for exempting hazardous waste recycling from RCRA's preventative management standards occurs when the recycling practice itself is inherently protective (i.e., conducted in an enclosed system or without releases) and when toxics are not merely shifted from one medium to the next (i.e., from land, back to the air.) (SEA, L0010)

Response: Due to the fact that 1) the recovery efficiency of hydrocarbons from oil contained in the secondary materials used in the quenching process is comparable to the recovery efficiency of the conventional coking process, 2) the use of oil-bearing hazardous secondary materials (including RCRA listed hazardous wastes) in the quenching process is consistent with the overall goal of the petroleum refining industry, namely to maximize the recovery of hydrocarbon values from the original crude oil feedstocks, and 3) the coke product continues to meet product specifications and indicates no increase in risk, the Agency concludes that the use of oil-bearing hazardous secondary materials generated by the refinery can legitimately be used in the coke quenching process, dependent upon whether there is both hydrocarbon recovery and no adverse effect on the coke product.

Having determined that certain oil-bearing hazardous secondary materials can be legitimately used in the quenching process, the question then becomes whether this activity constitutes on-going production and hence is excludable, or legitimate hazardous waste recycling -- potentially subject to regulation as a form of hazardous waste treatment. There are several aspects that would point to either outcome. Industry has documented that there is recovery of hydrocarbon values from the oil-bearing secondary materials, short- and middle-chain fractions are condensed and sent to refining processes to produce high-value fuel products (consistent with the overall coking operation). In addition, there is some beneficial contribution to the coke product in the form of carbon and higher energy values (even though this may not be reflected by an actual increase in market value), and the Agency also notes that the coke product continues to meet the market-driven specifications for the product, even for high-value anode grade coke. And, as with other side streams generated by one process and used as feedstocks to other production processes, this activity constitutes a link in the multi-step chain of processing steps designed to recover as much of the hydrocarbon value from the original crude oil feedstock as possible. Thus, there are arguably aspects of this activity that lead one to conclude that the oil-bearing hazardous secondary materials used in the quenching process can be considered, for regulatory purposes, as part of an on-going production process and hence classified as an activity not subject to RCRA jurisdiction.

The Agency is assured that use of hazardous secondary materials in the quenching process is a legitimate activity warranting an exclusion from the definition of solid waste. The primary purpose of the activity is the recovery of the remaining hydrocarbon values in the oil-bearing secondary materials (with the addition of carbon and energy value to the co-product coke), using the existing heat energy contained in the coke product after the conventional coking process.

In general, the hazardous metals found in the hazardous secondary materials can be traced back to the metals found in the original crude oil feedstock and so do not represent contaminants introduced through means other than the continued processing of the raw material feedstocks. EPA's traditional concern regarding unnecessary hazardous constituents being processed and ending up in a product is mitigated in this case because the Agency views this activity as the continual processing of a raw material that contains the hazardous constituents, with concentrations of constituents found in the feedstock streams varying dependent on the point in the overall production process. In the context of a multi-step production process, there is much less of an element of discard of the hazardous constituents inherent in the original raw material than there would be had these secondary materials been generated by another industry or had the hazardous constituents not been inherent to the original raw material.

Finally, EPA believes that the recovery of hydrocarbon from the oil-bearing secondary materials in the quenching process is consistent with the overall petroleum refining process, and the coking operation in particular, i.e., the recovery of hydrocarbons for the production of high-value fuel products. Therefore, the Agency is providing a conditional exclusion for oil-bearing hazardous secondary materials that are inserted into the coker, based on the assumption that, whether

inserted along with normal feedstock (i.e., resids) or used in the quenching process, hydrocarbons are recovered for further refining and there is no degradation of the coke product.

II.B.1. EPA's jurisdiction over coke fines

Comment 1: Off-Specification Coke And Fines That Are Sold As Product Are Not Wastes.

Mobil concurs in EPA's conclusion that off-specification coke and fines that are sold as product are not wastes. The NODA offers EPA's explanation as to why off-specification coke and fines that are sold as product are beyond EPA's jurisdiction under RCRA as well as why EPA found it unnecessary to assess risks from land-based storage of such products. 62 Fed. Reg. 16750 (April 8, 1997). Off-specification products that are sold for their intended purpose are products and not wastes. See 40 CFR § 261.2(c)(2)(ii).

However, EPA states that "In the case of waste-derived fines, so long as the fines are legitimate coke product, they are exempt from RCRA regulation unless the material exhibits a characteristic, 40 CFR 261.6(a)(3)(v)." 62 Fed. Reg. 16750 (April 8, 1997). If "waste-derived" fines is meant to refer to coke fines from coking where hydrocarbon-bearing residuals are reprocessed, Mobil maintains that neither the hydrocarbon-bearing residuals nor the coke fines are solid wastes under existing case law. Moreover, upon finalization of the proposed expanded recovered oil exclusion, EPA's regulations will confirm that coke and fines derived from reprocessing hydrocarbon-bearing residuals are not wastes. (Mobil, 00002, pg 5)

Response: EPA maintains that coke fines managed and sold with coke as product are not solid wastes, as long as the coke product (and fines) do not exhibit any of the characteristics of hazardous waste.

Comment 2: EPA Has Correctly Addressed the Risks Associated with the Sale of Off-specification Coke and Fines.

Because off-specification coke and fines are sold as a product and are not wastes, they are beyond EPA's RCRA jurisdiction. Therefore, NPRA agrees with EPA's proposal not to list the residual. (NPRA, 00004, pg 4)

Response: The Agency thanks the commenter for stating its support of the Agency's proposal.

Comment 3: Off-Specification Coke and Fines that Are Sold as Product Are Not Wastes

In the NODA, EPA explains further why off-specification coke and fines that are sold as product are beyond EPA's jurisdiction under RCRA (and therefore, why EPA found it unnecessary to assess risks from land-based storage of such products). 62 Fed. Reg. 16750 (April 8, 1997). First, EPA states correctly that off-specification coke and fines that are produced without using wastes are not wastes. This is simply an application of the self-evident principle, codified in the

existing regulations, that off-specification products that are sold for their intended purpose are products and not wastes. *See* 40 CFR § 261.2(c)(2)(ii).

Second, EPA states that “In the case of waste-derived fines, so long as the fines are legitimate coke product, they are exempt from RCRA regulation unless the material exhibits a characteristic, 40 CFR 261.6(a)(3)(v).” 62 Fed. Reg. 16750 (April 8, 1997). This statement is also true, as far as it goes. However, to the extent “waste-derived” fines is meant to refer to coke fines from coking where oil-bearing residuals are used in the process, API maintains that neither the oil-bearing residuals nor the coke fines are even “solid waste” under existing case law. Moreover, upon finalization of the revised recovered oil exclusion, the non-waste status of the residual-derived coke and fines will be codified in EPA’s regulations. For all of these reasons, EPA is fully justified in its proposal not to list off-specification coke and fines as hazardous waste. (API, 00009, pg 25)

Response: EPA maintains that coke fines managed and sold with coke as product are not solid wastes, as long as the coke product (and fines) do not exhibit any of the characteristics of hazardous waste.

Comment 4: EPA has Correctly Characterized the Handling and Risks Associated with Off-specification Coke and Fines.

As EPA states, essentially all of this material is managed as a product and not wastes and therefore any listing decision is unjustified and beyond EPA's jurisdiction. (Sun, 00008)

Response: EPA maintains that coke fines managed and sold with coke as product are not solid wastes, as long as the coke product (and fines) do not exhibit any of the characteristics of hazardous waste.

Comment 5: In the case of off-spec products and fines, the NODA materials contain two relevant categories of information. For the first time, EPA offers its rationale for why off-spec products and fines are co-products when placed on petroleum coke piles for storage and subsequent reuse, and therefore outside of the jurisdiction of this listing determination when managed in this manner. In brief, EPA bases the co-product determination on the physical and chemical similarity to petroleum coke.¹⁶ In addition, for the first time, EPA evaluated the non-groundwater risks posed by the management of off-spec products and fines in LTUs, both as an individual waste and in the co-disposal scenario discussed above.

Insofar as EPA's co-product determination is based upon the similarity of off-spec products and fines to petroleum coke, EDF questions whether EPA can demonstrate either material has current economic value independent of avoided disposal costs. In response to an EDF FOIA request

¹⁶ See NODA Background Document, Chapter 5.

submitted earlier this year, EPA provided a memorandum from Dave Gustafson, DPRA to Max Diaz, EPA dated March 18, 1997, attached as Exhibit 1 to these comments. In that memorandum, DPRA quotes petroleum coke price ranges from \$0-\$80/ton, the highest price presumably for rarely produced anode production grade coke. In the Rocky Mountain region, generators pay to dispose of the coke, therefore it can hardly be considered a product in that region. Elsewhere, a typical export price is merely \$7.50 per short ton, while use within a company may be valued at \$12.50 per short ton. Significantly, most petroleum coke produced domestically is now exported, because the coke is too dirty to burn under U.S. air standards.¹⁷

DPRA's findings that petroleum coke is of little or no economic value are confirmed by other sources. The Oil and Gas Journal published a recent article in which the author states:

Conventional heavy-resid conversion processes for high-metals stocks, such as coking processes, are no longer the final solution they once were. High-sulfur, high-metals coke can no longer be directly fired in boilers in many parts of the world. Firing in fluid-bed combustors often is not permitted because of limited sulfur recovery and disposal problems with the heavy metals in the spent bed.

The market for high-sulfur, high-metals coke has constricted to the point where some U.S. refiners are faced with negative netbacks on their coke production.¹⁸

In response to the same FOIA request, EPA also provided information on the economic value of off-spec products and fines. According to EPA, survey respondents reported receiving payment for 24 of the residual streams sent off-site. Since 38 streams were reported as transported offsite with petroleum coke in 1992, 14 of the 38 survey respondents did not indicate they received any payment for the offsite transfer.¹⁹ The payments received by the remaining respondents generally fell within \$10-20 per metric ton.²⁰ Since the data is from 1992 when DPRA found petroleum coke had a similar value, it is reasonable to assume these small payments have declined since then in the same manner as the value of coke. Therefore, EPA's economic data demonstrate both petroleum coke and off-spec products and fines have very little or no current

¹⁷ As reported by DOE and provided by EPA in its response to EDF's FOIA request, about 15 million of 25 million metric tons of petroleum coke produced domestically in 1994 was exported.

¹⁸ Heaven, "Gasification Converts a Variety of Problem Feedstocks and Wastes", Oil and Gas Journal, May 27, 1996, pp. 49-50.

¹⁹ 1995 Listing Background Document, Table 3.7.1.

²⁰ See Letter from David Bussard, EPA to Karen Florini, dated March 25, 1997 (answer to question 3).

economic value independent of avoided disposal costs. Accordingly, off-spec products and fines are not properly characterized as co-products.

In addition, assuming arguendo the off-spec products and fines are co-products when stored with petroleum coke, EPA must still render a listing determination for this residual when stored on piles. Pursuant to 40 CFR 261.33, EPA lists a variety of products, including off-specification products, when discarded or intended to be discarded. Therefore, if the off-spec products and fines are not actually reused when placed on the pile, because the residual blows off the pile or migrates via runoff, such off-spec products and fines would be regulated as hazardous wastes. Indeed, by listing off-spec products and fines as hazardous under 40 CFR 261.33, regulatory officials would be empowered to respond to such discard by placing appropriate controls on the pile to prevent it from becoming an unauthorized disposal unit.

The importance of rendering a 40 CFR 261.33 listing determination in this context is dramatized by the limited risk assessment EPA conducted as part of the 1995 proposal. The cancer risks associated with landfill air releases (where no daily cover was assumed as would be the case for the storage pile) for off-spec thermal products and fines exceeded 1×10^{-3} for home gardeners, subsistence farmers, and subsistence fishers; and a high cancer risk to subsistence fishers from mercury exposure was also predicted.²¹ Significantly, EPA regarded these risk estimates as "comparable to the potential risks associated with onsite storage prior to final management" due in large part to the small particle size associated with off-spec products and fines.²²

The NODA LTU risk modeling for off-spec products and fines is not a meaningful surrogate for evaluating the risks posed by pile storage, and therefore does not contradict the 1995 findings. In the NODA LTU modeling, the annual onsite LTU modeled volumes were one ton (median) and 34 tons (high-end). For offsite LTUs, both the median and high-end volume values were 21 tons.²³ In the onsite co-disposal LTU modeling, the off-spec products and fines volume was set at 34 tons, while in the offsite scenario, the volume was 21.2 tons.²⁴ In contrast, the annual median and high-end volumes for pile storage are 4,447 and 17,000 tons respectively.²⁵ In short,

²¹ See EPA 1995 Non-Groundwater Risk Assessment, Appendix Q, Table 3a.

²² 1995 Listing Background Document at 142.

²³ NODA LTU Risk Assessment, Table 2.1.

²⁴ *Id.*, Tables 7.1, 7.2.

²⁵ See 1995 Listing Background Document, Table 3.7.1. ("transfer with coke product").

the NODA onsite LTU modeling considered median volumes approximately 0.022%, and high-end volumes approximately 0.20% of the relevant pile volume.²⁶

Pursuant to the Consent Decree in EDF v. Browner, EPA is required to issue a listing determination for off-spec products and fines. Given that an estimated 169,986 MT of the total 194,262 MT (87%) off-spec products and fines generated in 1992 was placed in piles and subject to discard,²⁷ and that such discard presents a substantial risk to human health and the environment based upon the assessments conducted to date, the required listing determination must include a decision as to whether off-spec products and fines warrants listing pursuant to 40 CFR 261.33. EPA must either list the residual as hazardous based upon its 1995 risk findings, or perform an appropriate risk assessment evaluating the present and potential risks to human health and the environment posed by the storage of large quantities of off-spec products and fines on piles. (EDF, 00006, L0009)

Response: The Agency is not listing coke fines as a hazardous waste because coke fines are the same as coke and are, for the most part, managed in the same manner as product coke. The Agency's risk analysis for coke that is disposed in landfills and land treatment units resulted in low risk estimates. The issues raised on the risks posed by this waste are discussed in the response to Comment 4 in Section I.A.5 of this document.

Furthermore, EPA made follow up calls to the 6 facilities which have cokers out of the 20 refineries in which site visits were conducted and found most of the facilities employed some kind of dust suppression to the coke product piles. The phone log is below.

Phone Log - Documentation of Release Controls for Coke Product Piles

Facility Number	Process Unit Type	Dust Suppression	Run-off Controls
093	Fluid Coking - Coke pile is owned by the neighboring co-generation plant but leases the land from the refinery	As part of the lease, the cogeneration plant must use a dust suppressant and crusting agent on the pile to control dusting.	The area is sloped and stormwater drains into the stormwater collection ditch and which is sent to the wastewater treatment plant. The product pile is walled in with wooden walls.

²⁶ Since the 1995 landfill risk estimates cited above were based upon volumes 1/7 of the pile high-end volumes, even those landfill risk estimates may substantially underestimate the potential risks posed by airborne off-spec products and fines.

²⁷ 1995 Listing Background Document, Table 3.7.1.

Facility Number	Process Unit Type	Dust Suppression	Run-off Controls
155	Delayed Coker-processes F&K wastes	Coke is wet when placed on the piles from the drilling water. Dust suppression system continuously sprays the piles with water. Trucks carrying product covered and are sprayed before leaving the unit to remove coke from tires.	The coking unit and product pile is enclosed with sheet metal walls. Unit area is sloped so drilling water and stormwater collects in the cutting water system where the water is reused for cutting and the fines are placed back on the product piles.
171	Delayed coker with calciner	The "green coke" is loaded from the unit onto a covered conveyor with a gantry crane and bucket and taken to the "coke barns" (an enclosed storage warehouse). From the barns, it travels to the calciner on another covered conveyor. The calcined coke storage and loading areas all have dust suppression equipment.	Drilling water may drain from the conveyor or loading area and it drains back into the coker drilling water maze. Drilling water drainage ("black water") from the barns collects in a sump and is routed back to the coker maze. The maze water is recycled to the "jet tank" for drilling.
063	Delayed coker making anode-grade coke	Coke is wet when placed on the piles from the drilling water. Dust suppression system continuously sprays the piles with water. From the piles it travels via covered conveyor to the loading barge.	The product pile is enclosed with walls. Unit area is sloped so drilling water and stormwater collects and it is sent to a clarifier where the water is reused for cutting and the fines are placed back on the product piles.
076	Delayed coker sent to an offsite calciner	No sprinkler system; Louisiana is a rainy area and helps keep dust down. Looked into a polymer dust suppression but didn't go with it due to cost and decrease in coke purity. Coke pile can't be sprayed with water because the coke must have a minimum moisture content for the calciner. Use a truck washer to minimize fines carried off by trucks.	The coke unit and product piles are enclosed by concrete walls. Drilling water and stormwater drain into the "fines pit" (a sloped drainage area) where the water is reused for drilling and the fines are recovered and placed on the product pile.
170	Delayed coker making anode-grade coke	Majority of the coke is stored in storage buildings. Water sprinkler systems control coke that is stored outside. Trucks are washed and tarped before leaving the process area.	Runoff water from drilling and dust suppression is drained into "sediment traps." Water is then recycled for cutting. A small portion of the water may go to WWT. Fines collected in the "traps" are placed back on the product pile and sold.

II.b.2. EPA Invites Comment on the Potential Impact of Recycling Hazardous Waste to the Coker.

II.B.2.a. Favors Exclusion

Comment 1: The NODA Provides Additional Strong Support For the a Prompt and Early Finalization of the Long Overdue Exclusion For Hydrocarbon-Bearing Residuals Inserted In The Coking Process

In its November 20, 1995 proposal, EPA proposed to expand the recovered oil rule exclusion in 40 CFR § 261.4(a)(12) to exclude from the definition of solid waste hydrocarbon-bearing residuals produced in the petroleum industry (including the petrochemical industry) and inserted into the petroleum refining process, including the coking process. Based on existing case law and the record already developed in this rulemaking, Mobil believes EPA had a sound basis to finalize the proposed exclusion long ago. The data and analysis presented in the NODA provide yet more support for this long overdue exclusion, and Mobil strongly urges EPA to promulgate the exclusion in final form as soon as possible.

The NODA provides a very persuasive response to the concerns of some who have commented that the proposed exclusion could allow some toxic constituents to be passed through to the product coke at elevated levels, sometimes referred to as "toxics along for the ride." Data provided by Mobil and others demonstrate that the use of hydrocarbon-bearing residuals in the coking process does not materially impact toxic metals levels in product coke. USEPA, Petroleum Refining Process Waste Listing Determination: Supplemental Background Document: Listing Support Analyses ("Listing Support Analyses") § 4 (1997).

EPA's effort in the NODA to address the theoretical possibility that in the future there could be a dramatic increase in the reprocessing of residuals on the coker for the recovery of hydrocarbons and the production of valuable transportation and other fuels, including coke production, is very informative. EPA calculated the predicted impact on coke product quality if all refinery F/K wastes produced during 1992 were reprocessed on cokers to produce the total quantity of coke produced in 1992. Even under this "worst case" scenario, EPA calculates such reprocessing would have minimal impact on metals levels in coke. *Id.*

Any concerns about "toxics along for the ride" should be finally and completely resolved based on 1)the data presented or derived by EPA analysis, 2)the operational imperative to avoid using incompatible materials in the economically critical coking process, 3)the existence of coke product specifications²⁸, and 4)the requirement that the coke product not exhibit a hazardous

²⁸ Such specifications apply regardless of the reprocessing method used to recover hydrocarbon for the production of valuable transportation and other fuel products and to incorporate hydrocarbon-bearing secondary materials into the product coke, whether the method involves processing the secondary materials along with normal coker feed or injecting the

waste characteristic. EPA should finalize the proposed exclusion as soon as possible and without further delay. (Mobil, 00002, pg 4)

Response: In today's final rulemaking, the Agency is promulgating an exclusion from the definition of solid waste for oil-bearing secondary materials generated by the petroleum refining sector (i.e., SIC 2911) and returned to the refinery process, with the following conditions:

- The secondary materials may not be stored or placed on the land prior to being re-inserted into the refinery process (including prior to insertion into the coker, either as part of the conventional coking process or prior to insertion with the quench).
- The secondary materials may not be accumulated speculatively.
- Use of the secondary materials in the refinery process must not result in the coke product exhibiting one or more of the hazardous waste characteristics.

The Agency is convinced, after a review of data provided by commenters, that the hazardous metals found in the hazardous secondary materials can be traced back to the metals found in the original crude oil feedstock and so do not represent contaminants introduced through means other than the continued processing of the raw material feedstocks. EPA's traditional concern regarding unnecessary hazardous constituents being processed and ending up in a product is thus mitigated in this case because the Agency views coking as a continuation of the refining process to recover hydrocarbons from crude oil. Hazardous constituents (with the exception of lead and chromium) originate with the initial raw material, i.e., the crude oil.

Concentrations of hazardous constituents found in the feedstock streams vary depending on the point in the overall production process. In the context of this multi-step production process, there is thus much less of an element of discard of the hazardous constituents because they come from the raw material. The situation would be different had these secondary materials been generated by another industry or had the hazardous constituents not been inherent to the original raw material. (In addition, the preamble notes that lead and chromium are being phased out of refining operations and record information documents the decline of these constituents in petroleum industry secondary materials and petroleum coke.)

EPA notes that the Agency is limiting the exclusion to oil-bearing secondary materials generated by the petroleum refining sector only (i.e., SIC 2911). The Agency is limiting the scope of the exclusion in this way to ensure that secondary materials containing hazardous constituents not present in crude oil feedstocks and/or hazardous constituents that cannot contribute to the production process are not discarded in the coking process or incorporated into the coke product without benefit to the product. In addition, the scope of the exclusion is limited to those

secondary materials during the quench cycle of the coking process.

secondary materials generated within the petroleum refining industry sector that result in a coke product that does not exhibit a characteristic of hazardous waste. The Agency has no information on which to base a finding that the use of oil-bearing hazardous secondary materials originating in a non-refinery sector of the petroleum industry in the coke quenching process would be anything other than the management of wastes (e.g., hazardous waste recycling) from that non-refinery sector.

Comment 2: The NODA Provides Additional Support for the Prompt Promulgation of the Long Overdue Exclusion for Oil-Bearing Residuals Employed in the Coking Process

In the original proposal, EPA proposed to expand the recovered oil rule exclusion in 40 CFR § 261.4(a)(12) so as to exclude from the definition of solid waste any oil-bearing residuals produced in the petroleum industry (including the petrochemical industry) and inserted into the petroleum refining process, including the coking process. API believes that based on existing case law and the record already developed in this rulemaking, EPA had a sound basis to finalize the proposed exclusion long ago. The data presented in the NODA provides yet more support for this long overdue exclusion, and API urges EPA to promulgate the exclusion in final form as soon as possible.

In particular, the NODA responds very persuasively to the concerns of some commenters that the proposed exclusion would permit toxic constituents to be passed through to the coke product at elevated levels, *i.e.*, that it would permit “toxics along for the ride.” The data presented from industry and updated literature sources demonstrate that use of oil-bearing residuals in the coking process does not measurably affect the levels of toxic metals in product coke. USEPA, Petroleum Refining Process Waste Listing Determination: Supplemental Background Document: Listing Support Analyses (“Listing Support Analyses”) § 4 (1997).

Moreover, to address the theoretical possibility that in the future there would be a dramatic increase in the use of residuals in coke production, EPA calculated the predicted effects on coke product if 100 percent of the volume of refinery F and K sludges produced during 1992 were used in production of the total quantity of coke produced in 1992. Even under such a theoretical “worst case” scenario, EPA projects minimal impact on levels of metals in coke. *Id.*

The data presented, together with the operational imperative to avoid using incompatible materials in the coking process, the existence of product specifications for coke,²⁹ and the proposed condition that the coke product not exhibit a hazardous waste characteristic, should lay

²⁹ Such specifications apply regardless of the reprocessing method used to recover oil for the production of valuable transportation and other fuel products and to incorporate oil bearing residuals into the product coke, *i.e.*, regardless of whether the method involves processing the residuals along with other coker feed or injecting the residuals during the quench cycle of the coking process.

to rest once and for all any concerns about “toxics along for the ride.” EPA should promulgate the proposed exclusion without further delay. (API, 00009, pg 24)

Response: The Agency is finalizing an exclusion from the definition of solid waste for oil-bearing secondary materials generated by petroleum refineries and returned to the refinery process with several conditions:

- The secondary materials may not be stored or placed on the land prior to being re-inserted into the refinery process.
- The secondary materials may not be accumulated speculatively.
- Use of the secondary materials in the refinery process must not result in the coke product exhibiting one or more of the hazardous waste characteristics.

Further discussion is found in the previous response.

EPA also clarifies that the Agency is not including within the scope of the exclusion oil-bearing secondary materials generated outside the petroleum refining sector (i.e., SIC 2911). The Agency is basing its decision not to exclude these secondary materials from the definition of solid waste on the fact that EPA has very limited data from industry demonstrating the chemical and toxic content of the materials. In fact, the Agency has no information on which to base a finding that the use of oil-bearing hazardous secondary materials originating in a non-refinery sector of the petroleum refining industry in the coking process would be anything other than the management of wastes (e.g., hazardous waste recycling) from that non-refinery sector. Oil-bearing secondary materials originating from the non-refinery sector have the potential to include toxic constituents that are not present in crude oil feedstocks and that may not contribute to the refinery process. It is the Agency's intent not to exclude from the definition of solid waste those secondary materials with significant concentrations of hazardous constituents which are only being discarded by destruction or by incorporation into the coke or other refining product without benefit to the product. See *U.S. v. Marine Shale Processors*, 81 F. 3d at 1365-66 (5th Cir. 1996). Further, information is thus needed so that EPA could evaluate this consideration as well as other factors bearing on whether such processes could be viewed as a type of on-going industrial process without significant elements of discard.

The Agency also is requiring that the materials excluded under this provision of today's rule be returned directly to a refinery for insertion. While this is not an issue if materials are recycled on site, EPA has concerns about situations where these materials are generated at one refinery for insertion into another, but are instead managed at intermediate non-refinery facilities prior to insertion into a petroleum refinery process. This is consistent with the argument that the exclusion is provided on the basis that secondary materials are being used within the realm of on-going production in the petroleum refining sector. EPA is indicating in the regulatory text of the

exclusion that oil-bearing materials may be inserted into the same refinery where they are generated, or sent directly to another refinery, and still be excluded.

Comment 3: In response to concerns raised by some commenters on the original proposal, EPA has reconfirmed its determination that the use of oil-bearing residuals in the coking process does not measurably affect the levels of toxic materials in product coke (*Petroleum Refining Process Waste Listing Determination, Supplemental Background Document, Listing Support Analyses*, Section 4, March 1997). This is consistent with the argument that the exclusion is provided on the basis that the secondary materials are being used within the realm of on-going production in the petroleum refining sector. BP Oil submitted comments dated March 19, 1996 on the proposed rule (Docket No. F-95-PRLP-FFFFF) which contained data demonstrating no substantive difference in product coke quality when secondary materials are inserted into the refining process (coker) compared to when they are not. A trial was conducted at one of our refineries during which an oil/water/solids slurry of secondary materials (K/F wastes) was injected into the coke to evaluate a variety of operating conditions and secondary material loadings, including loadings that were considerably higher than those anticipated during normal operations. Analytical results obtained during the trial included that slurry injection had no substantive impact on iron, nickel, vanadium, sulfur or volatile combustible matter (VCM) levels in the coke product. TCLP (Toxicity Characteristic) levels in the product coke were well below regulatory levels and indicated no significant difference from levels in product coke produced with no slurry injection.

- The exclusion should extend to oil-bearing residuals produced throughout the petroleum industry which are inserted into the refining process. (BP, 00011)

Response: EPA thanks the commenter for submitting data to the Agency to assist in analyzing the potential consequences of the proposed exclusion. The Agency is finalizing an exclusion from the definition of solid waste for oil-bearing secondary materials generated by petroleum refineries and returned to the refinery process with several conditions:

- The secondary materials may not be stored or placed on the land prior to being re-inserted into the refinery process.
- The secondary materials may not be accumulated speculatively.
- Use of the secondary materials in the refinery process must not result in the coke product exhibiting one or more of the hazardous waste characteristics.

The Agency is convinced, after a review of data provided by commenters, that the hazardous metals found in the hazardous secondary materials can be traced back to the metals found in the original crude oil feedstock and so do not represent contaminants introduced through means other than the continued processing of the raw material feedstocks. As shown in the preamble and elsewhere in the record, lead and chromium, which are non-indigenous constituents (i.e.

hazardous constituents not originating primarily in the initial crude oil) are being phased out of refining and so would not significantly contaminate coke products.) EPA's traditional concern regarding unnecessary hazardous constituents being processed and ending up in a product is mitigated in this case because the Agency views coking as the continual processing of a raw material that contains the hazardous constituents, with concentrations of constituents found in the feedstock streams varying dependent on the point in the overall production process. In the context of a multi-step production process, there is much less of an element of discard of the hazardous constituents inherent in the original raw material than there would be had these secondary materials been generated by another industry or had the hazardous constituents not been inherent to the original raw material.

EPA also clarifies that the Agency is not including within the scope of the exclusion oil-bearing secondary materials generated outside the petroleum refining sector (i.e., SIC 2911). The Agency is basing its decision not to exclude these secondary materials from the definition of solid waste on the fact that EPA has very limited data from industry demonstrating the chemical and toxic content of the materials. In fact, the Agency has no information on which to base a finding that the use of oil-bearing hazardous secondary materials originating in a non-refinery sector of the petroleum refining industry in the coking process would be anything other than the management of wastes (e.g., hazardous waste recycling) from that non-refinery sector. Oil-bearing secondary materials originating from the non-refinery sector have the potential to include toxic constituents that are not present in crude oil feedstocks and that may not contribute to the refinery process. It is the Agency's intent not to exclude from the definition of solid waste those secondary materials with significant concentrations of hazardous constituents which are only being discarded by destruction or by incorporation into the coke or other refining product without benefit to the product. See *U.S. v. Marine Shale Processors*, 81 F. 3d at 1365-66 (5th Cir. 1996). Further, information is thus needed so that EPA could evaluate this consideration as well as other factors bearing on whether such processes could be viewed as a type of on-going industrial process without significant elements of discard.

Comment 4: Sun Continues to Support EPA's addition for Hazardous Oil-Bearing Residuals Returned to the Refining Processes to the Exclusions under the Definition of Solid Waste and Requests an Immediate Promulgation of this Rule.

The proposed change to 40 CFR 261.4 to add a new section (12) will be beneficial to Sun and to the environment. The petroleum refining industry has a long history of refining as much oil as possible, including recovered oils. A refinery is the best place for oil-bearing materials to be managed. The recommended change will encourage refineries to investigate and develop even more methods to manage these oily residuals within the refinery without having to use off-site waste management facilities. (Sun, 00008)

Response: See response to Comment 3 (above).

II.B.2.b. Disagrees with Exclusion

Comment 1: It should also be noted that toxics along for the ride is only one criterion for determining the legitimacy of recycling activities. In the instant rulemaking, EPA is proposing to reach a legitimacy determination for any oil-bearing residual inserted into the coker without making the requisite findings in accordance with applicable law and policies. For example, EPA presented 11 criteria in the Government's brief challenging the legitimacy of Marine Shale Processors' recycling activities, including whether the residual to be recycled is effective for its intended use, whether the residual is as effective as the material it is replacing, whether the specifications for the waste are selected to meet a recycling purpose, whether the hazardous waste contributes properties of value to the product, and whether the alleged recycling activity is replacing raw material of low value.³⁰

The infamous Lowrance Memorandum of April 26, 1989 adds several additional and important criteria, including the economics of the recycling process and whether the economic incentive is derived from avoided disposal costs or the value of the product, whether adequate records regarding the recycling transactions are kept, and whether the toxic constituents are "actually necessary" to the recycling process.

To date, EPA has not even addressed most of these legitimate recycling criteria, including but not limited to when the residual is used for quenching purposes. For example, EPA does not address the economics of the recycling process, and whether the principal reason for this so-called recycling is avoided disposal costs, particularly for residuals with limited oil content. As discussed above in Section IV, available information (including EPA data) indicate the market value of petroleum coke is declining, it has little or no market value currently, yet increasing quantities of hazardous waste are managed in this manner.³¹ These circumstances strongly suggest avoided disposal costs are driving the economics of this practice.

In addition, EPA does not address whether adequate records are kept of the recycling practices. According to EPA's contractor, "there are no paper trails" for domestic coke sales because resellers will not volunteer crucial recycling information. See Exhibit 1 to these comments.

³⁰ EPA Response to MSP before ERB, pp. 121-129.

³¹ The quantity of residuals inserted into the coker has increased from 144,840 tons in 1987 to 472,700 tons in 1995, while the corresponding quantity of residuals reused in the crude unit has declined from 68,160 tons to 16,300 tons over the same time period, according to API data. See Petroleum Industry Environmental Performance (5th Annual Report), API, May 1997, p. 25. Interestingly, API does not indicate how much of this increased use of residuals in the coker is for quenching purposes, as opposed to feedstock introduction.

Furthermore, EPA has not addressed whether the hazardous waste contributes to the value of the coke. In a paper on the insertion of waste in cokers presented at the 1995 NPRA annual meeting, representatives of Scaltech Inc. noted the introduction of waste actually poses problems for the coking operation.

The downside, especially of direct injection of raw sludge, is that introduction of waste in the coking cycle interferes with the process itself. Therefore, it is important that water be removed before the sludge is injected. But no matter which method of coking cycle injection of waste is used, the introduction of waste with the feed reduces the overall capacity of the coker, exposes process equipment to abrasive solids and increases the fouling of tubes and furnaces.³²

Consequently, refinery wastes are often not introduced into the coker with the feedstock, but are instead used in place of a portion of the quench water. Even this practice poses potential problems if "too much sludge" is applied incorrectly.³³

Indeed, the practice of using waste in the quench cycle as opposed to inserting the waste with the feedstock completely belies one of EPA's rationales for the proposal. Based upon a minuscule amount of unverified data provided by the industry, EPA contends all oil-bearing sludges that could be inserted into the coker are substantially similar to coker feedstock.³⁴ If this were true, why isn't the waste always inserted with the feedstock? Moreover, the proposal would exempt any oil-bearing residual, not just sludges, therefore EPA's bald assertion does not extend to the myriad of wastes potentially caught by the exemption.

Use of waste in the quenching process also belies industry assertions (and EPA's belief) that it is "highly unlikely" refinery owners/operators would allow the insertion of inappropriate materials into the coker, given the importance of the unit.³⁵ By using waste in the quenching process instead of the coking cycle, there is a reduced threat to the coker from the introduction of inappropriate wastes. In fact, "the introduction of sludge in the quench cycle is limited only by the amount of ash and metals allowable by coke specifications."³⁶ EPA would require the coke to contain metal contaminants below the toxicity characteristic because such metal specifications

³² Scalliet & Carter, "Recycling Refinery Waste in a Delayed Coker, presented at the 1995 NPRA Meeting, p. 3 (emphasis added).

³³ Id. Such problems include coke containing excess volatiles that is sticky and contains "foul odors". In addition, the solid particles in the sludge may plug the coke pores, thereby slowing the quenching process and creating hot spots.

³⁴ See 60 FR 57754 (November 20, 1995).

³⁵ 60 FR 57754 (November 20, 1995).

³⁶ Scalliet & Carter, *supra*, p. 3.

are inadequate.³⁷ However, as discussed above, the characteristic does not cover nickel, and the characteristic concentration thresholds are based upon leachate concentrations largely irrelevant to the subsequent use of coke as a fuel. Therefore, neither the purported incentive to protect the coker or the application of the toxicity characteristic would protect against the introduction of inappropriate wastes.

Ironically, new technologies encourage the use of listed refinery sludges (and presumably other wastes) in the quenching process through prior reclamation techniques which, in part, remove the free oil so that there is "practically no oil" in the waste used for quenching.³⁸ Yet under 40 CFR 261.6(a)(3)(v), the sludges still apparently qualify as a "hazardous waste containing oil", and therefore the similar handling of other wastes would presumably still meet the "oil-bearing residuals" definition in the proposed exemption. As noted above, EPA has yet to address how the remaining hazardous constituents in the deoiled waste contributes to the production of coke or the economics of the process. These technologies are justified economically solely on the basis of avoided disposal costs.³⁹ (EDF, 00006, L0009)

Response: EPA agrees that the so called sham criteria, use of which were upheld emphatically by the Fifth Circuit in the Marine Shale litigation, are also relevant here to ascertain whether the quench coking process is sham recycling or a potentially excludable intra-industry recovery process. However, EPA disagrees with the commenter's main premise that quench coking produces only coke as an output. Data provided to the Agency from industry sources indicate that hydrocarbons are recovered as a light fraction (i.e. as refinery feedstock, not as petroleum coke) from oil-bearing secondary materials when these materials are fed to the coker, including when these materials are fed into the coker with the quench cycle.

The efficiency of this recovery is comparable to the recovery of light ends during the conventional coking process.^{40 41} In addition, industry data indicate that there are always recoverable levels of oil in sludges generated by petroleum refineries and typically fed into the coker with the quench.

Based on a considered evaluation of conflicting comments received by the Agency regarding the constituent content of sludges fed to the coke and the degree of oil recovery when secondary

³⁷ Fuel grade coke used as cement fuel or fuel in steel plants has no metal specifications, according to Table 3 of Attachment 3 provided by EPA in response to the EDF FOIA request.

³⁸ Scalliet & Carter, *supra*, p. 4.

³⁹ *Id.* at 9.

⁴⁰ January 23, 1998 letter from Paul Bailey to Michael Shapiro.

⁴¹ 60 **FR** 57754.

materials are fed into the coker with the quench, and using engineering and technical judgement in ascertaining the extent of recovery of hydrocarbon values from the secondary materials used in the quenching process, the Agency believes that oil (i.e., hydrocarbon value) is recovered during the quenching process and that the efficiency of this recovery is comparable to the recovery of light-ends during the conventional coking process. This belief is based largely on the Agency's best professional judgement upon review of the typical range of boiling points in the hydrocarbons present in the secondary materials, in concert with the temperatures these secondary materials experience in the coke drum for the duration of the quench cycle; because of the presence of water during the quench cycle, the additional effect that water volatilization is predicted to have on the removal of volatile constituents (i.e., an effect analogous to "steam stripping") also serves, in the Agency's best professional judgement, to facilitate the removal and transport of volatilized hydrocarbons up and out of the coke drum to be recovered. In applying its best professional judgement to the technical information (e.g., boiling point ranges, coke drum temperatures, effect of water vapor, etc.) provided by commenters on both sides of the issue, the Agency relied heavily on its own familiarity with the industry, informed by numerous site visits to refineries and experience with the secondary materials at issue. The Agency also was persuaded by certain specific simulations of boiling point ranges provided by oil industry representatives. (The Agency also notes that in the worst case scenario provided by one commenter opposed to the exclusion, which assumed 80% of the oil in the secondary material was too heavy to significantly volatilize at the temperatures encountered during the quenching process, there was recovery of hydrocarbon, even from the heavy oil fraction.⁴²)

The Agency notes that the metals levels of sludges generated by petroleum refineries and typically fed into the coker (e.g., sludges bearing hazardous waste codes K048-K052) are, for the most part, comparable to the concentration of metals in normal refinery feedstocks. Although levels of lead and chromium may be higher than normal petroleum feedstocks, the concentrations of these two metals in petroleum sludges are expected to decrease due to changes in the petroleum production process. The NESHAP and MACT standards promulgated under the Clean Air Act will result in chromium no longer being used in cooling towers (see 40 CFR Part 63, Subpart Q). Therefore, the principal source of chromium contaminants in the production process will be ending. Lead levels in petroleum sludges will continue to decline due to the phasing out of leaded gasoline as a product line.

The Agency is convinced, after a review of data provided by commenters, that the other hazardous metals found in the hazardous secondary materials can be traced back to the metals found in the original crude oil feedstock and so do not represent contaminants introduced through means other than the continued processing of the raw material feedstocks. EPA's traditional concern regarding unnecessary hazardous constituents being processed and ending up in a product is mitigated in this case because the Agency views coking as the continual processing of a raw material that contains the hazardous constituents, with concentrations of constituents found

⁴² See the January 9, 1998 letter from Richard Fortuna to Michael Shapiro.

in the feedstock streams varying dependent on the point in the overall production process. In the context of a multi-step production process, there is much less of an element of discard of the hazardous constituents inherent in the original raw material than there would be had these secondary materials been generated by another industry or had the hazardous constituents not been inherent to the original raw material.

Concerning the issue of net contribution of the oil-bearing hazardous secondary materials to the coke product (i.e., added energy value vs. added ash content), the petroleum industry maintains that the additional ash content is insignificant and points to the amount of coke product produced per cycle (ranging from about 400 to 800 tons) that would be endangered if the ash content (as well as the VCM level) contributed during the quenching process was sufficient to lower the value or marketability of the coke product. Further, EPA notes that anode-grade coke, the most high-valued coke with the most stringent product specifications, can and is produced from quench coking and is likewise able to meet the product specifications while using oil-bearing secondary materials in the quenching process. Most important, as noted, the quenching process recovers petroleum as a light fraction; it does not just generate coke. Thus, evaluation of contribution or non-contribution to the coke product is not the sole relevant inquiry, or even the principal one.

The assertion by the commenter that it is questionable that the component in the secondary material that fulfills its primary purpose (i.e., oil) could also be a limitation on the use of the secondary material (i.e., that too much oil would degrade the coke product itself) is not compelling. It is not uncommon that industrial processes have specifications on a feedstock material that requires a minimum of a certain component while at the same time requiring that a maximum level for the same component not be exceeded because it would degrade the quality of the product.

In the case of oil-bearing secondary materials generated by petroleum refineries, the Agency disagrees with the commenter's assertion that the principal reason for using these secondary materials in the coking process is the avoidance of disposal costs. The Agency is convinced that there is some beneficial contribution to the coke product in the form of carbon and some energy values. Simply put, any hydrocarbon not recovered as light ends as described above must, by a straightforward mass balance assumption, remain in the coke product that is itself almost entirely made of carbon and is marketed for its carbon content (i.e., as a fuel). In addition, as noted above, EPA does not accept the commenter's premise that this process simply incorporates materials into the coke. A light petroleum fraction is recovered via desorption for return to the refining process. Given that the recovered hydrocarbon is the primary product of using the secondary materials in the quenching process, the simple fact that the coke product (i.e., the co-product) continues to meet the applicable product specifications and shows no appreciable increase in risk carries more weight in the Agency's evaluation. In other words, demonstrating hydrocarbon recovery is the key test in determining whether the hazardous secondary materials actually serve a useful role in the overall coking operation, rather than demonstrating a net contribution to the coke (as opposed to no degradation of the coke). EPA is convinced that this

oil cannot be recovered by other means (i.e. is not amenable to direct refining or conventional coking), so that the quench coking process can be viewed as the final step in a hydrocarbon recovery chain. Finally, the Agency believes that economic forces, driven by product specifications and competition for markets, will serve to ensure that the quenching process is not simply a means of indiscriminately disposing of hazardous wastes.

The Agency has determined that, as with other side streams generated by one process and used as feedstocks to other production processes, this activity constitutes a link in the multi-step chain of processing steps designed to recover as much of the hydrocarbon value from the original crude oil feedstock as possible. Thus, there are arguably aspects of this activity that lead one to conclude that the oil-bearing hazardous secondary materials used in the quenching process can be considered, for regulatory purposes, as part of an on-going hydrocarbon recovery and utilization production process and hence classified (as an act of interpretive discretion) as an activity not subject to RCRA jurisdiction.

EPA also has no evidence that the quenching process could be viewed as part of the waste management problem, part of the jurisdictional tests articulated in AMC I and II. As discussed earlier, there is no significant evidence of degradation of coke product quality, and indeed, coke products produced with and without using secondary materials in the quenching process are largely indistinguishable from the standpoint of concentrations of hazardous constituents.⁴³ And finally, again, EPA believes that the recovery of hydrocarbon from the oil-bearing secondary materials in the quenching process is consistent with the overall petroleum refining process, and the coking operation in particular, i.e., the recovery of hydrocarbons for the production of high-value fuel products. This goal, in turn, is consistent with the RCRA objective to encourage safe types of recycling. (See RCRA section 1003(a)(6)).

Taken all together, the fact that 1) the recovery efficiency of hydrocarbons from oil contained in the secondary materials used in the quenching process is comparable to the recovery efficiency of the conventional coking process, 2) the use of oil-bearing hazardous secondary materials (including RCRA listed hazardous wastes) in the quenching process is consistent with the overall goal of the petroleum refining industry, namely to maximize the recovery of hydrocarbon values from the original crude oil feedstocks, and 3) the coke product continues to meet product specifications and indicates no increase in risk (and so can be viewed as not being part of the waste disposal problem, in the language of the D.C. Circuit), the Agency concludes that the use of oil-bearing hazardous secondary materials generated by the refinery can legitimately be used in the coke quenching process.

EPA believes that these factors outweigh any inferences that could be drawn from the fact that some refineries may be paid to process other refineries' second materials in coking processes. (See 53 FR at 522 (Jan. 8, 1988) noting that the so-called sham recycling criteria are to be

⁴³ See the January 23, 1998 letter from Paul Bailey to Michael Shapiro.

considered on a case-by-case basis with the weight given any particular factor varying as appropriate under the circumstances; the same language appears in the Lowrance Guidance Memorandum referred to by the commenter.)

The Agency considered, as suggested in several comments, setting a minimum oil content to define the scope of "oil-bearing secondary materials" that are excluded when used in the quenching process, or to require a demonstration of hydrocarbons actually being recovered from the excluded secondary materials that is comparable to oil recovery in the conventional coking process. The Agency rejected limiting the exclusion based on a set minimum oil content or a recovery efficiency requirement for several reasons.

As the petroleum industry stated in their comments, the quenching process represents the last possible process in which to recover hydrocarbon from the original crude oil feedstock. The refinery processes and operating procedures are designed to separate and process into products as much hydrocarbon as possible from the crude oil feedstock, in other words, to prevent as much oil from making its way into these secondary materials as possible. The oil that does make its way into these secondary materials is generally considered unavoidable and inevitable, or in some cases, too much oil in these secondary materials is evidence of a problem with some aspect of the overall refining process or of the wastewater treatment system. (These same factors also explain to some degree the variability in the oil content of secondary materials used for quench coking: the same materials are used but the oil content varies depending on the daily efficiencies of the refining process and wastewater treatment system). Thus, it would be counter to the overall efficiency of the petroleum refining to require a minimum oil content in the secondary materials, since higher oil levels would tend to indicate that the same hydrocarbons are escaping recovery elsewhere in the system.

Also, the Agency believes that, in this case, a minimum oil content condition would do little to ensure that only those secondary materials from which oil can actually be recovered would be excluded; or in other words, the Agency does not believe that setting a minimum oil content would ensure that secondary materials are legitimately being used in the quenching process. Since most of the secondary materials in question result from wastewater treatment, a minimum oil content requirement would only serve to encourage a refinery to operate the refinery process less efficiently to ensure that these secondary materials contain the minimum oil content and thus avail themselves of an exclusion.

As for requiring a demonstration of oil recovery efficiency comparable to the conventional coking process, the Agency is assured that the normal operating practices and conditions described above (e.g., typical hydrocarbon boiling point ranges in secondary materials, coke drum temperatures at the end of each cycle, presence of water vapor) inherent to the quenching process will result in a comparable oil recovery efficiency. While there may be fluctuations in the actual volume of oil recovered (due to the fluctuations in the oil content of the secondary materials as well as the ratio of heavy-to-light oil in the secondary materials), the quenching process per se is such that there will be oil recovered from oil-bearing hazardous secondary

materials based on the Agency's best professional judgement as described earlier.⁴⁴ Therefore, requiring an actual demonstration of recovery efficiency would be unnecessarily burdensome unless there is a question regarding a site-specific coke quenching process or the hazardous secondary materials being used. The exclusion for oil-bearing hazardous secondary materials generated by the petroleum refining sector that are being legitimately used in the quenching process is conditioned therefore, only on these materials being managed such that there is no land placement and no speculative accumulation, and that the coke product produced not exhibit a characteristic of hazardous waste.

However, the Agency believes it is fundamental to this exclusion that there actually be oil recovered for further refining when these oil-bearing hazardous secondary materials are used in the quenching process. After all, the exclusion is only for secondary materials returned to a refining process for oil recovery, so that legitimate recovery must be occurring. Therefore, the Agency recognizes that the possibility exists in any particular case that quench coking may represent a means for disposing of hazardous wastes, and not represent a means of legitimately reusing secondary materials in an ongoing production process. Factors that would have to be considered by the Agency in making this determination, applicable in each case, are the percentage of oil in the secondary material, whether light hydrocarbons are recovered and the efficiency of the recovery, the effect the hazardous constituents have on the coke product, whether the refinery is paid to take the secondary materials, and whether there are high concentrations of non-indigenous toxics (toxics not originating in the crude oil feedstocks) which do not benefit the coke product.

In addition, the fact that petroleum industry representatives have referred repeatedly to quench coking as a means of getting rid of hazardous wastes means that this operation needs to be scrutinized with some care to assure that these statements do not become reality.

EPA also clarifies that the Agency is not including within the scope of the exclusion oil-bearing secondary materials generated outside the petroleum refining sector (i.e., SIC 2911). The Agency is basing its decision not to exclude these secondary materials from the definition of solid waste on the fact that EPA has very limited data from industry demonstrating the chemical and toxic content of the materials. Thus, the possibility exists that other types of secondary materials, generated outside the petroleum refining sector, may contain toxic that are non-indigenous to petroleum feedstocks, and that the possibility exists that the coking process could be used to get rid of these toxics. The fact that representatives from the petroleum refining industry have referred to quench coking as a means of waste disposal necessarily means that EPA should be cautious as to the scope of an exclusion involving these operations. In fact, the Agency has no information on which to base a finding that the use of oil-bearing hazardous secondary materials originating in a non-refinery sector of the petroleum refining industry in the coking process would be anything other than the management of wastes (e.g., hazardous waste

⁴⁴ February 2, 1998 Letter from John Medley to Max Diaz, EPA.

recycling) from that non-refinery sector. The Agency has no information on which to base a finding that the use of oil-bearing hazardous secondary materials originating in a non-refinery sector of the petroleum industry in the coke quenching process would be anything other than the management of wastes (e.g., hazardous waste recycling) from that non-refinery sector.

The Agency also is requiring that the materials excluded under this provision of today's rule be returned directly to a refinery for insertion. While this is not an issue if materials are recycled on site, EPA has concerns about situations where these materials are generated at one refinery for insertion into another, but are instead managed at intermediate non-refinery facilities prior to insertion into a refinery process. This is consistent with the argument that the exclusion is provided on the basis that secondary materials are being used within the realm of on-going production in petroleum refining sector.

Analyses conducted by EPA confirm that the final coke product is basically unchanged by the use of hazardous oil-bearing secondary materials in the coking process. The final exclusion from the definition of solid waste for oil-bearing secondary materials generated at petroleum refineries and returned to the refinery process is conditioned on there being no speculative accumulation of the materials, on the materials not being placed on the land prior to reuse and stored in a manner to minimize loss. Finally, the reuse of the secondary materials in the refinery process must not result in the coke product exhibiting any of the characteristics of hazardous waste.

Comment 2a: Recycling: Gaps Between Perception And Reality

Recycling of hazardous wastes in all its forms has always been regarded as a preferred form of environmental management due to the special promise that recycling holds: reclamation of a resource, and protection of the environment. Indeed, many forms of current-day recycling truly fulfill this promise. However, just as there is a major difference between Mother Theresa and Ma Barker, so too merely attaching the "recycling" label to a practice does not guarantee the implied protection. In fact, a rapidly growing number of recycling practices, particularly in the petroleum industry, not only fail to fulfill this promise, but are making an outright mockery of it.

Recycling: A Reality Check reveals how hazardous waste recycling has become the "Wild West" of hazardous waste management. In the process, the failure to control petroleum waste recycling is: lowering the overall standards for the industry, punishing good recyclers, discouraging new technologies, making a mockery of the Clean Air Act and historical Land Disposal Restriction controls under RCRA, causing the export of toxics to developing countries in the form of petroleum coke, effectively deregulating the oil industry's hazardous waste practices, and resulting in increased pollution through unregulated recycling practices. (See Chapter 7.)

The gap between the public's perception of recycling's benefits and the reality of the environmental damages that recycling has caused is significant. (See Chapter 1.) Moreover, this current gap between perception and reality is being both exploited and exacerbated: exploited by a growing number of refineries and other firms that seek to expand unregulated operation based on historical loopholes (See Chapters 2-3); exacerbated by lax State and Federal enforcement

policies (See Chapter 4, 6); and, will be accelerated by four pending policy initiatives of the Administration that would effectively deregulate the entirety of the petroleum industry's hazardous waste management practices. (See Chapter 5.)

Current Regulations: Sanctioning Pollution in The Name of Recycling

Under current RCRA regulations and enforcement policies petroleum refineries are: 1) packing petroleum coke with toxic metals and carcinogens in the quench cycle under the guise of "recycling" --- apparently a direct violation of the Agency's "sham recycling" prohibition; 2) operating unpermitted, covert commercial recycling facilities on their properties under a claim of "exempt recycling;" 3) land disposing of refinery wastes that contain percentage-levels of carcinogenic compounds often into unlined landfills; and, 4) "Blending-up" low-Btu refinery wastes/dirt into heavy-metal containing hazardous waste fuels. (See Chapters 2-4.)

Clean recycling alternatives to coking and fuel blending not only exist (i.e., gasification, desorption,) but have been developed by our own petroleum industry in many cases. It is ironic, if not shocking, that the use of these U.S.-developed technologies (i.e., particularly gasification) is being planned in Europe and Asia, but not the U.S. In short, as Italy is installing non-polluting petroleum recycling technology, in the name of "encouraging recycling" our refineries are increasing production of the world's dirtiest fuel, petroleum coke. This increase is directly attributable to the current and planned regulatory subsidiaries that the EPA has and continues to lavish on the refining industry. EPA regulations are encouraging refineries to use petroleum coke as a pollution sink and thereby evade the very public health and environmental protections required of all other forms of hazardous waste management.

Pending Policies: Going From Bad To Worse

Moreover, this Report demonstrates the compounding and adverse environmental implications of four pending recycling initiatives in the Office of Solid Waste (OSW) (See Chapter 5) and two glaring lapses in enforcement of current regulations (See Chapter 4):

- 1) the proposal to grant a total exemption to on-site recycling at petroleum refineries including expansion of the coking exemption (62 FR 16747; 4-8-97);
- 2) the failure to list additional petroleum refinery wastes as hazardous under RCRA (62 FR 16747; 4-8-97);
- 3) several aspects of the pending amendments to the Definition of Solid Waste, which would exempt all on-site hazardous waste recycling practices from RCRA permitting and preventive controls (61 FR 55718; 10-28-96);
- 4) exempting all refinery waste cleanups from land disposal pre-treatment requirements (61 FR 55721; 10-28-96); and,

5) the failure to investigate and enforce against violations of EPA's Sham recycling policies by allowing untreated hazardous wastes to merely be disposed of onto the coke pile as "quench" without recycling or reclamation, and by failing to enforce its own policies that prohibit blending up of low-Btu wastes to produce hazardous waste fuels. (See Chapter 4.)

Of all the aforementioned actions, the first one is the most disturbing. The Agency is on the verge of sacrificing its hard-fought policies to prevent sham recycling by allowing indiscriminate reinsertion of wastes back into the coking process in its pending rulemaking (62 FR 16747; 4-8-97.) This proposed new exemption is so broad as to effectively codify a special regulatory exemption from the "sham recycle" policy for refinery coking operations (See p. 37.) Why is the Agency going out of its way to encourage production of a waste material that has a \$0 market value, that is already serving as a pollution sink, and which will only make the world's dirtiest fuel even dirtier?

Is This "Reinventing Government?"

The Administration has undertaken numerous programs to respond to purported claims of over-regulation by manufacturing industries: the Common Sense Initiative (CSI), and Project XL to name two. Moreover, the current Solid Waste Definition proposal (See Chapter 5) represents yet another carte blanche surrender of jurisdiction with no legal impetus or environmental justification. This effort again emphasizes purported claims of regulatory excess with relatively little or no attention to recycling's dark side; the uncontrolled release of toxic constituents in the pursuit of marginal or non-existent resource values (i.e., coke, with a current market value of \$0.)

To date, these type of "exemption expansion" activities have almost exclusively characterized your Administration's "reinvention" efforts in the hazardous waste area. This Administration has a fundamental decision to make: will it continue the transition toward treatment and technology, or will it reverse the unprecedented progress of the last decade and allow "recycling", of all things, to become the new means to shift pollutants from one media to the next? Is it going to allow "reinventing government" to translate into a dismantling of national controls, in lieu of a patchwork quilt system of State controls that gave rise to current problems, or will "reinventing government" mean rectifying the loopholes that are making "recycling" the most reckless area of hazardous waste management? If ever there were an area that cried out for federal leadership, or "reinvention" this is it. However, "reinvention" must mean more than simply throwing exemptions at the petroleum industry and other hazardous waste generators and allowing them to attach a "recycling" label to anything and everything that they so desire, irrespective of where the toxic constituents from the recycled wastes are deposited in the environment.

Is This Encouraging New Technology?

When our refining industry develops advanced technology such as gasification for use everywhere in the world but in the U.S., and when an ever increasing volume of dirtier coke is produced in the U.S. in direct response to RCRA recycling exemptions, this nation's approach to hazardous waste

recycling needs to be quickly “reinvented.” Instead it is being further undermined by blithely catering to an industry already engorged with exemptions. If the petroleum industry can produce non-polluting recycling technology for use in Italy, it can certainly begin to use it in this country as well. (See Chapter 7.)

SUMMARY OF FINDINGS

The principle focus of this Report is on petroleum wastes. However, many of the examples cited herein have equal applicability to other forms of organic waste reclamation as well as to recycling operations involving metal-bearing and other inorganic wastes. Moreover, this Report focuses primarily on legitimate recycling that is being done badly (i.e., where toxic pollutants are merely shifted from one media to the next due to inadequate regulation) ; as well as “sham” recycling situations (i.e., operations producing bogus recycled products for the purpose of evading hazardous waste regulation). The following are the major findings of our 12-month investigative effort as presented in Chapters 1-8 of the Report.

CHAPTER 1: PAST AND PRESENT RECYCLING PROBLEMS

- “Recycling” in all its forms is the most rapidly growing hazardous waste management practice. Every facility is trying to configure themselves as some type of recycler;
- Unfortunately, recycling is also becoming the new haven for polluters and exemption seekers that desire self-regulation without accountability or governmental oversight;
- Although approximately 20% of the Superfund NPL is due in whole or in part to recycling practices (See Chapter 1), environmental insults from recycling are not due to historical mismanagement alone, but continue to occur today;
- Moreover, the pollution caused by recycling is not solely due to “sham recyclers” that produce bogus products nobody buys--such as Marine Shale Processors; but is increasingly due to legitimate recycling that is being done badly--i.e., facilities that make bonafide products, but do so in a way that is virtually without regard to the fate of toxic and carcinogenic constituents contained in the waste being recycled;
- For example, EPA went so far as to name high-temperature metals recovery (HTMR) as the best technology for recycling of steel industry air emission control dusts due to the high level of zinc recovery that HTMR yields. Nevertheless, due to the Agency’s failure to control waste storage, containment, waste transfer, air emissions and land disposal of various slags and residues (i.e., which contained high levels of lead and cadmium) under these or other RCRA regulations, the Agency was forced to engage in a multi-year prosecution and impose a multi-million dollar fine and 300+ page Consent Decree governing every aspect of recycling operations at the nation’s leading HTMR facility in Pennsylvania. Unfortunately, this rectifying action occurred only after the surrounding community had become contaminated

with lead and cadmium dusts from the current recycling operation, which is now being addressed under the Superfund Removal Program;

- Rather than learning from its decade-long prosecution of MSP (a sham recycler) or its resource-draining Consent Decree action with the Pennsylvania HTMR facility (a legitimate but sloppy recycler), the Office of Solid Waste continues to approach and “regulate” recycling as if it were some universally benign activity, mollified by the mere mention of the “recycling” mantra, and seemingly unconcerned with the fate of toxic constituents until environmental damage occurs;
- In short, doing one thing right should not become a license to do everything else wrong. Simply because something of value is recovered from a waste should not be an explicit, or tacit license to merely shift the toxic constituents contained in the recycled waste back into the air, or to other media. Nor should such recovery operations be allowed to sidestep the preventive controls that apply to all other treatment and disposal facilities such as secondary containment, air emission controls, flood controls, waste testing, residue analysis, record keeping, and proper residue management.

Response: Although the Agency agrees with the commenter’s contention that “simply because something of value is recovered from a waste should not be an explicit, or tacit, license to merely shift the toxic constituents contained in the recycled waste back into the air or to other media,” EPA does not believe that this occurs with regard to the exclusions promulgated in the final rule. With regard to use of secondary materials in the quench coking process, the commenter’s principal concern, after evaluating information and data made available to the Agency regarding the reuse of oil-bearing secondary materials in the quench coking process, the Agency has concluded that the reuse of oil-bearing secondary materials generated by the petroleum refining sector by inserting these materials into the refinery process, including inserting these materials into the coker quench cycle can be excluded as part of the on-going production process which is not part of the waste disposal problem.

Furthermore, the Agency does not see any adverse effect on the coke product, nor (given the benzene NESHAP and the MACT standards for the petroleum refining industry) impermissible cross-media transfer of hazardous constituents.

Data available to the Agency indicate that hydrocarbons are recovered from oil-bearing secondary materials when these materials are fed to the coker, including when these materials are fed into the coker with the quench cycle. The efficiency of this recovery is comparable to the recovery of light ends during the conventional coking process. In addition, data indicate that there are recoverable levels of oil in sludges generated by petroleum refineries and typically fed into the coker.⁴⁵ The metals levels in sludges typically fed into the coker (e.g., sludges bearing hazardous

⁴⁵ January 9, 1998 letter from John Medley to Max Diaz, EPA.

waste codes K048-K052) are, for the most part, comparable to the concentration of metals in normal refinery feedstocks. Although the levels of lead and chromium in these sludges may be higher than normal petroleum feedstocks, the concentrations of these two metals in petroleum sludges are expected to decrease due to changes in the petroleum production process. The MACT standards promulgated under the Clean Air Act will result in chromium no longer being used in cooling towers. Therefore, the principal source of chromium contaminants in the production process will be deleted. Lead levels in petroleum sludges will continue to decline due to the phasing out of leaded gasoline as a product line. Other toxics originate with crude oil and their presence is thus not inconsistent with viewing the quench coking process as a final step in the refining of crude oil -- the last means of recovering available hydrocarbon fractions.

EPA repeats that the Agency is convinced, after a review of data provided by commenters, that the hazardous metals found in the hazardous secondary materials can be traced back to the metals found in the original crude oil feedstock and so do not represent contaminants introduced through means other than the continued processing of the raw material feedstocks. EPA's traditional concern regarding unnecessary hazardous constituents being processed and ending up in a product is mitigated in this case because the Agency views coking as the end of the process of refining crude oil that contains the hazardous constituents, with concentrations of constituents found in the feedstock streams varying dependent on the point in the overall production process. In the context of a multi-step production process, there is much less of an element of discard of the hazardous constituents inherent in the original raw material than there would be had these secondary materials been generated by another industry or had the hazardous constituents not been inherent to the original raw material.

EPA clarifies that the Agency is not including within the scope of the exclusion oil-bearing secondary materials generated outside the petroleum refining sector (i.e., SIC 2911). The Agency is basing its decision not to exclude these secondary materials from the definition of solid waste on the fact that EPA has very limited data from industry demonstrating the chemical and toxic content of the materials. In fact, the Agency has no information on which to base a finding that the use of oil-bearing hazardous secondary materials originating in a non-refinery sector of the petroleum refining industry in the coking process would be anything other than the management of wastes (e.g., hazardous waste recycling) from that non-refinery sector. Oil-bearing secondary materials originating from the non-refinery sector have the potential to include toxic constituents that are not present in crude oil feedstocks and that may not contribute to the refinery process. It is the Agency's intent not to exclude from the definition of solid waste those secondary materials whose hazardous constituents are only being discarded, or incorporated into the coke product without benefit to the product. The Agency has no information on which to base a finding that the use of oil-bearing hazardous secondary materials originating in a non-refinery sector of the petroleum industry in the coke quenching process would be anything other than the management of wastes (e.g., hazardous waste recycling) from that non-refinery sector.

The Agency also is requiring that the materials excluded under this provision of today's rule be returned directly to a refinery for insertion. While this is not an issue if materials are recycled on

site, EPA has concerns about situations where these materials are generated at one refinery for insertion into another, but are processed at an intermediate, non-refinery facility. In cases where materials generated at one petroleum refinery are to be recycled at another refinery, to meet the conditions of the exclusion the materials must be located either at the generating refinery, at the receiving refinery, or must otherwise be in transit between the two facilities. This is consistent with the argument that the exclusion is provided on the basis that the secondary materials are being used within the realm of on-going production in the petroleum refining sector.

In response to the commenter's claims that coke has a zero market value and that coke is being exported to developing countries, the Agency reviewed available information regarding the market value of coke and obtained information from the Department of Energy (DOE) on coke exports. According to the article "U.S. Petroleum Coke Production Expected to Increase," by Edward J. Swain in the November 10, 1997 issue of Oil & Gas Journal, fuel-grade coke is a low-cost energy source for some utilities and industries. The article provides information on the market price of petroleum coke. During the period from 1992 through 1996, the price for short ton of petroleum coke ranged between \$15 and \$21 and the price was increasing at the end of 1996. This information as well as industry data does not support the claim that coke has no market value. The article provides an overview of petroleum coke exports. Although a major portion of the petroleum coke produced by U.S. refineries was exported in 1996, the large majority of coke was not exported to third world countries. In fact, 68 percent of petroleum coke exports in 1996 were to Japan, Spain, Italy, Belgium/Luxembourg, the Netherlands, Canada, and Turkey.

In any case, EPA remains convinced that the chief purpose of quench coking is to recover a light hydrocarbon fraction for return to refining. The coke is a byproduct of that recovery process. To the extent that actual oil recovery is not occurring in a particular instance, the Agency would undoubtedly regard the practice as sham recycling.

In response to the commenter's claim that gasification may be a preferable means of recovering hydrocarbons from petroleum industry secondary materials, EPA recently published a Notice of Data Availability seeking comment on this precise issue. A result of analysis of the comments could lead EPA to also exclude secondary materials from refineries which are gasified. EPA is not making a final determination on this issue in this rulemaking, and so is leaving the matter open for final action at a later time.

The commenter's other points regarding recycling practices that are not the subject of this rulemaking are beyond the scope of this proceeding and so do not require response in this forum.

Comment 2b: CHAPTERS 2-4: DEREGULATING THE PETROLEUM INDUSTRY

Deregulating the Petroleum Industry

- This repackaging of petroleum pollutants in the name of “recycling” is being accomplished through four basic means: coking (Chapter 2), “covert” commercial facilities (Chapter 3), failure to enforce (Chapter 4), and failure to regulate as “hazardous” other refining wastes (Chapter 5). The following pending Agency policies will make each of these worse;
- If approved, pending regulatory proposals regarding coking and often “recycling” practices would effectively deregulate the petroleum industry, and put all of their recycling practices on the honor system. The proposed expansion of the coking exemption is so broad that it would even sanction “sham recycling” activities such as using coke as disposal medium. (See Chapters 2; Chapter 5, p. 75);
- If approved, pending proposals would also grant carte blanche to the petroleum industry to operate un-permitted, commercial hazardous waste recycling units at their refineries as well. (See Chapters 3; Chapter 5, p. 73);
- Pending regulatory measures also fail to list over 200,000 tons per year of heavily contaminated petroleum wastes, which are subsequently disposed of as “non-hazardous” wastes into unlined pits and landfills or burned in substandard facilities (See Chapter 5, p. 81);
- The Agency has suspended without public notice or rulemaking the applicability of the Land Disposal Restriction Standards to all petroleum waste cleanups (See Chapter 5, p. 85);
- When the petroleum refining industry says it “recycles” its waste, what does that really mean? Based on the most recent survey of its own members, the American Petroleum Institute’s own data reveals that only 40% of the volume claimed as “recycled” actually qualify as traditional or controlled activities such as reclamation, regeneration or re-feed to the crude unit. Table ES-1 reveals the type and prevalence of recycling methods used.⁴⁶ The Report fails to specify what “Other Recycle” means, but may include uses such as fill material, dyking, composting or other land placement practices;
- The most recently released API data from 1995 reveals that the level of coking continues to increase (i.e., to 29%, double the figures API reported in 1993), and the amount of refeed to the crude unit (i.e., the form of recycling most equate with the term “recycling”) is almost non-existent at 1% (See () in Table ES-1).⁴⁷ These trends are not only ironic, but directly refutes the Agency’s principle rationale for proposing an expanded series of recycling

⁴⁶ “Trends in Petroleum Refining.” EI Digest. October, 1996. “Management of Residual Materials: 1994,” American Petroleum Institute, Washington, D.C., September 1996, pp. 15, 18, 22 (“API Report, 1996”).

⁴⁷ Fifth Annual Report, Petroleum Industry Environmental Performance, American Petroleum Institute, May, 1997, p. 25 (“API Report, 1997”).

exemptions for the petroleum industry --- that its waste materials are "feedstock-like." See p. 85 for detailed discussion.

- Ironically, in the 1996 API Survey actually reported that "coking" was their leading "pollution prevention" technique for 6 of the 12 wastestreams addressed by the Survey.⁴⁸

See also Section III (p. 15) for more complete discussion of the industry's current exemptions and its environmental problems.

TABLE ES-1: REFINERY RECYCLING METHODS

Method	% of Total Recycling
"Other" Recycling	34%
Coker	26% (29%)
Reclamation	17%
Regeneration	8%
Refeed to Crude Unit	10% (1%)
Catalytic Cracker	6%

Response: API supplied the Agency with detailed information regarding the coking operation, presenting a description of the physical processes involved in the coking process and the economic value of the overall coking operation to the refinery, as well as the feedstocks used and products produced. The Agency is convinced that the use of oil-bearing secondary materials as feedstock for conventional coking represents legitimate reuse of these materials in an ongoing production process whose main purpose is to thermally convert the heaviest crude oil fractions into light-end hydrocarbons (typically about 70 % of the feedstock is recovered as lighter oil fractions) used as feedstocks for refinery processes that produce high-value fuel products. In many cases, the coking operation is essential to the profitable production of petroleum products from heavier crude oil feedstocks. The coke product itself may best be characterized as a co-product of the coking operation, while the principal products are the light-ends that are returned to the refining process. Thus, the Agency is affirming that the coking operation, including the quench cycle, is integral to the ongoing petroleum production process, resids are normal feedstocks to this process and petroleum coke is a legitimate fuel product (noting that high-grade petroleum coke -- which can result from quench coking -- is used for producing anodes for use in electric furnaces, such as for steel and aluminum manufacturing).

⁴⁸ API Report, 1996. p. 11. See note 1.

In the specific case of oil-bearing secondary materials added to the coke quenching cycle, the Agency has determined that the quench cycle represents continual production in that oil contained in the secondary materials is either volatilized and condensed for further refining into high-value fuels, or is incorporated into the coke product, adding to the coke's carbon content and hence contributing some energy value. Given that the recovered hydrocarbon is the primary product of using the secondary materials in the quenching process, the simple fact that the coke product (i.e., the co-product) continues to meet the applicable product specifications and shows no appreciable increase in risk carries more weight in the Agency's evaluation. In other words, demonstrating hydrocarbon recovery is the key test in determining whether the hazardous secondary materials actually serve a useful role in the overall coking operation, rather than demonstrating a net contribution to the coke (as opposed to no degradation of the coke). The Agency understands the commenter's concern that since it is obvious that these secondary materials would otherwise be hazardous wastes that would be treated and disposed of if not used in the quenching process, it would seem to be a simple matter, as the commenter suggests, to ascribe a simple waste disposal motive to this activity and nothing more.⁴⁹ However, the Agency is compelled to go further and determine whether the oil-bearing secondary materials actually contribute to the product and/or process, or otherwise determine whether there is a production-related value to this activity.

The Agency solicited further information from industry to demonstrate the recovery efficiency of the oil contained in the hazardous secondary materials used in the quenching process. EPA believes that a comparison of the recovery efficiency of the quenching process to the recovery efficiency of the conventional coking process (of the resids) would provide some indication of how "production-related" the use of the hazardous secondary materials in the quenching process is (i.e., the more similar the quenching process is to the conventional coking process in the recovery of hydrocarbon values, the more it may be considered analogous to, or a component of, the coking process). The data supplied indicate that the recovery efficiency of oil contained in the secondary materials during the quenching process is comparable to the recovery efficiency from the feedstock side of the coking operation -- i.e. from conventional coking.⁵⁰ Thus, although the oil content in the hazardous secondary materials is markedly less, at the very least, there is demonstrated hydrocarbon recovery as a light fraction from the secondary materials used in the quenching process.

⁴⁹ Indeed, internal industry literature, as well as public statements made by industry representatives, relevant to the use of hazardous secondary materials in the quenching operation would lead one to believe that the principal purpose of this activity is to dispose of hazardous waste sludges; however, the Agency does not, as a rule, take such statements at face value and evaluates the activity independent of how the process may have been characterized in other contexts. The Agency would do the same in situations where all such industry statements would indicate that a particular process is legitimate production, i.e., evaluate the merits of the activity independent of statements from interested parties.

⁵⁰ See January 23, 1998 letter from Paul Bailey to Michael Shapiro

With regard to the commenter's assertion that the level of coking is increasing, data available to the Agency indicate that there may be several reasons for this occurrence. The use of coking may be increasing due to changes in the characteristics of available crude and the fact that more refineries have cokers. As more refineries add cokers to the refining process, the production of coke and the levels of coking are expected to increase. In addition, in 1994, the exclusion from the definition of solid waste for petroleum coke produced from refinery hazardous wastes containing oil (40 CFR 261.6(a)(3)(v)) was expanded to include coke produced using hazardous wastes generated by the same "person," rather than merely generated at the same "site."

According to information published by API, 406 thousand wet tons of primary sludge was managed by refineries in 1994. This represents the largest quantity of primary sludge generation ever reported (288 thousand wet tons were generated in 1993). API's information indicates that it is likely that this reflects the refineries' efforts to meet statutory deadlines to retrofit or close primary sludge or TC surface impoundments in 1994. Thus, just as increases in waste generation noted by API between 1991 and 1993 were related to regulatory actions, the closure of certain land-based units resulted in peaked generation of primary sludge in 1994.⁵¹ API questioned the refineries regarding the increase in sludge generation and they stated it was an "abnormal or one-time event." The primary management for this added quantity was "recycle to the coker."

In contrast, API reported a decrease of greater than 60 percent in primary sludge management in 1995. API members reported managing only 128 thousand tons of primary sludge in 1995. This is the lowest quantity managed since 1991, and possibly provides an explanation regarding the fluctuation in the amount of secondary materials managed in cokers.⁵² In the final analysis, as petroleum coking is part of legitimate production, increased petroleum coking would indicate increased materials recovery. In addition, as discussed above the Agency is investigating gasification as another means of recovery for these types of secondary materials.

EPA clarifies that the Agency is not including within the scope of the exclusion oil-bearing secondary materials generated outside the petroleum refining sector (i.e., SIC 2911). The Agency is basing its decision not to exclude these secondary materials from the definition of solid waste on the fact that EPA has very limited data from industry demonstrating the chemical and toxic content of the materials. In fact, the Agency has no information on which to base a finding that the use of oil-bearing hazardous secondary materials originating in a non-refinery sector of the petroleum refining industry in the coking process would be anything other than the management of wastes (e.g., hazardous waste recycling) from that non-refinery sector. Oil-bearing secondary materials originating from non-refinery sectors have the potential to be more waste-like and thus do not warrant an exclusion, especially if their ultimate use is in the quenching process.

⁵¹ API. Management of Residual Materials: 1994. September 1996.

⁵² API. Management of Residual Materials: 1995. June 1997.

EPA further clarifies that the exclusion from the definition of solid waste for oil-bearing secondary materials returned to the refining process only extends to materials that are actually re-inserted into the refinery process. In cases where oil-bearing secondary materials are reclaimed prior to re-insertion, any residuals that may result from reclamation which are not returned to the refinery process, and therefore may be discarded, retain the original hazardous waste listing. The Agency modified the proposed listing description for F037 to include any residuals that result from the processing of listed hazardous wastes that will be disposed. The Agency decided to include this clarification within the regulatory language so that the rules are explicit and to ensure that there is a requirement to manage residuals from the reclamation of hazardous secondary materials as hazardous wastes.

Responses to other points noted by the commenter in the above list are provided below.

Comment 2c: Encouraging Production of Dirty Fuels — Petroleum Coke

- Present and pending Agency policies actively encourage the petroleum industry to produce more of the world's dirtiest fuel, petroleum coke, which is a major source of pollution: burning of coke is a concentrated medium of metals, sulfur and toxics. Rather than removing ash and heavy metal toxics from an oily waste stream, coking merely repackages and concentrates them. (See Chapters 2, 5);
- Moreover, listed hazardous wastes are being disposed of without treatment under the guise of serving as "quench" at the end of the coking process. This practice serves no "recycling" purpose, rather it appears to be mere disposal of untreated hazardous waste onto the coke pile (See Chapter 2, p. 37);
- Table ES-2 reveals that currently petroleum coke has \$0 market value. There is virtually no domestic market for coke as a fuel. It's only value is that of an unregulated "pollution sink" for refinery wastes to avoid regulation, and otherwise applicable treatment requirements. (See Chapter 2, p 34);
- The petroleum industry is increasing its use of petroleum coke as a "pollution sink" for toxics from hazardous wastes despite the fact that petroleum coke has \$0 market value as a fuel (See Chapter 2, pp 30-36);
- Coking is increasingly becoming the disposal method of choice for a wide variety of RCRA listed hazardous waste. As Table ES-3 reveals, coking has assumed the lead role in disposal of virtually all listed petroleum wastes. Five (5) times more primary sludge (i.e., listed wastes

F037-38) was being coked in 1994 than in 1992 according to the petroleum industries own data.⁵³ (See Chapter 2, p. 36);

TABLE ES-2: Market Price of Petroleum Coke (per ton), 1993-1996

1993	\$20 ⁵⁴
1995	\$15 ⁵⁵
1996	≤ \$0 ⁵⁶

TABLE ES-3: TRENDS IN REFINERY COKING

RCRA Waste Code	Volume Coked (tons)			Coking Popularity*		
	1992	1993	1994	1992	1993	1994
F037(38)--Primary Sludge	20,500	30,300	112,700	3	2	1
K051--Separator Sludge	23,900	22,800	44,340	2	1	1
K048--DAF Float	48,600	43,300	170,200	2	2	1

* "Popularity" indicates rank of coking for the given waste stream among all recycling, treatment disposal activities including: coker, crude unit, catalytic cracker, other in-process recycle, cement kiln or industrial furnace fuel or feedstock, reclamation, regeneration, "other recycle", incineration, physical/chemical treatment, impoundments, land treatment, landfilling and "other" disposal.

Response: In evaluating whether the use of oil-bearing secondary materials in the quenching process provides a beneficial contribution to the coke product or process, the Agency notes that the main purpose of the petroleum coking unit is to recover hydrocarbons from the oil contained in the feedstocks for further refining. Similarly, the main purpose of using the secondary materials in the quenching process is the energy-efficient recovery of hydrocarbon from the residual oil in the oil-bearing secondary materials. Concerning the issue of net contribution to the

⁵³ Management of Refinery Residuals, 1994. American Petroleum Institute, October, 1996.

⁵⁴ Falsetti, James J. "Petroleum Coke Utilization with the Texaco Gasification Process," "Presentation at the National Petroleum Refiners Association Annual Meeting, March 21, 1993, p.1. See Attachment B.

⁵⁵ Scalliet, Robert M., "Recycling Refinery Waste NDA Coker." Presentation at 1995 National Petroleum Refiners Assoc. Annual Meeting March 19-21, 1995." p. 3. Attachment C.

⁵⁶ Heaven, David L., "Gasification Converts a Variety of Problem Feed Stocks and Waste." Oil and Gas Journal. May 27, 1996. p. 48. See Attachment D.

coke product (i.e., added energy value v. added ash content), the petroleum industry maintains that the additional ash content is insignificant and points to the amount of coke product produced per cycle (ranging from about 400 to 800 tons) that would be endangered if the ash content (as well as the VCM level) contributed during the quenching process was sufficient to lower the value or marketability of the coke product. Based upon data provided to the Agency by the petroleum refining industry, the Agency notes that coke product produced using hazardous secondary materials in the quenching process is basically similar to coke produced without using secondary materials in the quenching process. Further, EPA notes that anode-grade coke, the most high-valued coke with the most stringent product specifications, can be produced using these secondary materials in the quenching process. The quench cycle represents continual production in that oil contained in the secondary materials is either volatilized and condensed for further refining into high-value fuels or is incorporated into the coke product, adding (perhaps marginally) to its carbon content and hence its energy value. Given that the recovered hydrocarbon is the primary product of using the secondary materials in the quenching process, the simple fact that the coke product (i.e., the co-product) continues to meet the applicable product specifications and shows no appreciable increase in risk carries more weight in the Agency's evaluation. In other words, demonstrating hydrocarbon recovery is the key test in determining whether the hazardous secondary materials actually serve a useful role in the overall coking operation, rather than demonstrating a net contribution to the coke (as opposed to no degradation of the coke).

EPA's traditional concern regarding unnecessary hazardous constituents being processed and ending up in a product is mitigated in this case because the Agency views this activity as the continual processing of a raw material that contains the hazardous constituents, with concentrations of constituents found in the feedstock streams varying dependent on the point in the overall production process. In the context of a multi-step production process, there is much less of an element of discard of the hazardous constituents inherent in the original raw material than there would be had these secondary materials been generated by another industry or had the hazardous constituents not been inherent to the original raw material. In general, the hazardous metals found in the hazardous secondary materials can be traced back to the metals found in the original crude oil feedstock and so do not represent contaminants introduced through means other than the continued processing of the raw material feedstocks.

Finally, EPA believes that the recovery of hydrocarbon from the oil-bearing secondary materials in the quenching process is consistent with the overall petroleum refining process, and the coking operation in particular, i.e., the recovery of hydrocarbons for the production of high-value fuel products. Therefore, the Agency is providing a conditional exclusion for oil-bearing hazardous secondary materials that are inserted into the coker, based on the assumption that, whether inserted along with normal feedstock (i.e., resids) or used in the quenching process, hydrocarbons are recovered for further refining and there is no degradation of the coke product.

In response to the commenter's claims that coke has a zero market value and that coke is being exported to developing countries, the Agency reviewed available information regarding the market value of coke and obtained information from the Department of Energy (DOE) on coke

exports. According to the article "U.S. Petroleum Coke Production Expected to Increase," by Edward J. Swain in the November 10, 1997 issue of Oil & Gas Journal, fuel-grade coke is a low-cost energy source for some utilities and industries. The article provides information on the market price of petroleum coke. During the period from 1992 through 1996, the price for short ton of petroleum coke ranged between \$15 and \$21 and the price was increasing at the end of 1996. This information as well as industry data does not support the claim that coke has no market value.

Likewise, the light hydrocarbon fraction which is recovered through desorption in the quenching process has positive market value.

EPA cannot directly respond to the commenter's concerns regarding the increased levels of coking. Data available to the Agency indicate that there may be several reasons for this occurrence. The use of coking may be increasing due to changes in the characteristics of available crude and the fact that more refineries have cokers. As more refineries add cokers to the refining process, the production of coke and the levels of coking are expected to increase. In addition, in 1994, the exclusion from the definition of solid waste for petroleum coke produced from refinery hazardous wastes containing oil (40 CFR 261.6(a)(3)(v)) was expanded to include coke produced using hazardous wastes generated by the same "person," rather than merely generated at the same "site." In addition, API claims that increased reliance on offshore heavier crudes has led to the addition of coker capacity, creating some increased opportunity for this process. Aside from the obvious incentive to recover hydrocarbons, another potentially significant factor could be the expiration of Mobil's patent in 1995, such that any refiner could begin using this technology without first licensing it from Mobil and paying a royalty fee.

According to information published by API, 406 thousand wet tons of primary sludge was managed by refineries in 1994. This represents the largest quantity of primary sludge generation ever reported (288 thousand wet tons were generated in 1993). API's information indicates that it is likely that this reflects the refineries' efforts to meet statutory deadlines to retrofit or close primary sludge or TC surface impoundments in 1994. Thus, just as increases in waste generation noted by API between 1991 and 1993 were related to regulatory actions, the closure of certain land-based units resulted in peaked generation of primary sludge in 1994.⁵⁷ API questioned the refineries regarding the increase in sludge generation and they stated it was an "abnormal or one-time event." The primary management for this added quantity was "recycle to the coker."

In contrast, API reported a decrease of greater than 60 percent in primary sludge management in 1995. API members reported managing only 128 thousand tons of primary sludge in 1995. This is the lowest quantity managed since 1991, and possibly provides an explanation regarding the

⁵⁷ API. Management of Residual Materials: 1994. September 1996.

fluctuation in the amount of secondary materials managed in cokers.⁵⁸ In the final analysis, as petroleum coking is part of legitimate production, increased petroleum coking would indicate increased materials recovery. In addition, as discussed above the Agency is investigating gasification as another means of recovery for these types of secondary materials.

Comment 2d: Toxic Waste Export

- RCRA's policies of encouraging the production of the world's dirtiest fuel, petroleum coke, are having significant international implications in that 70% of coke "fuel" is exported to developing countries, because it cannot be burned in this country. In fact, petroleum coke is quietly serving as a conduit for illegal waste export in the name of "product export." (See Chapters 2, p. 37; Chapter 7.)
- This trend is confirmed by other industry experts as well:

Although some high sulfur residual fuel oil and fuel coke have been able to find markets in countries that are environmentally loose, the sales prices are crumbling and the markets disappearing.⁵⁹ (emphasis added)

Response: Although a major portion of the petroleum coke produced by U.S. refineries was exported in 1996, the large majority of coke was not exported to third world countries. In fact, 68 percent of petroleum coke exports in 1996 were to Japan, Spain, Italy, Belgium/Luxembourg, the Netherlands, Canada, and Turkey. Data available to the Agency indicates that petroleum coke has a positive market value of at least \$20 per short ton. It thus is a legitimate product. In addition, as noted above, the critical fact in evaluating quench coking is that the main object of the process is recovery of oil as a light fraction for return to the refining process, and that this recovery occurs at the same efficiency as in conventional coking. The coke itself is a byproduct of that recovery step.

Comment 2e: Covert Commercial Facilities

- Louisiana is allowing the Shell Norco, LA refinery to operate an unpermitted commercial recycling facility on their property. Louisiana's "pen pal" authorization for this process unlawfully and incorrectly cites Federal authority for this exemption, and fails to address many of the preventive measures that are necessary for a commercial hazardous waste facility: waste analysis, air emission controls, containment, storage, waste compatibility, record keeping and residue analysis and management. (See Chapter 3, p. 49);

⁵⁸ API. Management of Residual Materials: 1995. June 1997.

⁵⁹ Aalund, L.R., "Italian Refinery Gasification Project to Make Electricity, Steam, and H₂ from Tar," Oil & Gas Journal. October 21, 1996. p. 33-35. See **Attachment E**.

- Four other states are allowing Kipin Industries to engage in unpermitted commercial recycling operations at four separate refineries under an unspecified series of recycling exemptions. (See Chapter 3, p. 51.)

Response: The Agency cannot document the commenter's claims. Information made available to the Agency by API and Shell Norco indicate that facility does have a RCRA permit. EPA believes that the Shell Norco and Kipin Industries recycling process has been scrutinized by state authorities and determined to meet the substantive criteria for an exemption for hazardous waste recycling. In addition, the facility is subject to air emissions standards under the CAA. In addition, the issue regarding the permitting status of one (or a few) facilities is beyond the scope of today's rulemaking.

Comment 2f: Exempting Oily Waste Cleanups From Treatment Requirements

- The Agency has not only exempted 500,000 tons of oily hazardous wastes from RCRA land disposal ban controls at the CITGO refinery but it has institutionalized this policy for all such similar cleanup. This pusillanimous surrender of jurisdiction will now allow remedial oily wastes to be land disposed without treatment despite readily available technology to meet the Land Disposal Restriction (LDR) standards. Once again the Agency has carved out an unjustified environmental exemption for big oil. (See Chapter 5, p. 86.)

Response: EPA has not provided a blanket exemption from RCRA requirements for all petroleum cleanups. However, any facility conducting a remediation may apply for a case-by-case treatability variance from the LDR treatment standards. This issue is outside the scope of today's rulemaking (although EPA notes that ultimately, a treatment variance was not granted to Citgo because the company decided to attempt to close the impoundment with waste in place, the result being no treatment of the sludge, rather than the partial treatment provided by the variance).

Comment 2g: Enforcement Failures: Sham Coke Production, "Waste Maximization" Through Blending-Up, Illegal Land Disposal

- Despite a decade-long fight to formally adjudicate its policies to prevent "sham recycling" in the context of the MSP case, when it comes to the refining industry, the EPA has chosen to look the other way. Hazardous wastes are being disposed of as "quench" at the end of the coking process." This so-called recycling process serves no "recycling" purpose, rather it is mere disposal of untreated hazardous waste onto the coke pile and appears to violate the Agency's hard-fought principle to stop "sham recycling." In fact, the proponents of this practice cite only one benefit of such a "waste as quench" practice --- cost savings on the treatment of refinery waste at permitted facilities. There is no mention whatsoever of the Btu or yield benefits to coke production. (See Chapter 2, p. 37; Chapter 4, p. 67);
- This shifting of pollutants from the land back into the air in the form of toxic laden petroleum coke is exacerbated by the Agency's failure to enforce against illegal "blended up" of low-Btu

waste in "fuel" for industrial furnaces. This "blending up" to produce industrial furnace fuels is a form of "waste maximization," resulting in 2-3X the volume of waste that was originally generated. (See Chapter 4, p. 64);

- Not only has the Agency failed to "list" as hazardous over 200,000 tons/year of refinery waste, but due to a lack of enforcement the Agency continually allows refineries to illegally dispose of "characteristically" hazardous wastes into non-hazardous waste landfills by allowing them to merely vent the benzene contained therein prior to disposal. Such disposal invariably occurs without treating the remaining 26± toxic and carcinogenic constituents typically contained in such waste (i.e., naphthalene, benzo(a) pyrene). These constituents are the very ones which the Agency itself has deemed necessary to prohibit from disposal into lined hazardous waste landfills (i.e., the Universal Treatment Standards (UTS) for pre-treatment of wastes prior to land disposal.) Current regulations require proper treatment of all underlying hazardous constituents before land disposal. If RCRA's requirement to treat underlying hazardous constituents in wastes that previously tested positive for a hazardous characteristic (i.e., typically benzene) were being enforced, such large-scale land disposal would not be occurring. However, neither the states nor EPA are enforcing this requirement and EPA is effectively letting the states rewrite RCRA's hazardous waste regulations. (See Chapter 4, p. 68; Chapter 6);
- A prime example of this trend is depicted in Table ES-4 (See p. 11). Table ES-4 reveals that the primary method for disposal of petroleum tank bottoms is landfilling. In fact, according to API's own Survey 51% of all petroleum tank bottoms (i.e., currently a "non-hazardous waste") are landfilled as a "non-hazardous" waste. At this point, most petroleum tank bottoms would qualify as a "hazardous waste" only if they contain leachable levels of one or more of 40 "characteristic" toxic constituents. Of these 40 constituents, benzene is the principle one that would be expected in crude tank bottoms. However, due to benzene's volatility, it often evaporates, or is deliberately vented, ostensibly in the cleaning and separation process. Is the Agency to believe that 51% of all petroleum tank bottoms do not flunk the "characteristic" leach test for benzene and are not artistically vented to remove benzene? Moreover, does the Agency believe that the remaining 49% of petroleum tank bottoms that do qualify as hazardous (i.e., for leachable levels of benzene) do not contain any of the other Land Disposal Ban constituents (i.e., Universal Treatment Standard UTS constituents; naphthalene, benzo(a) pyrene) for which a "characteristically" hazardous waste also must be treated?⁶⁰ Is the Agency even checking to determine the level of compliance with the requirements to treat all underlying hazardous constituents, or is this simply another example of how the Agency and its authorized state enforcement offices have yet again looked the other way just because the petroleum industry is involved? Simply attaching the "recycling" label to the evaporation of benzene does not alter the fundamental fact that this is nothing more than disposal of toxic constituents at levels that would be prohibited into a hazardous waste landfill. (See Chapter 4.)

⁶⁰ See 40 CFR 268.40(e)

- Many of the landfills receiving those so-called “non-hazardous” wastes are little more than unlined, unmonitored holes in the ground. (See Chapter 6, p. 95);

TABLE ES-4: TRENDS IN LANDFILLING AS “NON HAZARDOUS” WASTE

Waste Description	Volume Landfilled			Landfilling Popularity*		
	1992	1993	1994	1992	1993	1994
Tank Bottoms	70,200	60,600	54,800	1	1	1
Contaminated Sediments	38,700	111,300	96,000	1	1	1
FCCU Catalyst	82,200	81,100	78,100	1	1	1
Hydroprocessing Catalyst	6,200	23,800	12,398	2	2	2

* “Popularity” indicates rank of coking for the given waste stream among all recycling, treatment disposal activities including: coker, crude unit, catalytic cracker, other in-process recycle, cement kiln or industrial furnace fuel or feedstock, reclamation, regeneration, “other recycle”, incineration, physical/chemical treatment, impoundments, land treatment, landfilling and “other” disposal.

Response: In evaluating whether the use of oil-bearing secondary materials in the quenching process provides a beneficial contribution to the coke product or process, the Agency notes that the main purpose of the petroleum coking unit is to recover hydrocarbons from the oil contained in the feedstocks for further refining. Similarly, the main purpose of using the secondary materials in the quenching process is the energy-efficient recovery of hydrocarbon from the residual oil in the oil-bearing secondary materials. Concerning the issue of net contribution to the coke product (i.e., added energy value v. added ash content), the petroleum industry maintains that the additional ash content is insignificant and points to the amount of coke product produced per cycle (ranging from about 400 to 800 tons) that would be endangered if the ash content (as well as the VCM level) contributed during the quenching process was sufficient to lower the value or marketability of the coke product. The Agency notes that coke product produced using hazardous secondary materials in the quenching process is basically similar to coke produced without using secondary materials in the quenching process. Further, EPA notes that anode-grade coke, the most high-valued coke with the most stringent product specifications, can be made to specification when secondary materials are utilized the quenching process.

During the coking operation, including the quench cycle, there is recovery of hydrocarbon values from the oil-bearing secondary materials, short- and middle-chain fractions that are condensed and sent to refining processes to produce high-value fuel products (consistent with the overall coking operation). In addition, there is some beneficial contribution to the coke product in the form of carbon and higher energy values (even though this may not be reflected by an actual increase in market value), and the Agency also notes that the coke product continues to meet the market-driven specifications for the product, even for high-value anode grade coke. And, as with other side streams generated by one process and used as feedstocks to other production processes, this

activity constitutes a link in the multi-step chain of processing steps designed to recover as much of the hydrocarbon value from the original crude oil feedstock as possible. Thus, the Agency concludes that the oil-bearing hazardous secondary materials used in the quenching process are considered, for regulatory purposes, as part of an on-going production process and hence classified as an activity not subject to RCRA jurisdiction.

EPA proposed not to list crude oil tank sediment. The Agency noted in the proposal that the risks from landfilling this waste may be effectively controlled by the existing TC regulations, and sought comment on this decision. Upon reevaluation, EPA has determined that the available information provides sufficient basis to list crude oil storage tank sediment as hazardous. EPA is taking this action because additional analyses of groundwater risks indicate that potential risks are somewhat higher than the results of the risk analysis conducted for the proposal. Further analyses indicate that the existing TC regulations may not adequately control these risks as effectively as EPA originally thought at the time of the proposed rule. In addition, the waste has moderately high PAH and oil content, which may present additional risks under some circumstances.

The commenter's concerns regarding an alleged lack of enforcement actions on the part of the Agency is beyond the scope of this rulemaking.

Comment 2h: Vague Regulations: Failing to Verify Recycling Exemption Claims.

- States are making numerous incorrect recycling interpretations without the benefit of Federal oversight. The exclusion for the recycling unit, various wastewater treatment exemptions, creative sampling, and other strained interpretations of the 90-day storage exclusion are all combining to give exemption-seekers free reign with the current system. (See Chapter 4, p. 68).

CHAPTERS 5-6: FEDERAL AND STATE REGULATORY POLICIES CAUSING THESE PROBLEMS

Overview

- There are several reasons behind the emergence of recycling as “the Wild West” of hazardous waste management. To be sure, many of these insults are the result of historical EPA policies and/or aggressive interpretations by State Officials that have gone unchecked by EPA. However, 4 pending initiatives coupled with numerous Federal and state-level enforcement failures and unchecked regulatory interpretations threaten to take the current situation to a new level of chaos and “regulatory entrepreneurship.”

The Proposed Petroleum Waste Rule-Recycling: Exempting All Refinery Coking And Recycling

- The very pollutants that RCRA's land disposal ban seeks to keep out of the groundwater and that the various CAA fuels programs seek to keep out of the air are merely being

concentrated and repackaged in the form of petroleum coke and re-emitted to the air in the U.S., and increasingly in developing countries. The Proposed Petroleum Waste Listing would greatly expand this exclusion. Recycling at petroleum refineries would be completely deregulated and even allowed to shield covert commercial facilities. Refinery-based recycling of hazardous wastes and coking would be expanded and allowed to emerge as major commercial competitors, despite the absence of permits, and/or substantive operating standards to prevent environmental contamination. (See Chapter 5, pp. 72-80.)

The Proposal Petroleum Rule: Failure to List Additional Wastes

- The recently Proposed Rule on Petroleum Waste would also fail to list as “hazardous” the petroleum storage tank bottoms and numerous other streams that consistently and routinely contain levels of toxic constituents that exceed those present in many of the wastes that are currently regulated as hazardous. If such wastes were “listed”, rather than simply muddle through as “characteristic” wastes, refiners could not simply vent the benzene with impunity and ignore the other 26 ± UTS toxic constituents contained therein, and then landfill such oily mixtures into “non-hazardous” landfills. Ironically, the consequence of this regulatory and enforcement failure is to continue to allow a higher concentration of petroleum-based UTS toxic constituents to be disposed of as “non-hazardous” wastes into unlined sanitary landfills than would even be allowed into lined, secure hazardous waste facilities. (See Chapter 5, p. 81)

The Solid Waste Redefinition: Exempting All On-Site Recycling

- The pending plan to revise RCRA’s Solid Waste Definition would among other things completely deregulate all forms of hazardous waste recycling that occurred on the site of waste generation be they refineries, chemical plants, or whatever. Such an action is without environmental justification and is completely without an objective basis. Once again, EPA is being led by state programs that place expediency above protection. (See Chapter 5, p. 89);

State Program Serendipity

- State recycling programs are literally and figuratively “all over the map” with contradictory, inconsistent and in some cases illegal decisions being made with virtually no federal input, oversight or control. The normal feedback mechanism for many of these problems, state hazardous waste program directors, is operating at a significant disadvantage since many of these programs are under the control of chief executives that have a “deregulation for deregulation’s sake” approach to the environment. (See Chapter 6);
- Louisiana is allowing refineries to operate un-permitted, commercial recycling facilities, and the U.S. EPA is nowhere to be found. These facilities are operating under the cover of

the refinery without satisfying many of environmental safeguards that apply to other commercial facilities. (See Chapter 3);

- Four other states are similarly allowing commercial recycling operations to operate on refinery property as exempt unpermitted facilities. (See Chapter 3);
- Texas has no limit on the amount of Total Petroleum Hydrocarbon limit (TPH) that can be placed into "non-hazardous" Class I industrial waste landfills in the state. These so-called "non-hazardous" wastes are "non-hazardous" in name only and in most cases contain higher levels of toxic constituents than would be allowed in a fully permitted and lined hazardous waste landfill. This contrasts with significantly lower TPH disposal levels being proposed even in the Developing World (See further discussion below). These "Class I" industrial landfills have only two mandatory design and operating requirements: location and construction inspections. Every other substantive control is discretionary including: liners, leachate collection, air emission controls, storm water run-on/run-off controls, leak detection, waste testing and even groundwater monitoring. Thus a refinery hazardous waste that has been rendered "non-hazardous" by merely venting benzene contained therein, which otherwise consists of 100,000 ppm benzo(a)pyrene and other UTS constituents and up to %100 TPH, can be dumped into an unlined, unmonitored, hole in the ground in most of the fifty states, including Texas. (See Chapter 6);
- This example further illustrates how waste generators and state agencies are exploiting the vast disparity between RCRA facility requirements for hazardous waste and "non-hazardous" waste. If there were at least a standard in place that established a percentage-level limit for TPH or for UTS constituents and/or some minimal design, liner and detection standards for so-called "non-hazardous" landfills, then the double standard of protection between "hazardous" and "non-hazardous" disposal facilities would not be as severe. How can the Agency continue to ignore such high levels of toxic metals and/or carcinogenic constituents being disposed of into typically unlined, unmonitored "non-hazardous" landfills, when it has established exceedingly stringent levels for these same constituents when disposed of into state-of-the-art lined and monitored *hazardous* waste landfills?
- The State "safety net" standards for these "non-hazardous" waste facilities are largely discretionary and/or non-existent (See Chapter 6, p. 95.)

Response: The Agency disagrees with the commenter's assertion that as a result of today's rulemaking, "recycling at petroleum refineries would be completely deregulated and even allowed to shield covert commercial facilities." Today's final rule provides a limited exclusion from regulation as solid waste for oil-bearing secondary materials generated by the petroleum refining sector (SIC 2911) and inserted into the petroleum refining process, including the coker, both conventional coking and quench coking.

EPA clarifies that the Agency is not including within the scope of the exclusion oil-bearing secondary materials generated outside the petroleum refining sector (i.e., SIC 2911). The Agency is basing its decision not to exclude these secondary materials from the definition of solid waste on the fact that EPA has very limited data from industry demonstrating the chemical and toxic content of the materials. In fact, the Agency has no information on which to base a finding that the use of oil-bearing hazardous secondary materials originating in a non-refinery sector of the petroleum refining industry in the coking process would be anything other than the management of wastes (e.g., hazardous waste recycling) from that non-refinery sector. Oil-bearing secondary materials originating from non-refinery sectors have the potential to be more waste-like and thus do not warrant an exclusion, especially if their ultimate use is in the quenching process.

EPA further clarifies that the exclusion from the definition of solid waste for oil-bearing secondary materials returned to the refining process only extends to materials that are actually re-inserted into the refinery process. In cases where oil-bearing secondary materials are reclaimed prior to re-insertion, any residuals that may result from reclamation which are not returned to the refinery process, and therefore may be discarded, retain the original hazardous waste listing. The Agency modified the proposed listing description for F037 to include any residuals that result from the processing of listed hazardous wastes that will be disposed. The Agency decided to include this clarification within the regulatory language so that the rules are explicit and to ensure that there is a requirement to manage residuals from the reclamation of hazardous secondary materials as hazardous wastes.

The Agency also is requiring that the materials excluded under this provision of today's rule be returned directly to a refinery for insertion. While this is not an issue if materials are recycled on site, EPA has concerns about situations where these materials are generated at one refinery for insertion into another, but are processed at an intermediate, non-refinery facility. Such materials should not end up at an intermediate non-refinery facility without an accompanying hazardous waste manifest. In cases where materials generated at one petroleum refinery are to be recycled at another refinery, to meet the conditions of the exclusion the materials must be located either at the generating refinery, at the receiving refinery, or must otherwise be in transit between the two facilities. This is consistent with the argument that the exclusion is provided on the basis that the secondary materials are being used within the realm of on-going production in the petroleum refining sector.

As the commenter points out, EPA proposed not to list crude oil tank sediment. The Agency noted in the proposal that the risks from landfilling this waste may be effectively controlled by the existing TC regulations, and sought comment on this decision. Upon reevaluation, EPA has determined that the available information provides sufficient basis to list crude oil storage tank sediment as hazardous. EPA is taking this action because additional analyses of groundwater risks indicate that potential risks are somewhat higher than the results of the risk analysis conducted for the proposal. Further analyses indicate that the existing TC regulations may not adequately control these risks as effectively as EPA originally thought at the time of the proposed rule. In addition,

the waste has moderately high PAH and oil content, which may present additional risks under some circumstances.

The commenter's concerns regarding the Agency's on-going evaluation of the hazardous waste recycling regulations are beyond the scope of this rulemaking.

The Agency cannot respond to the commenter's claims of "state program serendipity" within this forum. Authorized states may implement and enforce the RCRA program elements for which they are authorized within their state boundaries. EPA does not approve facility permits in authorized states. Concerns regarding individual facility operations and/or the status of particular facility's permit should be raised to the appropriate authority in the applicable state.

Comment 2i: CHAPTER 7: OTHER CONSEQUENCES OF RECYCLING LOOPHOLES

Overview

Unless the trends discussed above are reversed, the repackaging of pollution and their subsequent placement into increasingly vulnerable situations such as urban air or unlined landfills will continue. In addition, they will result in the following:

- The shifting of pollutants back to the land and the air, and from our shores to those of unsuspecting or unprepared nations;
- Undermine the development of technologies (i.e., gasification, desorption) both within the petroleum industry and at commercial facilities to properly reclaim hydrocarbon value, while isolating toxic constituents;
- The gasification technologies that have been developed by U.S. petroleum firms are being used in Italy and elsewhere, but not in the U.S. Instead our industry continues to produce ever increasing volumes of ever more heavily contaminated petroleum coke;
- It will increase the cost of treatment by virtue of regulating only a "boutique" volume of wastes, rather than all oily wastes that are truly hazardous;
- Undermine the Administration's four year effort under the "Combustion Strategy" by establishing a double standard between exempt onsite refinery coking and recycling and offsite commercial recyclers.

Double Standard of Protection

- As a result of policies that are under consideration and current enforcement practices, a double standard of protection is being established: stringent controls for commercial

facilities; total exemptions for on-site facilities. (See Chapter 3, p. 51-63; Chapter 5, p. 88-89.)

Undermining The Clean Air Act

- The complimentary controls that the Agency believes are being imposed under the Clean Air Act to fill RCRA gaps (i.e., benzene NESHAP) are not triggered in many cases due to a variety of “small source” exclusions.⁶¹ Moreover, it is ironic that as a nation we are spending millions of dollars to produce the cleanest motor fuels that technology can buy, but at the same time Agency policies are encouraging the industry to channel its pollutants into petroleum coke and produce an ever increasing volume of the world’s dirtiest fuel.

Losing Our Technological, International Edge

- As a result of the “laissez faire” attitude that has been allowed to govern the implementation and enforcement of RCRA’s recycling provisions, we are not only losing environmental control over the most significant emerging sector in the hazardous waste industry, but we are losing our competitive edge in technologies as well. (See Chapter 7);
- At present, three separate refineries in Italy are installing clean gasification technology, technology that was developed in the U.S. by Texaco and other petroleum firms! When refineries in Italy begin to install advanced non-polluting petroleum recycling technology, such as gasification, as an alternative to coking at a faster rate than we are in the United States, something is seriously wrong. Despite domestically developing this technology, there is not a single refinery in the U.S. that has or is contemplating use of gasification as a standard waste management practice. (See Chapter 7, pp. 100-103);
- When countries such as Venezuela establish total petroleum hydrocarbon (TPH) disposal levels that are orders of magnitude more stringent than those being employed in the U.S. (i.e., 15 ppm, versus no limit in Texas), something is seriously wrong. It is ironic that petroleum wastes that would be tightly regulated in Venezuela (i.e., wastes with 10,000 ppm TPH) would be exempt from all Federal and most state-level regulation in the United States. (See Chapter 7, pp. 102-103).

Recycling of all types, whether done onsite or offsite, commercially or non-commercially must be done properly and must live up to its implied promise: the reclamation of a resource, not the reintroduction of toxics into the environment. Section III provides additional discussion of the key findings identified above.

⁶¹ While the Petroleum Refinery NESHAP (40 CFR 63.640) in general governs coking units, other recycling units such as desorbers are more frequently subject to the Benzene NESHAP (40 CFR 61.341) and typically fail to trigger the volume limits continued therein.

Response: The Agency disagrees with the commenter's assertions. Today's final rule provides a limited exclusion from regulation as solid waste for oil-bearing secondary materials generated by the petroleum refining sector (SIC 2911) and inserted into the petroleum refining process, including the coker.

However, the Agency is further investigating the scope of petroleum industry gasification operations and is considering whether to extend the exclusions promulgated in this rule to include gasification operations involving petroleum industry secondary materials.

EPA clarifies that the Agency is not including within the scope of the exclusion oil-bearing secondary materials generated outside the petroleum refining sector (i.e., SIC 2911). The Agency is basing its decision not to exclude these secondary materials from the definition of solid waste on the fact that EPA has very limited data from industry demonstrating the chemical and toxic content of the materials. In fact, the Agency has no information on which to base a finding that the use of oil-bearing hazardous secondary materials originating in a non-refinery sector of the petroleum refining industry in the coking process would be anything other than the management of wastes (e.g., hazardous waste recycling) from that non-refinery sector.

EPA further clarifies that the exclusion from the definition of solid waste for oil-bearing secondary materials returned to the refining process only extends to materials that are actually re-inserted into the refinery process. In cases where oil-bearing secondary materials are reclaimed prior to re-insertion, any residuals that may result from reclamation which are not returned to the refinery process, and therefore may be discarded, retain the original hazardous waste listing. The Agency modified the proposed listing description for F037 to include any residuals that result from the processing of listed hazardous wastes that will be disposed. The Agency decided to include this clarification within the regulatory language so that the rules are explicit and to ensure that there is a requirement to manage residuals from the reclamation of hazardous secondary materials as hazardous wastes.

The Agency also is requiring that the materials excluded under this provision of today's rule be returned directly to a refinery for insertion. While this is not an issue if materials are recycled on site, EPA has concerns about situations where these materials are generated at one refinery for insertion into another, but are processed at an intermediate, non-refinery facility. In cases where materials generated at one petroleum refinery are to be recycled at another refinery, EPA has added to the regulatory text of the exclusion that these secondary materials must be sent "directly to" another petroleum refinery. This is consistent with the argument that the exclusion is provided on the basis that the secondary materials are being used within the realm of on-going production in the petroleum refining sector.

Comment 2j: TOTAL DEREGULATION OF THE PETROLEUM INDUSTRY

A Sea of Exemptions

Table ES-5 reveals the extent to which the petroleum industry is already exempt from most of RCRA's hazardous waste management requirements, and is on the verge of total deregulation. **Table ES-5** shows the many exemptions that already apply for petroleum waste generally and for other wastes when "recycled". Attempts to quantify the volumes of wastes exempted are difficult to estimate precisely. However, of the 4,800,000+ tons of petroleum waste produced per year, less than 2.0% is reclaimed for its petroleum feedstock value at facilities that are permitted to ensure proper protection during the process. This and other issues related to the "exempt status" of the petroleum industry under RCRA and all environmental laws are more fully discussed in a recent Report by the Friends of the Earth.⁶²

An Ocean of Problems

What makes the current and pending petroleum exemptions contemplated by the Administration all the more puzzling is the fact that few industries are as undeserving of special regulatory treatment as the oil industry. Aside from the myriad of historical Superfund NPL sites and RCRA corrective actions at refinery and other petroleum facilities currently operating refinery, marketing and transportation facilities continue to funnel pollutants back into the environment.

In 1994 the U.S. Environmental Protection Agency (EPA) and the American Petroleum Institute (API) developed a survey to compile information on releases to groundwater only from petroleum storage facilities, their causes, and efforts made in recent years by these facilities to prevent these releases. As such this survey only examines contamination from the passive activity of storage, not refining or waste management. Approximately 85 percent or 299 of the 350 API member company facilities surveyed responded, an excellent response rate. The Survey provides useful data on the pervasiveness of groundwater contamination at petroleum storage facilities and its migration to adjacent properties, and quantifies the failure to use equipment and practices to prevent and detect groundwater contamination.

⁶² "Crude Awakening," The Oil Mess in America, Jack Doyle, Friends of the Earth, 1994, Washington, D.C.

TABLE ES-5: Compendium of Exemptions from Hazardous Waste Regulations for Petroleum Industry Coking and Recycling Operations

Description	Reference
1) General Exemption for Coking of Petroleum Wastes: excludes various listed waste and any characteristically hazardous coke by-product wastes when these materials "...are recycled to coke ovens, to the tar recovery process, or as a feedstock to produce coal tar..."	40 CFR §261.4(a)(10)
2) Exemption for "Recovered Oil" Inserted to Refinery Process: exempts any petroleum waste (i.e. defined as "Recovered Oil") from "...refining, exploration and production that is inserted into the refining process with normal streams.... Recovered Oil does not include listed hazardous wastes, does include oil recovered from such wastes."	40 CFR §261.4(a)(12)
3) General Exemption for Petroleum Exploration and Production (Bevill Exemption): exempts all "...drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil, natural gas or geothermal energy."	40 CFR §261.4(b)(5)
4) Contaminated Groundwater Re-Injection Exemption: exemption for re-injection of groundwater that exhibits a hazardous waste characteristic when it being used to recover free phase hydrocarbon that has been previously released to soil or groundwater.	40 CFR §261.4(b)(11)
5) Exemption for Hazardous Waste Fuels Reinsertion: exempts "hazardous waste fuels produced from oil-bearing hazardous wastes from petroleum refining, production, transportation practices, or produced from oil reclaimed from hazardous waste where such hazardous wastes are reintroduced into a refinery process.....so long as the fuel meets the used oil specification ..."	40 CFR §261.6(a)(3)(iv)(A)
6) Exemption for Hazardous Waste Fuels Burning: exemption is same as above except that it allows such wastes to be burned as a fuel, rather than reinserted to the production process	40 CFR §261.6(a)(3)(iv)(C)
7) Exemption for Coke Product : exempts the actual coke product from all applicable hazardous waste regulations provided it does not exhibit a hazardous waste characteristic	40 CFR §261.6(a)(3)(v)
8) Exemption for Used Oil: exempts any used oil that is recycled for any purpose, including burning, so long as it is hazardous only by virtue that it exhibits a hazardous waste characteristic	40 CFR §261.6(a)(4)
9) General Exemption for Recycling Unit: "the recycling process itself is exempt from regulation except as provided in 261.6(d)." This provision further excludes from regulation any recovery unit used to "recycle" refinery wastes that may still be subject to RCRA. The provision attaches 3 record keeping requirements, but no universal standards to control releases. This exclusion is not limited to refinery or oily wastes.	40 CFR §261.6(c)(1)
10) Exemption for Insertion of Any Hazardous Waste Into Refinery Operation: Pending proposal to expand current exemptions to allow any hazardous waste to be inserted into a refinery process. <u>See</u> Section V below for further discussion.	60 <u>FR</u> 57750 (November 13, 1995) Proposed Rule
11) Exemption for Underground Storage Tank Wastes Cleanups: Exempts all characteristically hazardous waste from the cleanup of an underground storage tank release from RCRA standards.	40 CFR §261.4(b)(10)

Description	Reference
12) Exemption for All Petroleum Cleanup Wastes From RCRA: Recent policy determination summary exempts all Petroleum cleanups from RCRA Land Disposal Ban Standards applicable to all other hazardous waste.	OSW Memo. (January 15, 1997) Attachment G.

According to the Survey report, the percentage of petroleum storage facilities with confirmed groundwater contamination is very high. Eighty-five percent (85%) of all refineries have known groundwater contamination (See Table ES-6).⁶³ Forty-four percent (44%) of such facilities have had such contamination migrate off their site.

TABLE ES-6: Percent of Petroleum Storage Facilities with Groundwater Contamination and Off-site Contamination

Type of Facility	Groundwater Contamination	Off-Site Contamination
Refining	85%	44%
Marketing	68%	35%
Transportation	10%	27%

Response: The Agency disagrees with the commenter's assertion that the petroleum industry is already exempt from most of the RCRA hazardous waste management requirements and is on the verge of "total deregulation." The exemptions listed in Table ES-5 are not the subject of this rulemaking and some of the regulatory exemptions listed by the commenter are not specific to the petroleum refining industry. For example, the first entry in Table ES-5 applies to recycling the of hazardous wastes and coke by-products in coke ovens in the iron and steel industry, where the coke is produced in the iron manufacturing process from coal. In addition, the last entry in the table refers to an OSW memorandum to RCRA/CERCLA Senior Policy Managers in the EPA Regional Offices outlining the appropriate uses of site-specific land disposal restriction treatability variances. The memorandum explains that such variances are approved on a case-by-case basis in consideration of site-specific and waste-specific circumstances and conditions. The memorandum makes no mention of the petroleum refining industry or specific refinery waste streams.

In response to the commenter's issue regarding petroleum storage facilities with groundwater contamination, the Agency does not have information regarding the specific sources of such contamination, the characterization and extent of the releases, or information on whether the contamination is the result of recent releases of hazardous wastes or the result of historical, pre-

⁶³ Epstein, N. Lois, "A Survey of API Members' Aboveground Storage Tank Facilities: A Critical Analysis." Environmental Defense Fund, July, 1994. See Attachment H.

RCRA, releases. Therefore, even if the claims of extensive groundwater contamination were determined to fall within the scope of the today's rulemaking, the Agency does not have sufficient information to respond to the commenter's claims.

The Agency notes that under the conditions of today's limited exclusion from regulation as solid waste for oil-bearing secondary materials generated by the petroleum refining sector and inserted into the refinery process, refineries are precluded from storing these materials on the land and from accumulating the materials speculatively. In addition, information available to the Agency indicates that the management of oil-bearing secondary materials at petroleum refineries prior to insertion into the refinery process occurs in tanks designed, constructed, operated, maintained, and inspected in accordance with the American National Standard Institute (ANSI) standards. The Agency believes that these standards are sufficient to ensure that secondary materials are managed in an environmentally protective manner.

Finally, EPA notes that many of the exemptions, and the proposed exclusions, cover a situation on the margins of EPA's legal authority: sequential recovery of hydrocarbon values within the generating industry conducted (given the condition on no land placement) so as not to become part of the waste disposal problem. Thus, limits on jurisdiction influenced the Agency's choices. (As explained in the preamble, however, EPA finds explicitly that the exclusion for quench coking is not required as a matter of law, but rather, is a permissible and reasonable exercise of EPA's authority to interpret the ambiguous statutory term "discarded" in the context of a recovery operation occurring within the generating industry.)

Comment 2k: CONCLUSIONS

Reversing 15 Years Of Progress

There is a lot to like about recycling and we believe it is the right approach to the management of petroleum wastes. When done right it yields two benefits: reclaimed resources and no release of toxins to air, land, groundwater or surface water. But frankly, doing a little of the right thing does not give you a license to do everything else wrong. In answer to market and environmental demands and through the development of better technologies, the refinery industry has provided cleaner burning, higher quality fuels from increasingly heavier, dirtier crudes. However, simply because you are able to direct a part of the waste matrix in the right direction, should not allow you to direct the majority of the toxics in the wrong direction. If there are no rules other than "recycling activities are exempt," then the lowest cost rule will apply, not what is best for the environment. The easiest, cheapest thing to do is to reclaim what's easy and bury the rest in landfills and dirty fossil fuels. Recycling is not benign, and must be viewed as critically as any waste treatment activity such as disposal, destruction or landfilling. Where the toxics go must take precedence over what is reclaimed.

In 10 years time, from 1984-1994, this Nation managed one of the most swift and dramatic transformations in environmental protection that any nation has witnessed. In 10 years, we went

from being a nation of dumpers to a nation of technology; from a spectator on the world stage to a leader in technology-based control of hazardous waste. However, at present we are neither moving forward nor securing these gains. Rather, we are losing ground and allowing uncontrolled land disposal and air emissions to reverse the progress of the last 10 years.

This reversal of course is due in no small part to EPA's current preoccupation with granting recycling exemptions, rather than ensuring equal environmental protection from recycling operations. Perhaps the most poignant indicator of where we stand is the sorry fact that U.S. petroleum firms have developed clean recycling technology such as gasification for oily waste recycling, and are selling them everywhere in the world, but the U.S. Italy is actually surpassing us in terms of environmental management of refinery waste. Not a single such unit is in commercial or routine production use in the U.S. Instead, our industry continues to produce ever increasing volumes of coke --- the world's dirtiest fuel, that contains an ever increasing volume of toxic metals and carcinogens. While the rest of the world is using U.S. technology to make refinery waste toxics less available to the environment, our industry is producing more and more coke, the burning of which makes toxics more available to the environment. Moreover, they are doing so in the name of "recycling," and with the full blessing and active encouragement of our "environmental protection" regulations. Coking has become the unregulated pollution sink for all the refining industry's unwanted toxics, and pending EPA policies promise more of the same.

"Reinvention" Must Mean More Protection, Not Just More Exemptions

The Administration has undertaken numerous programs to respond to purported claims of over-regulation by manufacturing industries: the Common Sense Initiative (CSI), and Project XL to name two. Moreover, the current Solid Waste Definition proposal represents yet another carte blanche surrender of jurisdiction with no legal impetus or environmental justification. This effort again emphasizes purported claims of regulatory excess with relatively little or no attention to recycling's dark side; --- the uncontrolled release of toxic constituents in the pursuit of marginal or non-existent resource values (i.e., coke with a current market value of \$0.)

To date, these type of "exemption expansion" activities have almost exclusively characterized the Administration's "reinvention" efforts on the environmental front. The Administration has a fundamental decision to make: will it continue the transition toward treatment and technology, or will it reverse the unprecedented progress of the last decade and allow "recycling", of all things, to become the new means for media shifting of pollutants? Is it going to allow "reinventing government" to translate into a dismantling of national controls, in lieu of a patchwork quilt system of State controls that gave rise to current problems, or will "reinventing government" mean rectifying the loopholes that are making "recycling" the most reckless area of hazardous waste management? If ever there were an area that cried out for federal leadership, or "reinvention" this is it. However, "reinvention" must mean more than simply throwing exemptions at the hazardous waste generators and allowing them to attach a "recycling" label to anything and everything that they so desire, irrespective of the environmental consequences or toxics loading.

The progress that has taken 15 years to achieve under RCRA, and the strides that the CAA Clean Fuels programs are beginning to make will be undermined if national recycling policy continues to drift and states continue to march to 50 different drummers. Moreover, the pending regulatory initiatives at the Agency promise to take a bad situation and make it worse.

True Recycling Technology Will Be Destroyed By Present Policy

Choosing coking and fuel blending over separation and gasification as a recycling alternative destroys incentives to create true low cost recycling technologies to such an extent that technology-based businesses are economically prohibited from evolving. The refining industry may wince at the thought of having to use such technologies due to short term additional costs, but they are the ones that will drive those costs down through economy of scale processing and evolution of capability. The industry will also benefit the most in the long term from improved public perception, avoidance of future remediation costs and international technology transfer. We need a system that encourages separation and gasification, not dilution; the use of engineers, not lawyers.

Recycling; But Not At Any Cost And Not In Name Only

In conclusion, everyone wants to be a recycler; if not in reality, at least in name for purposes of exempting themselves from substantive environmental standards. In addition, State programs are all over the map making incorrect, un-informed and in some cases illegal determinations regarding recycling operations. While all of this is occurring, neither the Office of Solid Waste nor the Enforcement Office appear to be focusing on the environmental and marketplace disparity being created by cavalier recycling operations.

Good recycling is and should be its own best incentive. While some encouragement of recycling practices is understandable, we cannot lose sight of the fact that hazardous wastes are like water running downhill, always following the path of least control and least cost. If the Agency seeks to establish an HOV lane for recycling, that may be appropriate. However it does not need to simultaneously eliminate the "speed limit" for these practices. A two-tiered system that virtually exempts all onsite recycling from substantive controls, but that forces commercial facilities to comply with stringent standards is utterly unjustified and will turn back the clock on fifteen years of unprecedented progress in protecting the public from uncontrolled hazardous waste management practices.

This uncontrolled situation with recycling should come as no surprise to the Agency, which historically has always aired on the side of exempting, rather than regulating recycling. Protection has always taken a back seat to promotion. So too it is with the pending regulatory initiatives at the Agency, which appear to be almost exclusively focused on accelerating the pace of exemption and deregulation, with virtually no attention to the environmental or equity consequences of such action. If the NPL and the Agency's recent experience with other notorious recycling situations are any guide, recycling must be held to the same substantive standards, even if that may be through an alternative authorization process.

The signals that have been sent by the 4 pending policy initiatives are already taking root in the marketplace in the form of regulatory liberties and cavalier actions that are virtually devoid of environmental consideration. For so much hazardous wastes to be managed in such an uncontrolled manner should be impermissible. For this to be occurring in the name of recycling is indeed intolerable. We urge the Agency to not only re-examine the 4 pending policy initiatives, but to refocus its enforcement and regulatory efforts to ensure that tangible environmental protections are not sacrificed in the name of intangible and other ethereal notions of recycling's benefits.

RECOMMENDATIONS

We would recommend that the following actions be taken:

- Place these comments into the Docket of both the Notice of Data Availability on The Proposed Petroleum Waste listing/recycling exclusion proposed rule and the Docket of the Solid Waste Definition revisions, (62 FR 16747; 4-8-97);
- Initiate a "Sham recycling" enforcement investigation of the practice of disposing of listed hazardous wastes into petroleum coke under the guise of "quench" water;
- Reexamine both the Petroleum Waste Listing Proposed Rule and the Solid Waste Definition Initiative for their potential to cloak unpermitted commercial operations under the guise of on-site recycling operations. This mode of operation is becoming increasingly prominent even under the current exclusions, and would only be exacerbated by further expansions such as are included in these two initiatives;
- Re-propose the Petroleum Waste Listing to eliminate: the recycling exclusions contained therein, particularly the provisions that allow unqualified reinsertion of wastes into the coking and refining process, and the failure to list various other petroleum streams, particularly crude oil tank bottoms;
- Prohibit the use of refinery coking or other recycling exemptions for any commercial operation that seeks to establish itself in such a manner;
- Carefully reexamine the proposed expansion of the petroleum coke exclusion and its impacts on the environment as well as legitimate commercial recyclers. Is petroleum coke really true legitimate energy recovery, or is it simply unregulated waste disposal and waste export to the Developing World?;
- Investigate Region VII and other EPA Regions for the extent to which the "blending up" prohibition on low Btu waste are being enforced or even inspected for;

- Direct EPA Region VI to investigate the legality of LADEQ's recycling decisions regarding the Shell, Norco facilities's acceptance of listed hazardous waste for commercial processing without a permit;
- Direct EPA Regions to investigate the extent to which other current RCRA exclusions of being used/abused by on-site operations to cloak unpermitted commercial waste management operations.
- Investigate how "characteristically" hazardous refinery wastes are being tested, and whether benzene is being illegally vented, or diluted, in order to avoid treatment requirements.
- Investigate the other forms of "gaming" to avoid preventive waste management controls such as "point-of-generation" determinations and sampling techniques. (SEA, L0006, L0010)

Response: The Agency thanks the commenter for its comments and recommendations. The Agency notes that EPA initiated extensive dialogue on the issues raised by the commenter with the commenter and with representatives of the petroleum refining industry.

As mentioned above, EPA disagrees with many of the commenter's assertions regarding the legitimacy of today's rulemaking and the potential consequences of today's rulemaking. Although the Agency notes that EPA has limited the exclusions, based upon comment and information provided by commenters and on additional analyses conducted by the Agency. The final rule provides a limited exclusion from regulation as solid waste for oil-bearing secondary materials generated by the petroleum refining sector and returned to the refinery process.

The Agency is finalizing the exclusion with several conditions. The secondary materials may not be placed on the land prior to insertion into the refinery process and may not be accumulated speculatively. In addition, the coke product resulting from the use of secondary materials in the refinery process must not exhibit any of the hazardous waste characteristics.

As mentioned several times above, data available to Agency indicate that hydrocarbons are recovered from oil-bearing secondary materials when these materials are fed to the coker, including when these materials are fed into the coker with the quench cycle. In addition, data indicate that there are recoverable levels of oil in sludges generated by petroleum refineries and typically fed into the coker. The metals levels in sludges typically fed into the coker (e.g., sludges bearing hazardous waste codes K048-K052) are, for the most part, comparable to the concentration of metals in normal refinery feedstocks. Although the levels of lead and chromium in these sludges may be higher than normal petroleum feedstocks, the concentrations of these two metals in petroleum sludges are expected to decrease due to changes in the petroleum production process. The NESHAPS standards promulgated under the Clean Air Act will result in chromium no longer being used in cooling towers. Therefore, the principal source of chromium contaminants in the production process will be deleted. Lead levels in petroleum sludges will continue to decline due

to the phasing out of leaded gasoline as a product line. Finally, analyses conducted by EPA confirm that the final coke product is basically unchanged by the use of hazardous oil-bearing secondary materials in the coking process.

EPA clarifies that the Agency is not including within the scope of the exclusion oil-bearing secondary materials generated outside the petroleum refining sector (i.e., SIC 2911). The Agency is basing its decision not to exclude these secondary materials from the definition of solid waste on the fact that EPA has very limited data from industry demonstrating the chemical and toxic content of the materials. In fact, the Agency has no information on which to base a finding that the use of oil-bearing hazardous secondary materials originating in a non-refinery sector of the petroleum refining industry in the coking process would be anything other than the range of wastes (e.g., hazardous waste recycling) from that non-refinery sector.

EPA further clarifies that the exclusion from the definition of solid waste for oil-bearing secondary materials returned to the refining process only extends to materials that are actually re-inserted into the refinery process. In cases where oil-bearing secondary materials are reclaimed prior to re-insertion, any residuals that may result from reclamation which are not returned to the refinery process, and therefore may be discarded, remain listed hazardous wastes. The Agency modified the proposed listing description for F037 to include any residuals that result from the processing of listed hazardous wastes that will be disposed. The Agency decided to include this clarification within the regulatory language so that the rules are explicit and to ensure that there is a requirement to manage residuals from the reclamation of hazardous secondary materials as hazardous wastes.

The Agency notes that EPA is further investigating the scope of the petroleum industry gasification operations and is considering whether to extend the exclusions promulgated in today's rule to include the reuse of secondary materials in gasification operations.

The commenter's concerns regarding the investigation of EPA Regional and state agency enforcement decisions are beyond the scope of this rulemaking. The Agency notes that authorized states may implement and enforce the RCRA program elements for which they are authorized within their state boundaries. EPA does not approve facility permits in authorized states. Concerns regarding individual facility operations and/or the status of any particular facility's permit should be raised to the appropriate authority in the applicable state.

The commenter's request that EPA investigate other forms of "gaming" to avoid preventive waste management controls is beyond the scope of today's rulemaking.

II.b.2.c. Quench Coking

Comment 1: The commenter disagrees with EPA's proposal to allow reinsertion of "any" oily waste material into any part of the refining process, likening the proposal to a "Bevill II" exemption for refineries. The commenter points out that allowing insertion of wastes into the

coker, without regard to oil content, will assure that the coker becomes a limitless "black hole" for refinery waste. The commenter contends that the exclusion will: (1) establish a regulatory override to the Sham Recycling Criteria where coking is involved; (2) foster the production of more of the world's dirtiest fuel by allowing yet additional toxic metals, PNAs, and other toxics to be deposited onto the coke without treatment; and (3) deal a deadly blow to true recycling technologies such as thermal desorption, flexi-coking, and gasification, which produce clean products for direct reuse or reuse within the refinery, rather than create a product with no real market value. (SEA, 00015, L0006, L0010)

Response: In today's final rulemaking, EPA is promulgating an exclusion from the definition of solid waste for oil-bearing secondary materials generated within the petroleum refining sector and returned to the refining process. As finalized, the exclusion from the definition of solid waste for oil-bearing residuals from specified petroleum refining sources is expanded to allow the use or reuse of a broader array of residuals from petroleum refining operations by inserting the materials into any part of the refinery process, including the coking process. The Agency notes that the exclusion is conditioned on there being no storage or placement of the secondary materials on the land and no speculative accumulation. In addition, the recycling of oil-bearing secondary materials cannot result in coke products that exhibit any of the characteristics of hazardous waste.

The Agency clarifies that the exclusion, as promulgated, is limited to oil-bearing secondary materials generated within the petroleum refining sector (i.e., SIC 2911) and inserted into the petroleum refining process. In addition, in the final rule, EPA clarifies that the exclusion for oil-bearing secondary materials returned to the refining process only extends to the materials actually re-inserted into the refinery process. In cases where oil-bearing secondary materials are reclaimed prior to re-insertion, any residuals that may result from the reclamation process and that are not returned to the refinery process retain the hazardous waste listing and must be managed as hazardous wastes. In the final rule, the Agency is modifying the descriptions for the F037 waste code to include any residuals from the processing of listed (refinery) hazardous wastes.

After considering all data and information made available to the Agency, EPA concluded that the main purpose of the petroleum coking unit is to recover hydrocarbons from the oil contained in the feedstocks for further refining. Similarly, the main purpose of using the secondary materials in the coke quenching process is the energy-efficient recovery of hydrocarbon from the residual oil in the oil-bearing secondary materials. Conventional and quench coking recover light fraction hydrocarbons with equal efficiency. The Agency also concludes, based upon available data, that coke product produced using hazardous secondary materials in the quenching process is basically similar to coke produced without using secondary materials in the quenching process. Further, EPA notes that the making of anode-grade coke, the most high-valued coke with the most stringent product specifications, is likewise able to meet the product specifications while using these secondary materials in the quenching process.

In considering whether the fact that the coke product produced using secondary materials in the quenching process continues to meet the product specifications (and, in fact, demonstrates little

change in the levels of contaminants compared with coke produced without hazardous secondary materials) is simply a result of dilution, the Agency acknowledges that such dilution does occur. However, there are several other considerations. For example, the primary product of the petroleum coking process is the light hydrocarbon fraction recovered for use as feedstock in the production of high-value fuel products, with the coke product being a co-product of the coking process. The Agency is convinced that such recovery occurs when oil-bearing secondary materials are used in the quenching process. Given that the recovered hydrocarbon is the primary product of using the secondary materials in the quenching process, the simple fact that the coke product (i.e., the co-product) continues to meet the applicable product specifications and shows no appreciable increase in risk carries more weight in the Agency's evaluation. In other words, demonstrating hydrocarbon recovery is the key test in determining whether the hazardous secondary materials actually serve a useful role in the overall coking operation, rather than demonstrating a net contribution to the coke (as opposed to no degradation of the coke). Acknowledging that there is a potential for some degradation of the coke product, depending on the constituent make-up of the particular secondary materials used in the quenching process, the Agency believes that economic forces, driven by product specifications and competition for markets, will serve to ensure that the quenching process is not simply a means of indiscriminately disposing of hazardous wastes. However, in cases where there is sufficient degradation of the product (or co-product) such that it no longer meets product specifications or otherwise becomes unmarketable, the Agency would question the legitimacy of using the secondary materials in the quenching process. Similarly, if there were no hydrocarbon recovery stemming from the use of the hazardous secondary materials in the quenching process, the Agency would question the legitimacy of the activity. (The Agency knows of no such cases.)

With regard to the commenter's concern regarding the potential for metals and other hazardous constituents contained in hazardous secondary materials to be "toxics-along-for-the-ride," the hazardous metals and constituents found in the hazardous secondary materials generally can be traced back to the metals and constituents found in the original crude oil feedstock and so do not represent contaminants introduced through means other than the continued processing of the raw material feedstocks. EPA's traditional concern regarding unnecessary hazardous constituents being processed and ending up in a product is mitigated in this case because the Agency views this activity as the continual processing of a raw material that contains the hazardous constituents, with concentrations of constituents found in the feedstock streams varying dependent on the point in the overall production process. In the context of a multi-step production process involving sequential processing of an initial raw material, there is much less of an element of discard of the hazardous constituents inherent in the original raw material than there would be had these secondary materials been generated by another industry (and so had a different mix of hazardous constituents) or had the hazardous constituents not been already present in the original raw material.

The Agency notes for the commenter that EPA is considering the merits of a parallel exclusion from the definition of solid waste for secondary materials generated by the petroleum refining sector and reused in petroleum gasification operations. Such an exclusion, if the Agency considers it to be warranted, could be finalized in a separate action.

Comment 2: The commenter questions EPA's reliance on industry assurances regarding the protectiveness of the coking process as a recycling operation. The commenter contends that the extent of the Agency's health and environmental assessment consists of the following statement:

Coke is subject to certain limited industry product specifications ...Coke is also subject to product standards established by the ASTM for volatile matters and ash content. Taken together, these controls help to insure the coke product does not contain unsafe levels of toxic contaminants. (60 FR 57755, Emphasis added)

The commenter notes that ASTM is a test methods group, not a health standard setting agency. Further, combustibility criteria do not substitute for a health assessment. The commenter cites petroleum industry personnel who state that contaminants are deposited on coke sludge and sent out with the product.

The Agency must consider the affects of the proposed recycling exemption, including movement of pollutants from one medium to another and the making toxics in wastes more available to the environment. The commenter contends that the only environmental justification for exempting hazardous waste recycling from RCRA's preventative management standards occurs when the recycling practice itself is inherently protective (i.e., conducted in an enclosed system or without releases) and when toxics are not merely shifted from one medium to the next (i.e., from land, back to the air.)(SEA, L0010)

Response: The Agency agrees with the commenter's assertion that product standards are not health-based standards. However, after reviewing and analyzing data available to the Agency regarding the coking process and the subsequent effects upon the coke product from the use of oil-bearing secondary materials in the coking process, including the quench cycle, EPA concludes that there is no evidence of significant degradation of the coke product or enhanced risk to human health and the environment due to the use of oil-bearing secondary materials in the process.

During the coking operation, including the quench cycle, there is recovery of hydrocarbon values from the oil-bearing secondary materials, short- and middle-chain fractions that are condensed and sent to refining processes to produce high-value fuel products (consistent with the overall coking operation). In addition, there is some beneficial contribution to the coke product in the form of carbon and higher energy values (even though this may not be reflected by an actual increase in market value), and the Agency also notes that the coke product continues to meet the market-driven specifications for the product, even for high-value anode grade coke. And, as with other sidestreams generated by one process and used as feedstocks to other production processes, this activity constitutes a link in the multi-step chain of processing steps designed to recover as much of the hydrocarbon value from the original crude oil feedstock as possible. Thus, the Agency concludes that the oil-bearing hazardous secondary materials used in the quenching process are considered, for regulatory purposes, as part of an on-going production process and hence classified as an activity not subject to RCRA jurisdiction.

Comment 3: Quench-side coking appears to violate the HSWA prohibition on dilution as a method of treatment and the Agency's long-standing concern with toxics along for the ride. The LDRs clearly state that restricted wastes or residuals from the treatment of a restricted waste will not be diluted as a substitute for adequate treatment. Slurrying the solids and toxic metals with water and pouring them into the quench with the expected "dispersion into the mass of the coke" appears to violate the dilution prohibition.

Response: Since EPA is excluding oil-bearing secondary materials reused in the refinery process from the definition of solid waste, the dilution prohibition is not applicable. The excluded secondary materials are not subject to the LDR requirements when managed in accordance with all conditions of the exclusion. One condition of the exclusion is that the secondary materials not be placed upon the land prior to reuse. Hazardous secondary materials placed on the land prior to reuse do not meet the conditions of the exclusion and are subject to all applicable provisions for prohibited wastes under the LDR program.

EPA does not agree with the commenter's premise, which is that unusable secondary materials are being dumped into the coke, which dilutes them. The main object of quench coking is to recover oil as a light fraction. This occurs at the same efficiency as in conventional coking (an operation whose legitimacy is not questioned by the commenter.) Moreover, in considering whether the coke product produced using secondary materials in the quenching process continues to meet the product specifications (and, in fact, demonstrates little or no change in the levels of contaminants compared with coke produced without hazardous secondary materials) is simply a result of dilution, the Agency acknowledges that such dilution does occur. Of course any carbon derived from the secondary materials that remains in the coke after light ends are recovered in the quench process serves the same function as the coke product itself (that is, as fuel), although this value is admittedly nominal. However, there are several other considerations. For example, as noted above, the primary product of the petroleum coking process is the hydrocarbon fraction recovered for use as feedstock in the production of high-value fuel products, with the coke product being a co-product of the coking process. The Agency is convinced that such recovery occurs when oil-bearing secondary materials are used in the quenching process.⁶⁴

Based on a considered evaluation of conflicting data provided by commenters, and using engineering and technical judgement in lieu of data actually demonstrating the recovery of hydrocarbon values from the secondary materials used in the quenching process, the Agency believes that oil (i.e., hydrocarbon value) is recovered during the quenching process and that the efficiency of this recovery is comparable to the recovery of light-ends during the conventional coking process. (The Agency also notes that in the worst case scenario provided by the commenter, which assumed 80% of the oil in the secondary material was too heavy to significantly

⁶⁴ February 2, 1998 letter from John Medley to Max Diaz.

volatilize at the temperatures encountered during the quenching process, there was recovery of hydrocarbon, even from the heavy oil fraction.⁶⁵)

Given that the recovered hydrocarbon is the primary product of using the secondary materials in the quenching process, the simple fact that the coke product (i.e., the co-product) continues to meet the applicable product specifications and shows no appreciable increase in risk carries more weight in the Agency's evaluation. In other words, demonstrating hydrocarbon recovery is the key test in determining whether the hazardous secondary materials actually serve a useful role in the overall coking operation, rather than demonstrating a net contribution to the coke (as opposed to no degradation of the coke). The Agency believes that the product specifications, and the economic consequences if those specifications are not met, will serve to limit the use of the quenching process to secondary materials that will not cause the coke to exceed its specifications, and effectively limits the allowable insertion of metals and excess high boiling point hydrocarbons. However, in cases where there is sufficient degradation of the product (or co-product) such that it no longer meets product specifications or otherwise becomes unmarketable, the Agency would question the legitimacy of using the secondary materials in the quenching process. Similarly, if there were sharply decreased efficiency of hydrocarbon recovery stemming from the use of the hazardous secondary materials in the quenching process (recovery rates of, for example, less than 50% of the oil contained in the secondary materials, rather than the minimum 70% efficiency EPA believes occurs), the Agency would question the legitimacy of the activity. (The Agency knows of no such cases at present.)

During the coking operation, including the quench cycle, there is recovery of hydrocarbon values from the oil-bearing secondary materials, short- and middle-chain fractions that are condensed and sent to refining processes to produce high-value fuel products (consistent with the overall coking operation). Any hydrocarbon not recovered as light ends as described above must, by a straightforward mass balance assumption, remain in the coke product that is itself almost entirely made of carbon and is marketed for its carbon content, i.e., as a fuel (even though this may not be reflected by an actual increase in market value). The Agency also notes that the coke product continues to meet the market-driven specifications for the product, even for high-value anode-grade coke. And, as with other sidestreams generated by one process and used as feedstocks to other production processes, this activity constitutes a link in the multi-step chain of processing steps designed to recover as much of the hydrocarbon value from the original crude oil feedstock as possible. Thus, the Agency concludes that the oil-bearing hazardous secondary materials used in the quenching process are considered, for regulatory purposes, as part of an on-going production process and hence classified as an activity not subject to RCRA jurisdiction.

However, in cases where there is sufficient degradation of the product (or co-product) such that it no longer meets product specifications or otherwise becomes unmarketable, the Agency would question the legitimacy of using the secondary materials in the quenching process. Similarly, if

⁶⁵ See the January 9, 1998 letter from Richard Fortuna to Mike Shapiro.

there were no hydrocarbon recovery stemming from the use of the hazardous secondary materials in the quenching process, the Agency would question the legitimacy of the activity. (The Agency knows of no such cases.)

Comment 4: The commenter stated that the proposed rule's new exclusions should not allow unpermitted "covert" commercial facilities to operate at refineries. There should be no double standard of protection between refinery-based or off-site recyclers. The commenter cited examples of the proposed exclusion and stated that changes to the definition of solid waste would penalize legitimate, permitted recycling firms.

"Among the most significant issues raised by these case studies and those which are in need of further interpretation and clarification include: the legitimacy of the so-called exemption claims; the applicability of the Boiler and Industrial Furnace (BIF) rule standards; why the thermal desorption standards of the Superfund program are not being applied to such units when operating at refineries; the type of stack testing and stack gas monitoring; whether the State's "fugitive emission" controls provide equivalent protection to RCRA's Subpart AA & BB air emission standards; the adequacy of the waste and residuals analysis; the quality of the wastewater discharge; containment to prevent soil releases; closure; and enforcement verification. All of these issues/standards would be addressed in a permit proceeding for a commercial offsite operation, but in the case of GDC, amounts to little more than a glossed-over "pen pal" proceeding as the attachments to our July 11, 1997 submission reveal."

"Legality notwithstanding, it is clear that through aggressive interpretations of recycling exemptions, commercial facilities are being allowed to operate at refinery sites without the same level of environmental safeguard that free-standing commercial facilities are subject to. The result is that EPA is financially rewarding businesses that do the least to protect the environment and punishing those that do the most. The Agency must launch an enforcement investigation to ensure that RCRA's recycling provisions and safeguards, such as they are, are being correctly interpreted and applied and to reexamine current and pending regulations and policies to prevent the proliferation of unpermitted commercial recycle operations at petroleum refineries." (SEA, 00015, L0006, L0010)

Response: The Agency cannot document the commenter's claims. For example, information made available to the Agency by API and Shell Norco indicate that facility does have a RCRA permit. EPA believes that the Shell Norco and Kipin Industries recycling process has been scrutinized by state authorities and determined to meet the substantive criteria for an exemption for hazardous waste recycling. In addition, the facility is subject to air emissions standards for hazardous air pollutants (as well as conventional pollutants) under the CAA. In addition, the issues regarding the permitting status of one (or a few) facilities is beyond the scope of today's rulemaking. Authorized states are provided the authority to issue and enforce permitting standards. Nothing contained in the proposed rule or in today's final rule was or is intended to change state authority with regard to the review of RCRA facility permit applications and/or the authority to

approve operating permits. The Agency notes that several states require facilities that recycle RCRA hazardous waste to apply for and obtain a permit for such recycling activities.

Comment 5: EPA's recent requests for more information about quench cycle coking may be based on improper consideration of untimely, unresponsive, and unsupported comments made by interested parties made long after the public comment period had closed, including comments made at ex parte meetings with senior management in December 1997. EPA's consideration of those late comments has placed API and its members in an unfair and unreasonable position by requiring API to produce new information on very short notice and at virtually the same time that EPA should be making its final rulemaking decisions. These recent events could prejudice the outcome of the final rule and raise serious questions about whether EPA will satisfy the rulemaking requirements of the Administrative Procedure Act and its own regulations. (API, 1/23/98, Attachment A)

Response: EPA believes it is more important to make technical determinations on the best information possible, rather than to simply close off the rulemaking process. Consequently, the Agency gave careful consideration to the late comments of SEA and EDF and sought further dialogue with members of the petroleum refining industry as well. The Agency obtained additional information from the commenter to assist the Agency in analyzing technical aspects of the petroleum refining process (e.g., information on the coke quenching cycle) and to assist EPA in understanding potential consequences of the proposed exclusion from the definition of solid waste for oil-bearing secondary materials that were not anticipated, and therefore not considered, during the development of the proposed rulemaking. Information furnished by the commenter assisted EPA in determining that the coking process, including the quench cycle, are part of the on-going petroleum refining process. The Agency appreciates the commenter's assistance. EPA also believes that there has been ample notice and opportunity for comment on all of these issues.

Comment 6: The information recently requested by EPA is immaterial and unnecessary to a final decision on the proposed exclusion. EPA already possesses all of the information it needs to determine that oil-bearing secondary materials used in cokers (including the coking quench cycle) to make petroleum products are not discarded, do not contribute to waste management problems, and should be excluded from the definition of solid waste. (API, 1/23/98, Attachment A)

Response: The Agency's request for additional information was due to a concern that EPA did not have sufficient information to make a determination regarding the contribution of the coking process, including the quench cycle, to the overall petroleum refining process. The Agency appreciates the additional information provided by the commenter. Information furnished by the commenter assisted the Agency in making its determination that the coking process is an integral part of the overall petroleum refining process, that hydrocarbons are indeed being recovered during this process and therefore, the use of oil-bearing secondary materials generation by the petroleum sector in the coker is legitimate reuse of these materials in the original production process.

Comment 7: The suggestion that EPA merely characterize petroleum cokers as “exempt RCRA recycling units” rather than exclude oil-bearing materials used in cokers from the definition of solid waste is legally unacceptable because it: would assert jurisdiction over those materials in violation of the court’s mandate in the American Mining Congress (“AMC I”) case; would not provide any legal relief beyond what is already available under the existing rules; would not resolve the many legal questions raised by state and Regional enforcement agencies about the requirements for management of those materials. (API, 1/23/98, Attachment A)

Response: EPA disagrees that an exclusion is compelled as a matter of law (even though legitimate recycling is occurring). First, there is direct case authority that secondary materials which originate from wastewater treatment systems can be considered to be “discarded.” See **AMC II**, 907 F.2d at 1186 (“Nothing in **AMC II** prevents the Agency from treating as ‘discarded’ the wastes at issue in this case, which are managed in land disposal units that **are** part of wastewater treatment systems, which **have** therefore become ‘part of the waste disposal problem,’ and which are **not** part of ongoing industrial processes” (emphasis original)). Industry indicates that, primarily, the oil-bearing hazardous secondary materials utilized in the quenching process are wastewater treatment sludges (chiefly K048, F037 and F038⁶⁶), which are thus directly analogous to the sludges at issue in the **AMC II** decision, and thus could be considered to be discarded.

These sludges likewise could be considered to be solid wastes pursuant to RCRA section 3004(q)(2)(A) which indicates that certain provisions otherwise applicable to hazardous waste-derived fuels do not apply to petroleum coke produced from “petroleum refinery wastes containing oil which are converted into petroleum coke at the same facility at which such wastes were generated.” The plain language of the provision can be read to cover the activity at issue here, and thus indicate that wastewater treatment sludges and other hazardous secondary materials going to quench coking could be classified as solid wastes.⁶⁷

More basically, EPA does not regard the use of oil-bearing wastewater treatment sludges in the quenching process to be the type of operation which must necessarily be classified as part of an on-going manufacturing process. The parts of the petroleum refining process outside the Agency’s RCRA jurisdiction involve the sequential distillation of crude oil (**not** wastewater treatment sludges or other wastewater treatment residuals) into various fractions such as gasoline, fuel oil,

⁶⁶ See September 3, 1997 letter from Kyle Isakower, American Petroleum Institute to William Brandes, Office of Solid Waste.

⁶⁷The **AMC I** court gave this provision a restrictive reading, stating (somewhat circularly) that it applied only to material that had already become a hazardous waste. 824 F. 2d at 1188. However, given the holding of **AMC II** that wastewater treatment residuals can be classified as solid wastes and that wastewater treatment operations break any chain of what must be regarded as a continuous industrial process, the wastewater treatment sludges destined for the quenching process could be classified as being hazardous wastes.

asphalt, and conventional coking. See 824 F.2d at 1181. However, the quenching process need not be viewed as one more on-going step in this process. Not only is there the temporal interdiction of the generation of wastewater and subsequent management of the wastewater and sludges in the refinery's wastewater treatment system, but the quenching process differs in material ways from the standard refining operations. As discussed above, the secondary materials utilized have less oil, higher percentages of unusable materials, and the process generates less recovered oil, than any other unit operation in the conventional refining process.

The Agency thus does not accept the argument that exclusion of hazardous secondary materials used in the quenching process is compelled. This is not to say that the Agency lacks the **discretion** to make such a determination. The term "discarded" is ambiguous, and within the Agency's authority to interpret consistent with the general goals and policies of the statute. **AMC II**, 907 F. 2d at 1186; **American Petroleum Inst v. EPA**, 906 F. 2d 726, 741 (D.C. Cir. 1990). Among these goals, of course, is encouraging environmentally sound recycling. RCRA section 1003(a)(6). Moreover, assessing what should be viewed as continuous industrial processes, and which types of material recovery operations are "not part of the waste disposal problem" (**AMC II**, 907 F.2d at 1186), are the types of technical and policy questions particularly committed to EPA's expert discretion. It is that discretion which the Agency is exercising in determining in this rule that a conditional exclusion is appropriate for certain hazardous oil-bearing secondary materials used in the coke quenching process.

Comment 8: The commenter noted that questions had been raised regarding whether quench cycle injection of secondary materials is a part of the manufacturing process known as coking. The commenter noted that, like conventional vacuum resid and other coker feeds, the injected hydrocarbon-bearing secondary materials are recovered as liquid products for the production of valuable transportation fuels or, in part, physically or chemically transformed into salable coke product of significant value. Because of the water content of most of the sludges, introduction with conventional coker feeds at greatly elevated temperatures is often not practiced due to safety, environmental, and operational concerns about coker upsets. However, the water content of the sludges becomes an advantage when introduced prior to or during the coke drum quench cycle since water cooling is desired at that point. (API, 1/23/98, Attachment C)

Response: The Agency thanks the commenter for its submittal of addition information regarding the use of oil-bearing secondary materials in the coking process.

Comment 9: The commenter responded to the question of how much of the oil in the hydrocarbon bearing secondary material is recovered for further upgrading into valuable transportation fuels. Based on work by Mobil Oil, inspection and analysis of a number of the injected hydrocarbon-bearing secondary materials, including distillation of the oil fractions, engineering calculations indicate that recoveries commonly range from 85-100% at the beginning of the injection when the coke drum overhead temperature is about 800±°F, declining to a range of 40-55% just prior to

ceasing injection at the recommended guideline temperature of about 600°F.⁶⁸ This data indicates that on average, over the entire range of coking temperatures, approximately 75% of the hydrocarbon injected with the sludges is vaporized and recovered for production of transportation fuels. The remaining 25% or so of the hydrocarbon becomes part of the final petroleum coke product, either as coke itself or as VCM. However, the petroleum coke produced, in part, from injected hydrocarbon bearing secondary materials, continues to meet required product specifications for sale. Volatile Combustible Material (VCM) of the coke is estimated to increase by 0.3-0.4 weight % due to the incorporated hydrocarbons and any other organic solids contained in the secondary material. A field comparison by Mobil Oil of VCM of commercial petroleum coke with or without the subject recycled secondary material confirmed that the actual VCM increment was 0.3 weight %. (API, 1/23/98, Attachment C)

Response: The Agency thanks the commenter for its submittal of addition information regarding the use of oil-bearing secondary materials in the coking process. Based upon the commenter's written submission and documentation and upon information provided to EPA in subsequent meetings between EPA and representatives from the petroleum refining industry held to discuss the coking process, including the quench cycle, and its contributions to the refining process, EPA has determined that conventional coking and quench coking are integral to the ongoing petroleum refining process.

Based on a considered evaluation of conflicting data provided by commenters, and using engineering and technical judgement in lieu of data actually demonstrating the recovery of hydrocarbon values from the secondary materials used in the quenching process, the Agency believes that oil (i.e., hydrocarbon value) is recovered during the quenching process and that the efficiency of this recovery is comparable to the recovery of light-ends during the conventional coking process. This belief is based largely on the Agency's best professional judgement upon review of the typical range of boiling points in the hydrocarbons present in the secondary materials, in concert with the temperatures these secondary materials experience in the coke drum for the duration of the quench cycle; because of the presence of water during the quench cycle, the additional effect that water volatilization is predicted to have on the removal of volatile constituents (i.e., an effect analogous to "steam stripping") also serves, in the Agency's best professional judgement, to facilitate the removal and transport of volatilized hydrocarbons up and out of the coke drum to be recovered. In applying its best professional judgement to the technical information (e.g., boiling point ranges, coke drum temperatures, effect of water vapor, etc.) provided by commenters on both sides of the issue, the Agency relied heavily on its own familiarity with the industry, informed by numerous site visits to refineries and experience with the secondary materials at issue. The Agency also was persuaded by certain specific simulations of boiling point ranges provided by oil industry representatives. (The Agency also notes that in the worst case scenario provided by one commenter opposed to the exclusion, which assumed 80% of the oil in the secondary material was too heavy to significantly volatilize at the temperatures

⁶⁸ See Attachment E.

encountered during the quenching process, there was recovery of hydrocarbon, even from the heavy oil fraction.⁶⁹)

Comment 10: The commenter explained why the use of secondary materials in the quench cycle has increased in recent years. From a general standpoint, increased reliance on offshore heavier crudes has led to additions of coker capacity, creating some increased opportunity for this process. Aside from the obvious incentive to recover hydrocarbons, another potentially significant factor could be the expiration of Mobil's patent in 1995, such that any refiner could begin using this technology without first licensing it from Mobil and paying a royalty fee. (API, 1/23/98, Attachment C)

Response: The Agency thanks the commenter for its submittal of addition information regarding the increased use of oil-bearing secondary materials in the coking process. Data available to the Agency indicate that there may be several reasons for this occurrence. The use of coking may be increasing due to changes in the characteristics of available crude and the fact that more refineries have cokers. As more refineries add cokers to the refining process, the production of coke and the levels of coking are expected to increase. In addition, in 1994, the exclusion from the definition of solid waste for petroleum coke produced from refinery hazardous wastes containing oil (40 CFR 261.6(a)(3)(v)) was expanded to include coke produced using hazardous wastes generated by the same "person," rather than merely generated at the same "site."

According to information published by API, 406 thousand wet tons of primary sludge was managed by refineries in 1994. This represents the largest quantity of primary sludge generation ever reported (288 thousand wet tons were generated in 1993). API's information indicates that it is likely that this reflects the refineries' efforts to meet statutory deadlines to retrofit or close primary sludge or TC surface impoundments in 1994. Thus, just as increases in waste generation noted by API between 1991 and 1993 were related to regulatory actions, the closure of certain land-based units resulted in peaked generation of primary sludge in 1994.⁷⁰ API questioned the refineries regarding the increase in sludge generation and they stated it was an "abnormal or one-time event." The primary management for this added quantity was "recycle to the coker."

In contrast, API reported a decrease of greater than 60 percent in primary sludge management in 1995. API members reported managing only 128 thousand tons of primary sludge in 1995. This is the lowest quantity managed since 1991, and possibly provides an explanation regarding the fluctuation in the amount of secondary materials managed in cokers.⁷¹ In the final analysis, as petroleum coking is part of legitimate production, increased petroleum coking would indicate increased materials recovery. In addition, as discussed above the Agency is investigating gasification as another means of recovery for these types of secondary materials.

⁶⁹ See the January 9, 1998 letter from Richard Fortuna to Michael Shapiro.

⁷⁰ API. Management of Residual Materials: 1994. September 1996.

⁷¹ API. Management of Residual Materials: 1995. June 1997.

Comment 11: The commenter explained why a minimum oil content limit for secondary materials used in the coker quench cycle is not needed. The historical purpose of this process has been the recovery of hydrocarbons for production of transportation and other fuels (i.e., petroleum coke). Typically, refiners have used secondary materials in the coker quench cycle to reprocess wastewater treatment sludges and tank sediments, such as crude oil or clarified slurry oil tank sediments from tank cleanings for inspections. These materials, by their nature, contain various levels of hydrocarbons, and those levels vary over time due to the nature of the various oil recovery processes involved in their generation. These sludges represent the end result of numerous efforts to recover oil during the wastewater treatment process or tank cleaning operations. Since it is in the interests of the environment to recover as much oil as possible as early in the wastewater treatment process or tank cleaning process as possible, it could be counter-productive to establish a minimum oil content requirement for such residuals being reprocessed via the coker quench cycle to recover hydrocarbons that cannot be recovered by other, more mechanical means. Hence, setting a minimum oil content requirement would be a classic case of the "tail wagging the dog," by effectively precluding the fullest use of a variety of highly efficient oil recycling techniques solely in order to leave enough oil in the residual to meet an arbitrary standard for cokers. In addition, EPA should not establish such a minimum oil content because it sends a message that materials with otherwise valuable oil contents below an arbitrary level are unworthy of recovery. (API, 1/23/98, Attachment C)

Response: The Agency thanks the commenter for its submittal of additional information regarding the use of oil-bearing secondary materials in the coking process. Based upon information provided by the commenter, the Agency rejected limiting the exclusion based on a set minimum oil content. The exclusion for oil-bearing hazardous secondary materials being legitimately used in the quenching process is conditioned only on these materials being managed such that there is no land placement and no speculative accumulation, and that the coke product produced not exhibit a characteristic of hazardous waste.

The Agency rejected limiting the exclusion based on a set minimum oil content or a recovery efficiency requirement for several reasons. As discussed above, the quenching process represents the final, and last possible process (other than possibly gasification, which the Agency is presently evaluating) in which to recover hydrocarbon from the original crude oil feedstock. The refinery processes and operating procedures are designed to separate and process into products as much hydrocarbon as possible from the crude oil feedstock, in other words, to prevent as much oil from making its way into these secondary materials as possible. The oil that does make its way into these secondary materials is generally considered unavoidable and inevitable, or in some cases, too much oil in these secondary materials is evidence of a problem with some aspect of the overall refining process (which goes towards explaining the wide range of oil contents in these materials). Thus, it would be counter to the overall efficiency of the petroleum refining process to require a minimum oil content in the secondary materials. Conversely, the Agency believes it is fundamental to this exclusion that there actually be oil recovered for further refining when these oil-bearing hazardous secondary materials are used in the quenching process. To the extent there is

no recovery of a light fraction, or drastically inefficient recovery, the operation could be a type of sham recycling, as discussed earlier.

Also, the Agency believes that, in this case, a minimum oil content condition would do little to ensure that only those secondary materials from which oil can actually be recovered would be excluded; in other words, the Agency does not believe that setting a minimum oil content would ensure that secondary materials are legitimately being used in the quenching process. Since most of the secondary materials in question result from wastewater treatment, a minimum oil content requirement would only serve to encourage a refinery to operate the refinery wastewater treatment process less efficiently to ensure that these secondary materials contain the minimum oil content and thus avail themselves of an exclusion.

Comment 12: The commenter critiqued the analysis of hydrocarbon “recovery” in quench-cycle cokers as presented by SEA in its January 9, 1998 correspondence to the Agency. The commenter identified numerous flaws in SEA’s technical arguments which the commenter argues discredit SEA’s conclusions. These technical flaws include:

1. The SEA data used to develop its “recovery” estimates are completely undocumented, and therefore, unverifiable and unreliable;
2. SEA’s characterization of F and K wastes bear little resemblance to the characteristics of wastewater treatment sludges actually reprocessed via quench-cycle coking;
3. The manner in which SEA uses 650°F as a cut-off for “low-end” vs. “high-end” hydrocarbons, and as an average temperature during the quench cycle, is inaccurate and arbitrary;
4. No technical basis is apparent for SEA’s assumptions of <50% volatilization of “light-ends” and <5% volatilization of “heavy-ends;”
5. The calculations do not account for the effects of lowered partial pressure from steam during the quench cycle;
6. SEA’s “recovery” rates are based on worst-case injection rates;
7. SEA has overstated the density of the injected residuals; and
8. The boiling ranges for SEA’s undocumented data should not be used in conjunction with API’s data. (API, 1/23/98, Attachment D)

Response: The Agency thanks the commenter for its submittal of addition information regarding the use of oil-bearing secondary materials in the coking process. The Agency notes that data and information related was received from several outside parties, including the petroleum industry. The Agency reviewed and considered all information and data provided to the Agency in making the final decisions regarding the conditional exclusion for secondary materials generated by petroleum refineries and returned to the refinery process.

The Agency cannot say with certainty whether all of the commenter’s criticisms of SEA’s comments are warranted. However, based upon a considered evaluation of conflicting data provided by commenters, and using engineering and technical judgement in lieu of data actually demonstrating the recovery of hydrocarbon values from the secondary materials used in the

quenching process, the Agency believes that oil (i.e., hydrocarbon value) is recovered during the quenching process and that the efficiency of this recovery is comparable to the recovery of light-ends during the conventional coking process.

EPA believes that the recovery of hydrocarbon from the oil-bearing secondary materials in the quenching process is consistent with the overall petroleum refining process, and the coking operation in particular, i.e., the recovery of hydrocarbons for the production of high-value fuel products. This goal, in turn, is consistent with the RCRA objective to encourage safe types of recycling. (See RCRA section 1003(a)(6)).

After evaluating all information available to the Agency, including, the fact that 1) the recovery efficiency of hydrocarbons from oil contained in the secondary materials used in the quenching process is comparable to the recovery efficiency of the conventional coking process, 2) the use of oil-bearing hazardous secondary materials (including RCRA listed hazardous wastes) in the quenching process is consistent with the overall goal of the petroleum refining industry, namely to maximize the recovery of hydrocarbon values from the original crude oil feedstocks, and 3) the coke product continues to meet product specifications and indicates no increase in risk (and so can be viewed as not being part of the waste disposal problem, in the language of the D.C. Circuit), the Agency concludes that the use of oil-bearing hazardous secondary materials generated by the refinery can a) legitimately be used in the coke quenching process; and b) can be viewed as a part of the petroleum refining process and, as a matter of discretion in determining whether secondary materials are discarded, excluded from being solid wastes.

Comment 13: The commenter presents data collected over a two week period regarding the percentage of hydrocarbons from injected sludges that are volatilized during the coker quench cycle, as well as some VCM content data. The commenter argues that the data clearly indicate that:

- Over the entire range of actual operating conditions, a majority of the hydrocarbons injected into the quench cycle are volatilized and recovered as coker products for the production of transportation fuels in other refinery processes;
- The VCM data indicates no significant statistical difference in VCM content of coke with and without residual injection during the quench cycle. (API, 1/23/98, Attachment E)

Response: The Agency thanks the commenter for its submittal of additional information regarding the use of oil-bearing secondary materials in the coking process. The Agency reviewed all information provided by all commenters. After reviewing all data and employing best professional engineering judgement, the Agency is persuaded by the commenter's statements. Based upon information regarding the characteristics of the secondary materials generated and reused by the petroleum refining industry, data regarding the temperatures obtained during the coking process and augmented by information regarding the lower partial pressure from steam obtained during the coking process, the Agency has concluded that hydrocarbons are recovered during the quench coking process and has determined that coking is an integral part of the refinery process.

Comment 14: The commenter responded to SEA's allegation that the use of the coking process by refiners has increased in the last few years as a means of disposal for residuals. The commenter believes that independent standard reference materials clearly validate the position that increased coke production is primarily a result of changes to available crude oil characteristics that are outside the control of petroleum refiners. (API, 1/23/98, Attachment F)

Response: The Agency thanks the commenter for its submittal of additional information regarding the increased use of oil-bearing secondary materials in the coking process. Data available to the Agency indicate that there may be several reasons for this occurrence. The use of coking may be increasing due to changes in the characteristics of available crude and the fact that more refineries have cokers. As more refineries add cokers to the refining process, the production of coke and the levels of coking are expected to increase. In addition, in 1994, the exclusion from the definition of solid waste for petroleum coke produced from refinery hazardous wastes containing oil (40 CFR 261.6(a)(3)(v)) was expanded to include coke produced using hazardous wastes generated by the same "person," rather than merely generated at the same "site."

According to information published by API, 406 thousand wet tons of primary sludge was managed by refineries in 1994. This represents the largest quantity of primary sludge generation ever reported (288 thousand wet tons were generated in 1993). API's information indicates that it is likely that this reflects the refineries' efforts to meet statutory deadlines to retrofit or close primary sludge or TC surface impoundments in 1994. Thus, just as increases in waste generation noted by API between 1991 and 1993 were related to regulatory actions, the closure of certain land-based units resulted in peaked generation of primary sludge in 1994.⁷² API questioned the refineries regarding the increase in sludge generation and they stated it was an "abnormal or one-time event." The primary management for this added quantity was "recycle to the coker."

In contrast, API reported a decrease of greater than 60 percent in primary sludge management in 1995. API members reported managing only 128 thousand tons of primary sludge in 1995. This is the lowest quantity managed since 1991, and possibly provides an explanation regarding the fluctuation in the amount of secondary materials managed in cokers.⁷³ In the final analysis, as petroleum coking is part of legitimate production, increased petroleum coking would indicate increased materials recovery. In addition, as discussed above the Agency is investigating gasification as another means of recovery for these types of secondary materials.

Comment 15: SEA contends that quench recycling feedstocks are not "feedstock-like" because they do not approach a 100% oil content. However, oil content is not the relevant measure of whether the injected residuals are "feedstock-like." The characteristics of the oil contained in the residuals are the important criteria, and, as EPA has correctly concluded, hydrocarbons contained

⁷² API. Management of Residual Materials: 1994. September 1996.

⁷³ API. Management of Residual Materials: 1995. June 1997.

in the residuals used in the coker quench cycle closely resemble numerous refinery intermediate streams, or mixtures thereof. (API, 1/23/98)

Response: EPA has determined that the quenching process (other than possibly gasification, which the Agency is presently evaluating) represents the last possible process in which to recover hydrocarbon. The refinery processes and operating procedures are designed to separate and process into products as much hydrocarbon as possible from the crude oil feedstock, in other words, to prevent as much oil from making its way into these secondary materials as possible. The oil that does make its way into these secondary materials is generally considered unavoidable and inevitable, or in some cases, too much oil in these secondary materials is evidence of a problem with some aspect of the overall refining process or of the wastewater treatment system. (These same factors also explain to some degree the variability in the oil content of secondary materials used for quench coking: the same materials are used but the oil content varies depending on the daily efficiencies of the refining process and wastewater treatment system). Since a key aim of the process is to recover these vestigial hydrocarbons, it stands to reason that the secondary materials will have less oil in them than in-process materials and secondary materials used elsewhere in the refining process.

Hydrocarbons in those materials can be recovered more easily, and the materials involved come from earlier steps in the process and so will have more oil, or more oil (viz. hydrocarbons) that are recoverable by less drastic means than quench coking (or gasification).

EPA thus does not find it determinative that the secondary materials utilized as feed for quench coking contain less hydrocarbons than secondary materials and in-process materials used in earlier parts of the refining process. In addition, it would be counter to the overall efficiency of the petroleum refining to require a minimum oil content in the secondary materials, since higher oil levels would tend to indicate that the same hydrocarbons are escaping recovery elsewhere in the system.

Also, the Agency believes that, in this case, a minimum oil content condition would do little to ensure that only those secondary materials from which oil can actually be recovered would be excluded, or in other words, the Agency does not believe that setting a minimum oil content would ensure that secondary materials are legitimately being used in the quenching process. Since most of the secondary materials in question result from wastewater treatment, a minimum oil content requirement would only serve to encourage a refinery to operate the refinery process less efficiently to ensure that these secondary materials contain the minimum oil content and thus avail themselves of an exclusion.

EPA believes that a comparison of the recovery efficiency of the quenching process to the recovery efficiency of the conventional coking process (of the resids) provides a better indication of how "production-related" the use of the hazardous secondary materials in the quenching process is (i.e., the more similar the quenching process is to the conventional coking process in the recovery of hydrocarbon values, the more it may be considered analogous to, or a component of, the coking

process). The data supplied indicate that the recovery efficiency of oil contained in the secondary materials during the quenching process is comparable to the recovery efficiency from the feedstock side of the coking operation.⁷⁴ Thus, although the oil content in the hazardous secondary materials is markedly less, at the very least, there is demonstrated hydrocarbon recovery from the secondary materials used in the quenching process, which is consistent with the overall production intent of petroleum refining.

The Agency notes that one major point of contention between those commenters opposed to the exclusion and those supporting the exclusion is whether there is actual evidence that oil (or hydrocarbon value) is recovered during the quenching process. As stated previously, the oil content of the oil-bearing hazardous secondary materials typically used in the quenching process varies considerably (8% - 40%), although the typical secondary materials have an oil content around 10%.⁷⁵ In determining the oil recovery efficiency of the quenching process (i.e., a quantification of how much of the oil contained in the secondary materials is actually volatilized and recovered for further refining versus how much oil is simply incorporated into the coke product), EPA encountered difficulty in getting any actual data. The data the Agency primarily relied on were derived from surrogate tests (i.e., tests designed to simulate the conditions the secondary materials encounter during the quenching process) performed on the secondary materials typically used in the quenching process.⁷⁶ This is because coking operations (particularly the capture and condensing of the light-end hydrocarbons) do not avail themselves to the type of quantifiable measurements that the Agency prefers. Regarding the quenching process, this is even more the case. However, surrogate tests may actually be more representative of the oil recovered from secondary materials used in the quenching process than actual measurements taken during the quenching process. This is because any measurement of the amount of oil recovered during the quenching process would also likely include the light-ends that remain entrained within the coke product from the conventional coking operation (i.e., light-ends derived from the resids feedstock) which are typically recovered during the quenching process in a manner analogous to steam stripping. In other words, surrogate tests, by using only oil-bearing secondary materials that are heated to simulate the environment encountered in the quenching process, allow for a more controlled system in which measurements of percent oil volatilized can be made. In contrast, during the actual quenching process, the recovered light-end hydrocarbons will contain a mixture of hydrocarbons derived from the secondary materials injected during the quench, and some residual hydrocarbons that were entrained within the coke product at the end of the normal coking cycle. In the latter example, apportioning the relative contributions of these two sources to the recovered hydrocarbon in a manner that allows accurate percentages is difficult.

⁷⁴ See January 23, 1998 letter from Paul Bailey to Michael Shapiro

⁷⁵ See the September 3, 1997 letter from Kyle Isakower to Max Diaz and the January 9, 1998 letter from Richard Fortuna to Mike Shapiro.

⁷⁶ See January 23, 1998 letter from Paul Bailey to Michael Shapiro.

One of the critical factors in estimating the oil recovery efficiency of the quenching process is the specific gravity of the oil contained in the hazardous secondary materials. The lighter the oil fractions, the more oil will volatilize during the quenching process. Here too, there was disagreement among commenters over how the oil contained in the secondary materials should be characterized. One commenter stated that since the quality of crude oils has grown steadily heavier over time, a trend that is only expected to continue, the oil contained in the secondary materials, especially the wastewater treatment sludges, would be disproportionately heavy and thus would be less and less likely to volatilize during the quenching process. This was supported by data (gathered from listed hazardous wastes sent to RCRA-permitted facilities) demonstrating the heavy-to-light ratio for oil contained in the wastes.⁷⁷ In response, the petroleum industry stated that the oil contained in the secondary materials (particularly wastewater treatment sludges) comes from oil that has been through some refining and thus the trend towards heavier crude oils will not have a corresponding effect on the oil contained in the secondary materials. Also, industry claims that the actual data used to support the assertion that the oil contained in the secondary materials is predominantly heavy is not representative of the secondary materials used in the quenching process because, prior to sending such materials to a permitted facility for proper treatment and disposal, a refinery will typically use other processes (e.g., centrifuging) to aggressively extract as much oil (and water -- to reduce the volume of material sent for treatment and disposal) as possible from the materials, more so than would be the case if these materials are to be used in the quenching process. The oil recovered by these more aggressive recovery processes would tend to be the lighter oils, leaving a disproportionate amount of heavy oil in the materials analyzed.⁷⁸

Based on a considered evaluation of these conflicting comments, and using engineering and technical judgement in lieu of data actually demonstrating the recovery of hydrocarbon values from the secondary materials used in the quenching process, the Agency believes that oil (i.e., hydrocarbon value) is recovered during the quenching process and that the efficiency of this recovery is comparable to the recovery of light-ends during the conventional coking process. (The Agency also notes that in the worst case scenario provided by one commenter opposed to the exclusion, which assumed 80% of the oil in the secondary material was too heavy to significantly volatilize at the temperatures encountered during the quenching process, there was recovery of hydrocarbon, even from the heavy oil fraction.⁷⁹)

Comment 16: SEA contends that heavier crude oil slates have led to heavier residuals being fed into the coker quench cycle.

In reality, changes in crude oil slates have had only minor effects on the intermediate refining streams, which are the source of the oil-bearing residuals that are sent to the coker quench cycle. (API, 1/23/98)

⁷⁷ See the January 9, 1998 letter from Richard Fortuna to Mike Shapiro.

⁷⁸ See the February 2, 1998 letter from John Medley to Max Diaz.

⁷⁹ See the January 9, 1998 letter from Richard Fortuna to Mike Shapiro.

Response: The Agency thanks the commenter for its submittal of addition information regarding the use of oil-bearing secondary materials in the coking process. The Agency agrees with the commenter, based upon the fact that the oil that ends up in the secondary materials in question comes from all parts of the refinery process, and represents hydrocarbons that have already undergone some amount of refining. The Agency acknowledges that there would be predictably lower recovery efficiencies if secondary materials containing more of the heavier (i.e., higher boiling point) hydrocarbons were injected into the coke drum at lower temperatures. However, based upon the Agency's best engineering judgement after reviewing the range of boiling points that have been measured in materials that are actually quench coked, and the operating parameters of the quench process as documented by the industry data, that the recovery efficiency predicted under these conditions is comparable to normal coking.

Comment 17: SEA contends that petroleum coke has no market value and is dumped on "Third World" Countries. As API has documented repeatedly, many third-party sources, including the Department of Energy, The Oil and Gas Journal, and The Pace Petroleum Coke Quarterly, all provide data on average petroleum fuel-grade (\$17-\$41/metric ton) and anode grade (\$74/dry short ton) coke prices, which conclusively demonstrate that coke is a valuable product in demand both domestically and in many other *industrialized* countries;⁸⁰ thus, SEA's contention is clearly without merit. (API, 1/23/98, supported by APCA, L0002)

Response: The Agency thanks the commenter for submitting additional information on the market and market value of petroleum coke. The Agency concludes that although a major portion of the petroleum coke produced by U.S. refineries was exported in 1996, the large majority of coke was not exported to third world countries. In fact, 68 percent of petroleum coke exports in 1996 were to Japan, Spain, Italy, Belgium/Luxembourg, the Netherlands, Canada, and Turkey. Data available to the Agency indicates that petroleum coke has a positive market value of at least \$20 per short ton.

Comment 18: SEA contends that quench injection results in "undesirable" coke. Although SEA continues to maintain that anode grade coke production and quench cycle coking are incompatible, both Marathon and Texaco routinely practice quench cycle coking while producing anode quality coke. (API, 1/23/98)

Response: The Agency thanks the commenter for its submittal of addition information regarding the use of oil-bearing secondary materials in the coking process and their effect upon the quality of the coke product.

⁸⁰ E.g., The Oil and Gas Journal, November 17, 1997, pp. 79-82. (Appended to Attachment F). In addition, the Portland cement and electric utility industries have stated for the record that they routinely use petroleum coke as a fuel, and anticipate a continued domestic market for petroleum coke in the future.

II.B.2.d. Supplemental comments on clarification

Comment 1: API has reviewed the issue that has been raised regarding the proposed SWD exclusion (40 CFR § 261.4(a)(12)) for oil-bearing secondary materials, i.e., how the proposed exclusion could affect the status of solid residuals generated by a unit processing secondary materials for further use in the refining process. As API understands this concern, a commenter believes that the proposed rule might be construed so that solid residuals generated by a unit (e.g., a centrifuge) which recovers oil from oil-bearing secondary materials excluded from the SWD under proposed § 261.4(a)(12), would not be covered by a hazardous waste listing that would have applied to the oil-bearing secondary material itself (e.g., K051, API Separator Sludge) but for the applicability of the exclusion. Since this was not intended by the proposed exclusion, EPA is considering clarifying that discarded solid residuals (as defined in 40 CFR § 261.2) from such a unit or process are covered by the original listing that otherwise would have applied to the oil-bearing secondary material.

API does not believe that the “loophole” suggested in Mr. Bussard’s letter is a reasonable construction of the proposed exclusion. Thus, API does not believe that any revision of the exclusion is needed. However, if EPA in its judgment feels that clarification must be made, such clarification can be provided in the preamble to the final rule (EPA’s Option 1), with clear examples of when a listing is applicable to such discarded solid residuals and when it is not. This is EPA’s simplest option, allowing the Agency to clarify the scope of the exclusion language, while maintaining EPA’s ability to meet its May 1998 deadline for promulgation of a final rule. Further, preamble language clarifying the rule’s intent would establish a reasonable, contemporaneous interpretation that would support EPA’s position in the event of a legal challenge to the scope of the rule. In fact, preamble language typically has been deemed sufficient to uphold the Agency’s position in court.

API suggests that the following language be included in the preamble to the final rule:

“With today’s rule, an exclusion from the definition of solid waste has been established for oil-bearing secondary materials that are recycled in the refining process. EPA has determined that reinserting these secondary materials is a beneficial recycling practice, reducing waste volumes while recovering valuable oil to be used as a raw material in the production of fuels or other petroleum products.

“One commenter has suggested that the existing language of this exclusion contains a potential ‘loophole’ that would allow discarded materials generated by an oil recovery unit (e.g., a centrifuge) to escape the hazardous waste listing that would otherwise apply in the absence of the exclusion. This was never EPA’s intent.

“It is true that EPA intended (and still intends) that the exclusion attach at the point of ‘generation’ of the oil-bearing residuals to be recycled. However, EPA did not intend for

the exclusion to apply to the solid wastes that are discarded after completion of oil recovery processes that precede insertion of the excluded materials into the refining process.

“As an example, API separator sludge that is simply disposed of is a solid waste and bears the listed hazardous waste code K051. However, if the sludge from the separator is destined for oil recovery in an oil recovery unit, it is neither a solid nor a hazardous waste until after completion of oil recovery. The recovered oil and any other oil-bearing residuals generated by the oil recovery unit that are destined for insertion into the refining process (e.g., a coking unit) continue to be excluded under § 261.4(a)(12). However, after completion of any oil recovery process preceding the insertion of an oil-bearing secondary material into the refining process, any residual that is discarded (i.e., not destined itself for reinsertion into the refining process, or, in the case of wastewaters, not discharged into the wastewater treatment system), and is not otherwise excluded under the definition of solid waste, is a solid and hazardous waste and bears the K051 waste code.”

API urges the Agency to clarify the intent of the exclusion using preamble language. If, however, EPA concludes that preamble language such as that furnished above is insufficient to close the perceived “loophole,” then API suggests amending the listing description for refining wastes. This amendment would state that solid residuals remaining after completion of oil recovery that are not reinserted into the refining process would bear the listing that would otherwise apply in the absence of the exclusion. This language would be included as a new subsection (e) to § 261.30. Suggested language for this new subsection follows:

(e) Oil-bearing secondary materials that would be listed as hazardous wastes F037, F038, K048, K049, K050, K051, or K052 [add new listings, *if any*], but for the exclusion in §261.4(a)(12), are not solid or hazardous wastes if they meet the terms of §261.4(a)(12); *provided*, that any materials that remain after completion of oil recovery and that meet both of the following conditions are solid and hazardous wastes and bear the listed waste codes that would otherwise apply in the absence of the §261.4(a)(12) exclusion:

(1) the materials are not destined for insertion into the petroleum refining process, or, in the case of wastewaters, are not discharged into the wastewater treatment system; and

(2) the materials meet the definition of solid waste in §261.2, and are not otherwise excluded from the definition of solid waste under any provision of this Part. (API)

Response: The Agency thanks the commenter for its comment and input on this issue. In today’s final rule, EPA clarifies that the exclusion from the definition of solid waste for oil-bearing secondary materials returned to the refining process only extends to materials that are actually re-inserted into the refinery process. In cases where oil-bearing secondary materials are reclaimed prior to re-insertion, any residuals that may result from reclamation which are not returned to the refinery process, and therefore may be discarded, retain the hazardous waste listing. The Agency

modified the proposed listing description for F037 to include any residuals that result from the processing of listed hazardous wastes that will be disposed. The Agency decided to include this clarification within the regulatory language so that the rules are explicit and to ensure that there is a requirement to manage residuals from the reclamation of hazardous secondary materials as hazardous wastes.

Comment 2: NPRA understands the concern of the commenter identified in your letter that the proposed exclusion could be construed to mean that the solid wastes resulting from the recovery of oil from secondary oil-bearing residuals *would not* be covered by a hazardous waste listing that would have applied to the secondary material itself, but for the proposed exclusion. NPRA agrees with EPA that it was not the intention of the proposed exclusion to change the status of these residues listed as hazardous waste.

Although NPRA believes that the proposed exclusion could be clarified in the preamble (Option 1) to the rule, we agree with the Agency's suggested approach describing Option 3 that solid wastes resulting from the recycling of EPA hazardous waste codes F037-38, K048-52 and any newly listed wastes that are not reinserted into the petroleum refining process retain the hazardous waste listing. Further, we agree with and support the suggested language for Option 3 that will be included in the comments of the American Petroleum Institute (API).

Response: The Agency thanks the commenter for its comment and input on this issue. In today's final rule, EPA clarifies that the exclusion from the definition of solid waste for oil-bearing secondary materials returned to the refining process only extends to materials that are actually re-inserted into the refinery process. In cases where oil-bearing secondary materials are reclaimed prior to re-insertion, any residuals that may result from reclamation which are not returned to the refinery process, and therefore may be discarded, retain the hazardous waste listing. The Agency modified the proposed listing description for F037 to include any residuals that result from the processing of listed hazardous wastes that will be disposed. The Agency decided to include this clarification within the regulatory language so that the rules are explicit and to ensure that there is a requirement to manage residuals from the reclamation of hazardous secondary materials as hazardous wastes.

Comment 3a: As EPA correctly observed, the proposed recycling exclusion as currently worded could allow reclamation residues to escape RCRA regulation, since the listings may no longer apply to the residues. Given the limited scope of the existing toxicity characteristic, and the extensive resources devoted to listing the various wastes, this result would be both unprotective and wasteful of Agency efforts. Moreover, EPA relies solely upon the listing process to regulate sludges destined for reclamation, therefore if the reclamation residues themselves receive subsequent reclamation, EPA may unknowingly lose jurisdiction over the subsequent reclamation and reuse steps (and their residues) entirely.

The Agency identified three options for closing this apparent loophole. Under the first option, EPA would merely include preamble language asserting RCRA jurisdiction over reclamation

residuals not reinserted into the refinery process. Under option 2, a condition to the proposed reuse exclusion would be added indicating the residuals not reinserted into the refining process must be managed as a listed hazardous waste. Under option 3, EPA would modify the existing and new listings to expressly include reclamation residuals not reinserted into the petroleum refining process.

EPA proposed option 3 as the clearest and most easily enforced option, and we agree. Option 1 is a non-starter because authorized states are not necessarily bound by Agency guidance in preamble form, and preamble statements are not reproduced in the CFR and thereby suffer from communication lapses at the implementation level. As a general matter, the RCRA program generally, and the recycling area particularly, suffers from excessive reliance on Agency letters, memoranda, guidance, and preambles that are difficult to assimilate in a comprehensive manner. EPA should not unnecessarily contribute to this morass in the instant rulemaking.

Option 2 needlessly adds a layer of complexity for enforcement purposes, and is therefore less desirable than option 3. Under option 2, the reclamation residuals may be regarded as exempt from the point of generation unless and until the conditions are violated. Where a waste is shipped from one refinery to another for reclamation and reinsertion into the refining process, but for some reason the second refinery elects not to reclaim the waste and/or the reclamation residuals, it is unclear when the violation of the conditional exclusion occurred for enforcement purposes and who is responsible for any resulting non-compliance. In this context, the waste/residuals appear to move in and out of the regulatory system, depending upon events yet to occur (i.e., final disposition of the material). However, if the hazardous waste listing includes both the waste and the reclamation residuals, it is clear the original generator bears the ultimate responsibility for the management of the waste, given the scope of the underlying listing. This is where primary responsibility for waste management belongs, with the party that first determines how the waste will be managed.

Response: The Agency thanks the commenter for its comment and input on this issue. In today's final rule, EPA clarifies that the exclusion from the definition of solid waste for oil-bearing secondary materials returned to the refining process only extends to materials that are actually reinserted into the refinery process. In cases where oil-bearing secondary materials are reclaimed prior to re-insertion, any residuals that may result from reclamation which are not returned to the refinery process, and therefore may be discarded, retain the hazardous waste listing. The Agency modified the proposed listing description for F037 to include any residuals that result from the processing of listed hazardous wastes that will be disposed. The Agency decided to include this clarification within the regulatory language so that the rules are explicit and to ensure that there is a requirement to manage residuals from the reclamation of hazardous secondary materials as hazardous wastes.

Comment 3b: Significantly, none of the proposed options are apparently intended to address whether and under what circumstances the use of hazardous wastes in the coking quench process constitutes legitimate recycling, and thus falls within the exempt "reinsertion into the refining

process". In comments filed July 11, 1997, a host of issues were raised regarding this practice, particularly since the exemption as proposed would apply to any "oil-bearing residual" without regard to the actual oil content of the waste or its other physical or chemical properties.

Notwithstanding additional documents filed by the petroleum industry well after the close of the comment period, EPA knows very little about the coking quench process, including important facts related to the legitimacy determination. In the remainder of these comments, we will highlight some of these important unknowns.

However, it must be noted from the outset that EPA should have fully investigated this practice before proposing the coking exclusion almost two years ago. The lack of awareness then that hazardous wastes were inserted for quenching purposes, coupled with the gaps in the Agency's current knowledge two years later, is indicative of the lack of Agency effort scrutinizing, verifying, and investigating the recycling issues in the instant rulemaking. EPA must undertake its own inquiry into how the quench cycle process works; the types, quantities, and physical/chemical characteristics of wastes that have been or may be employed for this purpose; and the economics associated with this practice; rather than simply accept industry submissions at face value.

Response: EPA made its final decision regarding the exclusion from the definition of solid waste for oil-bearing secondary materials generated and reused by petroleum refineries based upon a measured assessment of information made available to the Agency. This included data and information provided to the Agency by parties both supporting and opposing the proposed exclusion, as well as information contained in available literature the Agency's own engineering assessments and calculations.

Although it is the Agency's objective to fully investigate all the potential consequences of a proposed Agency action, one purpose of the publishing a proposed rule and soliciting public comment on the Agency's proposal is to obtain additional information that may bear additional insight and/or result in a conclusion that the Agency must conduct additional analyses prior to rendering a final decision. In the case of the Agency's proposed exclusion from the definition of solid waste for certain oil-bearing secondary materials inserted into the petroleum refining process, issues raised and information provided by commenters as a result of the proposed rulemaking did supply the Agency with cause to revisit the proposed exclusion and conduct additional analyses.

Comment 3c: Existing Agency guidance exemplified by the April 26, 1989 Lowrance Memorandum provides a list of factors that should be considered in a recycling legitimacy determination. EPA lacks substantial information relevant to many of these factors, as illustrated by the following questions and associated discussion in the footnote texts.

Is the Secondary Material Analogous to the Raw Material?

1. What is the oil content of raw materials typically inserted into the coker as feedstocks? How does this oil content compare to the range of 1-21% cited by Mobil as typical of hazardous wastes used for quench cycle purposes, particularly at the lower end of that range?

2. If the hazardous wastes contain valuable hydrocarbon, why aren't they inserted into the coker as feedstocks? What other physical or chemical properties of the listed wastes differ from coker feedstocks?

3. The "recycling" that purportedly occurs in the coker quench process consists of oil recovered and reprocessed at the refinery into transportation fuels, and the enhanced fuel value of the coke. What percentage of the hydrocarbon used in the quench cycle is recovered and further processed at the refinery, and how much remains in the coke? If this percentage is waste-dependent, what are the factors that determine the relevant proportion, and what is the proportion for each waste potentially eligible for the exclusion, particularly those wastes with higher boiling points and/or low oil content? How do these rates compare with the reported 70% recovery rate for reprocessing hydrocarbon at the refinery associated with coker feedstocks?

4. According to Mobil, it is recovering 125,000 barrels of crude oil equivalent through the MOSC process at 5 refineries. How much of this crude oil equivalent includes oil recovered in the centrifuge or other preparation steps preceding actual insertion into the coker for quench purposes, and how much of this "equivalent" reflects purported increases in the fuel value of the coke itself? Does the rate of crude oil equivalent recovered (for liquid fuel processing at the refinery) attributable solely to the quench process differ depending upon whether the waste receives pre-treatment prior to coker insertion, such as centrifugation or filtration? If yes, what factors determine the recovery rate for wastes receiving pre-treatment?

Response: First, as stated previously, the oil content of the oil-bearing hazardous secondary materials typically used in the quenching process ranges from 8% - 40%, although the typical secondary materials have an oil content around 10%.⁸¹ Even at the lower end of that range, as explained in earlier responses, it is clear, based on standard engineering principles relating to hydrocarbon boiling points, that oil recovery of a light hydrocarbon fraction can and does occur in quench coking, and that the recovery efficiency is comparable to that of conventional coking. Therefore, the EPA does not believe that oil content per se is the determinative factor here. The fact that most of the oil present is recovered as a light fraction at an efficiency equal to the conventional coking is the more critical fact. (See 53 FR at 522 (Jan. 8, 1988) noting that the so-called sham recycling criteria are to be considered on a case-by-case basis with the weight given any particular factor varying as appropriate under the circumstances; the same language appears in the Lowrance Guidance Memorandum referred to by the commenter.)

⁸¹ See the September 3, 1997 letter from Kyle Isakower to Max Diaz and the January 9, 1998 letter from Richard Fortuna to Mike Shapiro.

Second, the presence of water in the oil-bearing secondary materials (due to the fact that many are recovered from wastewater treatment systems) precludes their insertion into the normal coking process along with resid feedstock. This is because the temperatures in the coker along with the manner in which it is operated (e.g., enclosed device) are incompatible with water, which would produce potentially dangerous pressures as a result of the resultant water vapor.

Third, based on standard engineering principles relating to hydrocarbon boiling points, temperatures experienced during the quench cycle, and the effect of lowered partial pressures due to the presence of steam, oil recovery of a light hydrocarbon fraction can and does occur in quench coking, and that the recovery efficiency (~70%) is comparable to that of conventional coking. The recovery efficiency as a function of oil content was already addressed above. Regarding whether recovery efficiency may be waste dependent, the Agency points out that the exclusion is limited to oil-bearing materials generated at petroleum refineries, and it is data from these materials provided by the industry that EPA found most persuasive (see earlier responses) while making its assessment. The effect of higher boiling point hydrocarbons could result in a lower recovery efficiency; however such characteristics are not consistent with the data the Agency relied upon in making its determination. However, should recovery efficiencies actually be significantly lower than suggested by the data, due to differing feedstock characteristics or operating conditions, the Agency would question the legitimacy of the activity.

Fourth, according to the information provided by the industry, it is desirable from an operations standpoint to recover as much free oil as is practicable prior to the MOSC (quench coking) process. However, the 125,000 barrels of crude oil equivalent referred to by the commenter appears to include oil recovered in the preparation steps as well as oil recovered in the MOSC process. The Agency does not believe the hydrocarbon recovery efficiency in the quench process (~70%) (calculated based on documented boiling point ranges and simulations using actual refinery-generated secondary materials at temperatures experienced in the coker, 600 - 800 degrees F), would depend upon the amount of de-oiling prior to coker insertion. The manner in which recovery efficiency is calculated in simulations submitted by industry is a function of the boiling point range of the hydrocarbons present, and the documented temperatures that exist during the quench process.

As noted earlier, the Agency does not believe that a direct comparison of quench coking with conventional coking is the most germane comparison for determining sufficient oil content to judge the legitimacy of reusing secondary materials. The quench coking process exists to recover hydrocarbons which are not amenable to conventional coking. Hence the fact that the feed to quench coking is lower in oil content is not determinative of whether quenching is a legitimate recovery process. As explained in earlier responses, however, it is clear, based on standard engineering principles relating to hydrocarbon boiling points, that oil recovery of a light hydrocarbon fraction can and does occur in quench coking, and that the recovery efficiency is comparable to that of conventional coking.

The petroleum refining process is a continual hydrocarbon recovery process. Different steps in the process recover hydrocarbons differently. The refinery processes and operating procedures are designed to separate and process into products as much hydrocarbon as possible from the crude oil feedstock,; in other words, to prevent as much oil from making its way into these secondary materials as possible. The oil that does make its way into these secondary materials is generally considered unavoidable and inevitable, or in some cases, too much oil in these secondary materials is evidence of a problem with some aspect of the overall refining process or of the wastewater treatment system. These same factors also explain to some degree the variability in the oil content of secondary materials used for quench coking: the same materials are used but the oil content varies depending on the daily efficiencies of the refining process and wastewater treatment system. The coking process is designed to remove additional hydrocarbons from materials that have a higher solids content. Placing oil-bearing secondary materials that contain high solids content in the initial primary petroleum refining processing steps with crude oil feedstocks could harm that part of the production process that is not designed to recover hydrocarbons from oil-bearing secondary materials. However, the Agency does not believe that the premise that oil-bearing secondary materials cannot be inserted into the initial stages of production process is sufficient for determining whether or not the secondary materials maybe legitimately reused when returned to other parts of the production process.

As with other side streams generated by one process and used as feedstocks to other production processes, conventional and quench coking operations constitute a link in the multi-step chain of processing steps designed to recover as much of the hydrocarbon value from the original crude oil feedstock as possible. Thus, there are arguably aspects of this activity that lead one to conclude that the oil-bearing hazardous secondary materials used in the quenching process can be considered, for regulatory purposes, as part of an on-going production process and hence classified as an activity not subject to RCRA jurisdiction.

The Agency is assured that use of hazardous secondary materials in the quenching process is a legitimate activity warranting an exclusion from the definition of solid waste. The primary purpose of the activity is the recovery of the remaining hydrocarbon values in the oil-bearing secondary materials (with the addition of carbon and energy value to the co-product coke), using the existing heat energy contained in the coke product after the conventional coking process.

Comment 3d:

How Much Value Does the Quenching Process Add?

1. Where the hydrocarbon is not recovered and processed at the refinery, what is the value added to the petroleum coke of the hydrocarbon remaining in the coke? Is the price of petroleum coke higher as a result of using hazardous wastes in the quench cycle? Is there any documentation to this effect?

2. Is the potential value added to the coke waste-dependent as well, and upon what factors does it depend? Can some oil-bearing residuals actually detract from the value of the coke by contributing to a higher ash content?

3. Are the hazardous wastes inserted into the coker for cooling purposes as safe and effective a coolant as water?

Response: In evaluating whether the use of oil-bearing secondary materials in the quenching process provides a beneficial contribution to the coke product or process, the Agency notes that the main purpose of the petroleum coking unit is to recover hydrocarbons from the oil contained in the feedstocks for further refining. Similarly, the main purpose of using the secondary materials in the quenching process is the energy-efficient recovery of hydrocarbon from the residual oil in the oil-bearing secondary materials. Concerning the issue of net contribution to the coke product (i.e., added energy value v. added ash content), the petroleum industry maintains that the additional ash content is insignificant and points to the amount of coke product produced per cycle (ranging from about 400 to 800 tons) that would be endangered if the ash content (as well as the VCM level) contributed during the quenching process was sufficient to lower the value or marketability of the coke product. Based upon data provided to the Agency by the petroleum refining industry, the Agency notes that coke product produced using hazardous secondary materials in the quenching process is not significantly different from coke produced without using secondary materials in the quenching process. Further, EPA notes that anode-grade coke, the most high-valued coke with the most stringent product specifications, can be produced using these secondary materials in the quenching process. Given that the recovered hydrocarbon is the primary product of using the secondary materials in the quenching process, the simple fact that the coke product (i.e., the co-product) continues to meet the applicable product specifications and shows no appreciable increase in risk carries more weight in the Agency's evaluation. Thus, evaluation of contribution or non-contribution to the coke product is not the sole relevant inquiry, or even the principal one.

Regarding the comparisons of secondary materials with cooling water, the cooling water serves to quench the coke bed. The Agency does not view the secondary materials as a substitute for quench water. However, the quench water also provides the means by which these materials are conveyed into the coker to take advantage of the latent heat present. EPA also found persuasive industry's arguments that the steam produced from the cooling water during the quench process also provides additional recovery of light ends in a manner similar to "steam stripping" of organics.

(See 53 FR at 522 (Jan. 8, 1988) noting that the so-called sham recycling criteria are to be considered on a case-by-case basis with the weight given any particular factor varying as appropriate under the circumstances; the same language appears in the Lowrance Guidance Memorandum referred to by the commenter.)

Comment 3e: Is There a Guaranteed Market for the End Product?

1. Is the market for quench-derived petroleum coke any different from the broader petroleum coke market?
2. If not, why is the majority of petroleum coke shipped overseas if its such a valuable fuel? How will the foreign market demand change if and when the countries receiving the coke tighten their air emission standards?
3. What effect, if any, will the new particulate standards and upcoming global warming initiatives have on the domestic and foreign use of petroleum coke?
4. Perhaps most importantly, are there relevant industry specifications that would prevent sham recycling?
5. Are adequate records kept regarding the quench cycle process and petroleum coke purchases?

Response: EPA could not find any information supporting the notion that there are distinct markets for coke produced when secondary materials are introduced into the quench, versus when they are not. Information submitted by industry supported their assertion that coke made with secondary materials used in the quench cycle is not significantly different from coke made without using secondary materials in the quench cycle.

Regarding exports of petroleum coke, the Agency did not perform detailed market analyses of the petroleum coke market. Information submitted in comments suggests that U.S. petroleum coke production is increasing faster (due to heavier crude slates) than the number of domestic users.⁸²

The Agency did not assess the effect of the new particulate standards or global warming initiatives as part of this rulemaking. While obviously important, EPA does not regard these questions as negating any of the analysis as to whether the quench cycle -- which produces petroleum coke identical to the coke from conventional petroleum coking -- should be viewed as part of petroleum refining.

Regarding sham recycling, see responses to previous comments regarding industry specifications relevant to petroleum coke, and the Agency's assertion that the principle consideration overall is the legitimate light-end hydrocarbon recovery.

Regarding adequate records, the Agency did not require any recordkeeping in today's rulemaking for the exclusion for oil-bearing hazardous secondary materials, beyond the existing requirement that respondents in enforcement actions must be able to document claims regarding recycling. (40 CFR 261.2(f)).

⁸²*Oil and Gas Journal*, November 10, 1997, pp. 79-82.

In general, clearly there is a well-established end market for the petroleum coke. However, more importantly, as previously mentioned, the quenching process recovers petroleum as a light fraction; it does not just generate coke. Thus, evaluation of contribution or non-contribution to the coke product is not the sole relevant inquiry, or even the principal one.

Comment 3f:

What are the Economics of the Recycling Process?

1. Which oil-bearing residuals at the refinery are chosen for insertion in the quench cycle, and on what basis are they selected?
2. If the amount of hydrocarbon recovered for processing at the refinery is waste-dependent, isn't the economic value of the quench cycle process also waste-dependent since the value of the coke itself is very small or non-existent?
3. Did the use of hazardous waste in the quench cycle increase significantly in response to the F037 and F038 listings in 1990 and/or the onset of the RCRA LDR program?
4. When one refiner ships waste to another refiner for use in the coking quench process, what are the economics of the transaction? Who is paying who, and how much? If the refineries are part of the same company, how is the internal cost accounting handled between plants? (EDF, L0009)

Response:

Information from the industry indicates that both hazardous and non-hazardous oil-bearing secondary materials have been used in the quench process. The Agency cannot comment directly on the basis for selecting which oil-bearing residuals are "chosen" for insertion in the quench cycle, as these determinations are made by the refineries themselves based on site specific factors.

Regarding the possible trends in use of quench coking, see earlier response to comment 2c in Section II.b.2.c. of this document.

(See 53 FR at 522 (Jan. 8, 1988) noting that the so-called sham recycling criteria are to be considered on a case-by-case basis with the weight given any particular factor varying as appropriate under the circumstances; the same language appears in the Lowrance Guidance Memorandum referred to by the commenter.)

Comment 4: The October 1, 1997 letter makes a necessary and important clarification to the scope of the proposed rulemaking. However, in light of the refining industry's garbage-can-approach to waste recycling through the practice of dispersion of waste by quench, the industry's

record for reporting violations, and the vast variations in “oil-bearing” wastes generated by the 13 enumerated SIC codes, the Proposed Rule is still overly broad and fraught with pitfalls and loopholes. Unless clarified to apply to recycling residuals disposed of into the quench, the October 1 modifications, even if executed through Option 3, are insufficient to rectify the other structural deficiencies and the environmental and technology disincentives created by the proposal. The following summarizes general comments and concerns with the new proposed petroleum refining waste listing.

- Allowing reinsertion of any waste that contains any oil-bearing secondary material is an invitation to disaster and by virtue of failing to specify whether any minimum oil content is required in the hazardous oil-bearing secondary material.
- There are no specifications for wastes qualifying for this recycling exemption.
- The proposal allows the establishment of virtually unregulated commercial recycling facilities on and off the petroleum refinery sites, while requiring that other RCRA commercial facilities must meet the most stringent waste management standards in existence.
- How will the Agency even monitor for “speculative accumulation?” What records are required to demonstrate the date a waste was initially stored? What is “feed stock-like” in terms of original oil content?

Response: Under section 261.2 (f), persons storing excluded materials have the burden of demonstrating (in an enforcement action) that they are meeting the terms of the exclusion. Refineries consequently must be able to demonstrate the duration of storage of all secondary materials which are excluded (including, but not limited to, those processed by quench coking). The rule does not specify a particular record-keeping regime in order to provide flexibility for each facility to be able to demonstrate that there is no speculative accumulation in a manner best fitting the facility’s operating practices. (EPA notes that there is no explicit recordkeeping requirement for any other industry managing excluded secondary materials either.)

The Agency is unclear what the commenter refers to regarding the term “feed stock-like” and “original oil content”. The final rule recognizes the continued extraction of hydrocarbon values from in-process refinery materials, some of which may be considered “feedstocks,” but this rule does not specify a specific oil content for those materials. The definition of “recovered oil” in 40 CFR 261.4(a)(12)(ii) does imply that this material is mostly “oil”; however the Agency believes recovered oil will be inserted into refinery units other than quench-coking because it is directly amenable to refining.

Comment 4 (cont’d):

- As written, this proposal effectively allows petroleum coke permeated with hazardous metals and other substances to escape classification as “solid waste,” petroleum coke may be shipped to other countries in violation of RCRA and other applicable hazardous waste treaties and conventions.

- Jurisdictional exclusion of oil-bearing materials creates the opportunity for loophole non-RCRA regulated facilities outside refineries that receive and process hazardous waste prior to shipment for insertion into refineries.
- Jurisdictional exclusion of oil-bearing materials undermines tracking and storage requirements for enforcement of RCRA regulations governing the mis-handling of hazardous wastes.

Response: The Agency is requiring that the materials excluded under this provision of today's rule be returned directly to a refinery for insertion. While this is not an issue if materials are recycled on site, EPA shares the commenter's concerns about situations where these materials are generated at one refinery for insertion into another, but are instead processed at an intermediate, non-refinery facility. In cases where materials generated at one petroleum refinery are to be recycled at another refinery, EPA has added to the regulatory text of the exclusion that these secondary materials must be sent "directly to" another petroleum refinery.

Comment 4 (cont'd):

Specific Comments on the Policies Proposed in the October 1, 1997 Letter

The October 1, 1997 letter seeks additional comment on the proper way to clarify the regulatory status of residuals that result from the insertion of oil-bearing hazardous materials into the refining process. EPA proposes three different options of which we believe only the third would provide for an acceptable enforceable situation. That is, to change the listing description for refining waste to include any residuals from the processing of listed waste.

Based on staff discussions on October 31, 1997, it appears that the language of the October 1, 1997 letter to add to the listing description for F & K wastes "any residuals from the processing of listed wastes" is not necessarily limited to those residuals that are merely land applied or stored on the ground. We support the October 1 language change as reflected in Option 3. However, the language of the regulation must also be clarified and interpreted to include the vast majority of such "petroleum refining residuals" that are slurried with water and merely re-injected, ostensibly as quench/cooling water. Finally, the language must be clarified to prohibit unpermitted commercial recycling operations at refinery sites and prohibit waste acceptance from outside of the refinery.

Quench-side coking, just as any other recycling practice, must meet the legitimacy/Sham Recycling Criteria in order to be considered a valid recycling practice. We believe the evidence shows (see Section III of response to October 1st letter) that the vast majority of these practices are nothing more than Sham Recycling. In other words, quench-side coking practices today do not legitimately meet the Sham Recycling Criteria.

CONCLUSIONS

In conclusion, unless the Agency includes recycling residuals disposed of into the quench within the meaning of “any residuals from the processing of listed wastes” as per Option 3, it will not only ensure that the coker will become the omnibus and unregulated “trash can” for petroleum industry wastes, it will also be an open invitation to waste generators to claim that their hazardous wastes contains enough oil to be deemed “oil-bearing secondary material” qualifying for this unprecedented and unqualified exclusion.

Secondly, if the Agency truly seeks to establish incentives for technological alternatives to landfilling and incineration wants to encourage proper recycling, and recover the maximum petroleum values for use here at home, then it should require full and proper treatment of the LDR constituents contained in these petroleum wastes, which in turn would encourage the use of proper recycling technologies such as gasification and desorption, both of which are being used at only a handful of refining sites today. By doing so it will maximize the fuel and energy value return to this country by producing high grade fuels that can be used to produce additional gasoline, heating fuel, etc. Rather than encourage the use of quench-side coking, which at best is 20% efficient at recovering petroleum values, it should encourage the use of high recovery technology, such as desorption and gasification, which converts nearly 100% of the remaining petroleum values to recoverable petroleum units for use in the U.S., not as petroleum coke for export. Irrespective of whether the Agency’s aim is to recover petroleum values, or to protect public health, neither are served in the least by encouraging the addition of hazardous waste to the world’s dirtiest fuel, petroleum coke. In conclusion, the Proposed Listing Rule will:

- Exacerbate the current practice of dispersion of hazardous waste into fuel coke. This practice provides for the release of TCLP-UTS listed metals and PAH's into the environment under the guise of recycling;
- Create a new class of hazardous waste disposal facilities that is unchecked by RCRA controls and, therefore, competes unfairly with RCRA compliant commercial facilities;

Response: The Agency disagrees that this activity is “disposal;” rather, it is the recovery of vestigial hydrocarbons in a process that is not part of the waste disposal problem.

Comment 4 (cont’d):

- Cloud enforcement issues and creates double standards regarding the transportation and storage of hazardous wastes for any hazardous waste that contains de minimis quantities of oil and was generated by the petroleum industry;
- Punish facilities that have been RCRA compliant and rewards refiners that operate non-RCRA compliant facilities;
- Undermine the growth and development of responsible recycling technologies and practices.

RECOMMENDATIONS

In short, the Agency has two courses it can follow: finalize the rule as proposed and stimulate unregulated production of the world's dirtiest fuel so it can be shipped to Ghana; or it can modify the proposal in accordance with our recommendations which will stimulate the growth of currently available technology to safely remove metals and other toxics while maximizing the recovery of quality hydrocarbon values for use at home.

We recommend the following modifications to the policy and language of the recycling provisions of the proposed Petroleum Listing Rule:

- Include petroleum recycling residuals introduced into the quench under the definition of "residuals from the processing of listed waste" for purposes of Option 3, and thereby prohibited from being introduced to the quench unless they meet one of the two following criteria: 1) the petroleum values of the materials being introduced are comparable to that of crude oil feedstocks (i.e., 90% oil or greater) and; 2) that the rates of recovery of petroleum values in the quench is comparable to that of the recovery rate from crude oil distillation itself (i.e., 90% or greater) exclusive of whatever residuals are deposited into the coke product itself;
- Apply these same principles to other insertion points and "feedstocks;"
- Withhold issuance of the Proposed Rule until "feedstock-like" and "normal process streams" can be defined and minimal storage, tracking, acceptance and reporting requirements can be developed;
- Prohibit the acceptance and introduction of petroleum wastes into the coker from facilities other than the ones at which the waste was generated, unless a RCRA permit has been obtained. This is to ensure that any facility that engages in commercial acceptance of a potentially broad array of wastes complies with the basic public health and environmental protections that the Agency has established for any such commercial facility. The Agency has established many preventive measures that are necessary for commercial hazardous waste facilities, this includes: waste analysis, air emission controls, containment, storage, runoff/runoff controls, waste compatibility analysis, record keeping and residue analysis, as well as proper residue management. Given the breadth and of the proposed exclusion (i.e., "any hazardous oil bearing secondary material... introduced into any aspect of the refining process...") such a limitation is absolutely necessary unless the Agency seeks to establish petroleum refineries as the new locality of unregulated commercial operations;
- Promulgate regulations that encourage rather than discourage the development of responsible recycling technologies and practices that recycle hydrocarbon to hydrocarbon, water to water and solids to solids rather than metals and dirt to fuel. Accomplish this goal by imposing standards for ash and Btu content for wastes recycled into fuel;

- Consult with the enforcement arms of Region VI and NEIC before proceeding with this rulemaking to determine how those enforcement initiatives may be compromised by an exclusion that effectively deregulates the petroleum industry;
- Modify the proposed revision to 40 CFR §261.4(a)(12) to ensure that the exclusion will apply only when legitimate, as opposed to sham, recycling is occurring. The Agency must expressly state that this revised rule is in no way intended to create an exception from the established Sham Recycling Criteria and that, indeed, any person attempting to qualify under the new rule will be subject to a full showing under the Sham Recycling Criteria. (SEA, L0010, 0015)

Response: In today's final rule, EPA clarifies that the exclusion from the definition of solid waste for oil-bearing secondary materials returned to the refining process only extends to secondary materials generated by the petroleum refining sector and only to materials that are actually re-inserted into the refinery process. In cases where oil-bearing secondary materials are reclaimed prior to re-insertion, any residuals that may result from reclamation which are not returned to the refinery process, and therefore may be discarded, retain the original hazardous waste listing. The Agency modified the proposed listing description for F037 to include any residuals that result from the processing of listed hazardous wastes that will be disposed. The Agency decided to include this clarification within the regulatory language so that the rules are explicit and to ensure that there is a requirement to manage residuals from the reclamation of hazardous secondary materials as hazardous wastes.

Data available to Agency indicate that hydrocarbons are recovered from oil-bearing secondary materials when these materials are fed to the coker, including when these materials are fed into the coker with the quench cycle. In addition, data indicate that there are recoverable levels of oil in sludges generated by petroleum refineries and typically fed into the coker. The metals levels in sludges typically fed into the coker (e.g., sludges bearing hazardous waste codes K048-K052) are, for the most part, comparable to the concentration of metals in normal refinery feedstocks. Although the levels of lead and chromium in these sludges may be higher than normal petroleum feedstocks, the concentrations of these two metals in petroleum sludges are expected to decrease due to changes in the petroleum production process. The NESHAPS standards promulgated under the Clean Air Act will result in chromium no longer being used in cooling towers. Therefore, the principal source of chromium contaminants in the production process will no longer exist. Lead levels in petroleum sludges will continue to decline due to the phasing out of leaded gasoline as a product line.

Finally, analyses conducted by EPA confirm that the final coke product is basically unchanged by the use of hazardous oil-bearing secondary materials in the coking process. In addition, the final exclusion from the definition of solid waste for oil-bearing secondary materials generated at petroleum refineries and returned to the refinery process is conditioned on there being no speculative accumulation of the materials, on the materials not being placed on the land prior to reuse and stored in a manner to minimize loss. The reuse of the secondary materials in the refinery

process must not result in the coke product exhibiting any of the characteristics of hazardous waste.

Under the definition of speculative accumulation in 40 CFR 261.1(a)(8), a material is speculatively accumulated if: (1) it is accumulated for recycling but no recycling market exists, or (2) 75 percent of the material is not recycled within a calendar year. The 75 percent criteria is assessed on a calendar year, so an initial inventory must be made on January 1 of each year, and subsequently calculated on December 31 of each year. Persons accumulating secondary materials that are exempt from the definition of solid waste have the burden of proving that there is a feasible means of recycling the material. In addition, the persons accumulating secondary materials have the burden of proving that sufficient amounts of the secondary materials are recycled within a calendar year.

EPA clarifies that the Agency is not including within the scope of the exclusion oil-bearing secondary materials generated outside the petroleum refining sector (i.e., SIC 2911). The Agency is basing its decision not to exclude these secondary materials from the definition of solid waste on the fact that EPA has very limited data from industry demonstrating the chemical and toxic content of the materials. In fact, the Agency has no information on which to base a finding that the use of oil-bearing hazardous secondary materials originating in a non-refinery sector of the petroleum refining industry in the coking process would be anything other than the management of wastes (e.g., hazardous waste recycling) from that non-refinery sector. Oil-bearing secondary materials originating from non-refinery sectors have the potential to be more waste-like and thus do not warrant an exclusion, especially if their ultimate use is in the quenching process.

The Agency also is requiring that the materials excluded under this provision of today's rule be returned directly to a refinery for insertion. While this is not an issue if materials are recycled on site, EPA has concerns about situations where these materials are generated at one refinery for insertion into another, but instead end up at an intermediate non-refinery facility. In cases where materials generated at one petroleum refinery are to be recycled at another refinery, to meet the conditions of the exclusion the materials must be located either at the generating refinery, at the receiving refinery, or must otherwise be in transit between the two facilities. This is consistent with the argument that the exclusion is provided on the basis that the secondary materials are being used within the realm of on-going production in the petroleum refining sector.

Also see response to comment 2 above.

Comment 5: Amoco does not believe that revision of the proposed exclusion is necessary. Amoco does not believe that the "loophole" suggested in Mr. Bussard's letter is a reasonable construction of the proposed exclusion. Thus, no revision of the exclusion is needed to close it.

Amoco prefers modification of the preamble to clarify the intent of the proposed exclusion. If EPA in its judgement feels that clarification must be made, such clarification can be provided in

the preamble to the final rule (EPA's Option 1), with clear examples of when listing is applicable to such discarded solid wastes and when it is not.

Modification of the listing description for refining wastes should not jeopardize the ability of the refineries to continue to send refining residuals for use/recycle by second party operations. The Amoco Mandant Refinery currently send filter cake, generated by filter pressing API separator sludge, to the Dakota Gasification Company's (DGC) Great Plains Synfuels Plant for recycling under a RCRA treatability. Amoco requests that this operation not be jeopardized by the Agency's efforts to close a "loophole." Further, Amoco requests that modifications to the listing description not preclude state approval of this practice once the treatability study is complete.

Amoco Mandant Refinery urges the Agency to consider including additional "refining processes" as receptors of oil-bearing secondary materials excluded from the SWD. Specifically, the Agency is urged to exempt oil-bearing refining residuals from the SWD if they are recycled to a refining process, where such process may be a secondary party coker or coal gasifier. Amoco would like to see such recycling recognized as equivalent to reinsertion in the refining process from the standpoint of exempting this material from hazardous waste listing.

EPA should consider coal gasification to be an equivalent refinery process. There is no practical difference, other than the location of the operation, between sending filter cake to a coker on the refinery or to a second party gasifier. In both cases, the filter cake is being used as a substitute for the normal carbon source feed stock (heavy oil for the coker, lignite for the gasifier). In both cases the organics in the filter cake are undergoing chemical transformation to yield useful products (gasoline, jet fuel, and diesel fuel from the coker, methane, phenol, cresylic acid and ammonia from the gasifier), similar to organic compounds from the normal feed stocks. In fact, in some U.S. refineries a gasifier is considered to be a refinery operation. Neither ownership nor location of a gasifier impacts the environmental benefit of recycling filter cake to the gasification process. Gasification should be considered to be (or to be equivalent to) a refining process.

EPA should consider proximity benefits in including coal gasification as an equivalent refinery process. The Mandant Refinery does not have a coker. While the Mandant Refinery could ship filter cake to a coker at another Amoco refinery, the nearest is one thousand miles away from Mandant. In contrast, the Great Plains Synfuels Plant is 80 miles from the refinery. By recycling filter cake in the coal gasifier, rather than in an Amoco-owned coker, fuel consumption (and resultant vehicle emissions) to transport the material is significantly decreased, as is the potential exposure of the public.

Amoco wishes to emphasize that insertion of petroleum refining residuals in the coal gasification process is an environmentally sound method of turning potential waste materials into useful products. The Agency is urged to take advantage of a legitimate recycling opportunity by recognizing gasification as an equivalent refinery process for the purposes of the proposed exclusion. (Amoco, L0011)

Response: In today's final rule, EPA clarifies that the exclusion from the definition of solid waste for oil-bearing secondary materials returned to the refining process only extends to materials that are actually re-inserted into the refinery process. In cases where oil-bearing secondary materials are reclaimed prior to re-insertion, any residuals that may result from reclamation which are not returned to the refinery process, and therefore may be discarded, retain the hazardous waste listing. The Agency modified the proposed listing description for F037 to include any residuals that result from the processing of listed hazardous wastes that will be disposed. The Agency decided to include this clarification within the regulatory language so that the rules are explicit and to ensure that there is a requirement to manage residuals from the reclamation of hazardous secondary materials as hazardous wastes.

The commenter's request that the Agency consider including additional "refining processes" (e.g., coal gasification) as receptors of oil-bearing secondary materials within the exclusion from the definition of solid waste for oil-bearing secondary materials is beyond the scope of the current rulemaking. However, the Agency is considering the merits of an exclusion from the definition of solid waste for oil-bearing secondary materials returned to gasification processes, in a recently published Notice of Data Availability.

EPA clarifies that the Agency is not including within the scope of today's exclusion oil-bearing secondary materials generated outside the petroleum refining sector (i.e., SIC 2911) or re-inserted into any other processes other than the petroleum refining processes. The Agency is basing its decision not to expand the exclusion further or to additional secondary materials at this time on the fact that EPA has very limited data from industry demonstrating the chemical and toxic content of the materials. In addition, the Agency does not have sufficient information at this time to evaluate the use of refinery residuals in other off-site or non-refinery processes.

III. Land Disposal Restrictions - Revised Treatment Standards for Spent Catalysts from Hydrotreating (K171) and Hydrorefining (K172)

Comment 1: Proposed Revisions to the UTS Standards

As explained in the Federal Register notice, EPA proposes to revise the present UTS nonwastewater TCLP leachate values for antimony, nickel, and vanadium as follows:

- The UTS for antimony would be decreased from 2.1 mg/l to 0.07 mg/l;
- The UTS for nickel would be increased from 5.0 mg/l to 13.6 mg/l; and
- The UTS for vanadium would be increased from 0.23 mg/l to 1.6 mg/l.

In each case, the proposed standard reflects the higher of the stabilization-based or HTMR-based calculations. The proposed standards for antimony and vanadium are based on data from stabilization processes (which produced a higher UTS level than the HTMR data), while the proposed standard for nickel is based on grab sample data from INMETCO.⁸³ Having reviewed the data, we believe EPA has properly applied its BDAT methodology to calculate the proposed revisions to the three standards.

While the proposed changes to the antimony and vanadium standards reflect stabilization data, we believe they can be met by INMETCO's HTMR process as well. Accordingly, based on the data made available thus far, we support the new values for antimony and vanadium. We caution, however, that the proposed revisions do not reflect grab sample data from another HTMR operation which may submit such data within the next few months. See 62 FR 26041, 26047-26048 (May 12, 1997). It is possible that data from that HTMR process may support a higher standard for one or both of these metals. . . .

. . . In sum, we believe the revised UTS standards that EPA has proposed for antimony, nickel, and vanadium are supported by the underlying data and are achievable by both major treatment technologies. Unless data from another HTMR process support a higher standard for one or more of these metals, the standards should be adopted as proposed. (INMETCO, 00003, pg 2)

Response: The Agency concurs with the commenters and also believes the BDAT methodology has been properly applied to the available data to calculate the revised treatment standards, and that the levels are achievable by both major treatment technologies. Based on data submitted in the Phase IV rulemaking for nonwastewaters the treatment level for antimony is finalized at 1.15 mg/L TCLP, the treatment level for nickel is finalized at 11.0 mg/L TCLP, and the treatment standard for

⁸³See March 19, 1997 Memorandum to Anita Cummings from Howard Finkel, Attachment 5 (Docket item PRA-S0022 in this proceeding).

the vanadium, which is applicable only to K061, K171 and K172 as a constituent of concern in these wastes, is finalized at 1.6 mg/L TCLP. The Agency is therefore promulgating these standards consistent with the levels finalized in the Phase Four Rulemaking. All other standards are promulgated as proposed.

Comment 2: Both the existing and the proposed UTS values for nickel are based on sampling data for the slag produced by INMETCO's HTMR process. The present UTS level of 5.0 mg/l reflects INMETCO's monthly composite slag sampling data, while the proposed value of 13.6 mg/l reflects grab sampling data for INMETCO's slag. Because "grab samples normally reflect maximum process variability,"⁸⁴ a grab sample-based standard calculated in accordance with EPA's BDAT methodology ordinarily will be higher than a standard based on composite sampling data. Thus, the fact that the proposed grab sample-based UTS value for nickel exceeds the old composite-based value is as expected. Since EPA wishes to determine compliance with UTS standards on the basis of grab sampling,⁸⁵ the proposed revision in the UTS level for nickel is appropriate.

If it were based on the stabilization data considered by EPA, the proposed standard for nickel would be lower. However, EPA's BDAT methodology quite properly sets the UTS/BDAT standard at the higher of the HTMR-based or stabilization-based level.⁸⁶ This is particularly appropriate with respect to nickel because HTMR is the "best" treatment technology for metals: It is the most matrix-independent; it recovers valuable resources; it decreases the amount of waste sent for land disposal; it incorporates metals that are not recovered in a stable slag matrix; and it saves energy and pollution by reducing the need to process virgin ore.⁸⁷ INMETCO, for example, recovers and returns to commerce approximately 96% of the nickel present in the secondary materials entering its pyrometallurgical furnaces. If, instead, these materials were stabilized and landfilled, all of this nickel would be buried in the ground rather than being reused productively.

Furthermore, the stabilization data considered by EPA in this proceeding reflect the treatment of wastes having a very low nickel content and very low nickel TCLP influent values.⁸⁸ By contrast,

⁸⁴See 62 FR 26041, 26047/1 (May 12, 1997).

⁸⁵See *id.*

⁸⁶See 62 FR at 26045/2.

⁸⁷See Memorandum to the Record from Elaine Eby and Anita Cummings (Item S0010 in Docket F-97-2P4P-FFFFF); Proposed BDAT Background Document for Toxicity Characteristic Metal Wastes D004-D011, July 26, 1995 (Item S0003 in Docket F-97-2P4P-FFFFF) at 3-5 & 3-6.

⁸⁸Nickel was not among the primary constituents of any of the stabilization waste streams considered by EPA, and the mean nickel TCLP value in the "raw" stabilization waste streams was only 0.7925 mg/l. See March 19, 1997 Memorandum to Anita Cummings from Howard Finkel (Item S0022 in Docket F-97-PRA-FFFFF), Waste Stream Identifier Table and Attachment 1.

nickel is a primary constituent in the secondary materials processed by INMETCO. The nickel TCLP levels for many of these materials are orders of magnitude higher than the TCLP levels for the wastestreams represented in EPA's stabilization database.⁸⁹ It is not surprising, therefore, that INMETCO's HTMR data (reflecting the processing of high-nickel materials) produces a higher UTS/BDAT standard than the stabilization data (reflecting the treatment of wastestreams having a very low nickel content). (INMETCO, 00003, pg 2)

Response: The Agency is finalizing the treatment level for nickel at 11.0 mg/L, which is slightly lower than the level proposed and referenced by the commenter. See response to comment 1 for the Agency's decision to finalize the treatment level for nickel at 11.0 mg/L.

⁸⁹Secondary materials processed by INMETCO may have TCLP levels in excess of 1,000 mg/l, compared to the average of less than 1.0 mg/l in the stabilization waste streams considered by EPA.

IV. Other Comments

IV.A. Conditional Listings

Comment 1a: EPA Should Utilize Conditional Listings If Any of the Proposed Residuals Are Listed

If EPA disregards the foregoing and decides that there is adequate support in the record for listing CSO sediment or spent hydroprocessing catalysts under some circumstances, EPA should only list the affected residual in those specific circumstances, using conditional listings or the concept of "contingent management." To conform to the principles established in *Dithiocarbamate Task Force v. EPA*, 98 F.3d 1394 (D.C. Cir. 1996), the Agency should list residuals as hazardous only where they are managed in a manner shown to pose substantial risks. (Mobil, 00002)

Response: The Agency has decided not to proceed with a conditional listing for CSO sediment. This is discussed in response to comment 1 in Section V.A. of the proposed rule response to comment document. EPA also does not think the spent catalysts are good candidates for conditional listing either; this issue is discussed in response to comment 1 in Section V.H. of the proposed rule response to comment.

Comment 1b: If EPA Lists CSO Sediment, It Should Only List CSO Sediment That Is Subject To Land Treatment.

On the basis of population risk, CSO sediment does not pose substantial risk under any management scenario. Even if negligible population risks are ignored and only individual risks considered, EPA's risk assessments suggest that CSO tank sediment only rises to a potential level of concern when managed in land treatment units. Therefore, if listed, EPA should list CSO sediment only where it is land treated. EPA should not list CSO sediment disposed of in landfills. EPA's own contingent risk assessment for landfilling CSO sediment indicates that potential individual risks are well below concern thresholds, even with the generally conservative assumptions used. (Mobil, 00002)

Response: See response to comment 1 in Section V.A. of the proposed rule response to comment document.

Comment 1c: If EPA Lists Spent Hydroprocessing Catalysts, It Should Only List Hydroprocessing Catalysts That Are Land Disposed

Negligible population risks suggest there is no sound basis on which to find that spent hydroprocessing catalysts pose a substantial hazard to human health and the environment. EPA's individual risk assessment projected substantial risks only from disposal of hydrotreating and hydrorefining catalysts in landfills. While EPA did not perform a formal risk assessment of hydroprocessing catalyst recycling/metals reclamation, EPA did conclude that "based on EPA's

preliminary review of [the metals reclamation] industry, the spent catalysts appear to be managed and processed in a way that controls risks." USEPA, Listing Background Document for the 1992-1996 Petroleum Refining Listing Determination at 79 (Oct. 31, 1995).

Even if the record supported listing the catalysts when they are land disposed (Mobil suggests that it does not), it does not support listing them when they are recycled. EPA's own statements and conclusions strongly suggest that recycling of these catalysts does not pose substantial risks. Since eighty percent of the volume of such catalysts are typically recycled, it would seem arbitrary to dismiss EPA's conclusion that when recycled, "the spent catalysts appear to be managed and processed in a way that controls risks." *Id.* A listing of such catalysts would essentially ignore this EPA conclusion and subject the eighty percent of these residuals that are recycled to needless regulation. In the absence of a showing of substantial risk to counter its tentative conclusion that there is no such substantial risk, EPA should not list these catalysts when they are subject to recycling/metals reclamation. (Mobil, 00002, pg 3)

Response: EPA disagrees with the comment, and continues to believe that the risk analysis fully support listing this waste. See response to comment 8 in Section I.A.5 of this document. EPA believes that the catalyst wastes present several risks beyond those necessarily associated with landfill disposal, including pyrophoric properties and significant levels of benzene and arsenic (all of which may pose risks via pathways other than groundwater exposure, including risks from improper storage or other handling, and risks from uncontrolled air emissions from thermal treatment). Thus, this waste is not a good candidate for a conditional listing. Given the hazardous nature of this waste, EPA believes it is entirely appropriate for it to be transported and stored as hazardous waste before recycling. (See 40 CFR 261.6 for regulations applicable to hazardous wastes that are recycled). EPA points out that examples of problems at sites recycling these wastes have been noted in the record (see enforcement case described in the docket, document #PRA-S0037).

Comment 2: If EPA Lists Spent Hydroprocessing Catalysts, It Should Only List Hydroprocessing Catalysts That Are Land Disposed Off-site

EPA's risk assessments and supporting data on well distance indicate that risks from on-site landfill disposal are negligible. For most on-site landfills, there is no exposure and, therefore, no risk. If EPA decides to list spent hydroprocessing catalysts at all, spent catalysts that are recycled or disposed of in on-site landfills should not be listed, and any listing should be limited to spent hydroprocessing catalyst disposed of in off-site landfills. (Mobil, 00002, pg 3)

Response: EPA's disagrees that the risks from disposal of the spent catalysts in on-site landfills are negligible. The high-end groundwater risks given in the NODA for hydrotreating catalyst ranged up to $8E-5$, and the risks for hydrotreating catalysts ranged up to $4E-4$ (see 62 *FR* at 16752). The risks for on-site landfill disposal were only somewhat less than the risks for off-site landfills, so any attempt to argue on-site disposal is safe is not valid. Furthermore, EPA's decision to list these wastes was also based on the self-heating physical properties of these spent catalysts.

EPA observed and was told by catalyst reclamation and refinery facility operators that these wastes exhibit pyrophoric properties and do result in fires.

Comment 3: The Approach of Using Conditional Listings Allows EPA to Target Wastes not Managed Correctly

EPA has the authority to interpret the statutory definition of hazardous waste so that a waste which is otherwise hazardous would not require regulation if properly managed by a refinery. After 16 years of experience with the management of hazardous wastes, it is not necessary or correct to assume that all residuals will be mismanaged and therefore requiring them to be listed as hazardous wastes under Subtitle C. To the extent that EPA's analysis identified risks, those risks were found primarily in the landfill setting, and not at the refineries. A more targeted listing instead of "across the board" listing would be more effective in achieving protection of human health and the environment. (NPRA, 00004, pg 5)

Response: The Agency has decided not to proceed with a conditional listing for CSO sediment. This is discussed in response to comment 1 in Section V.A. of the proposed rule response to comment document.

Comment 4: Assuming EPA Decides To List Any of the Residuals Under Any Circumstance, EPA Should Employ Conditional Listings

As discussed above, EPA lacks record support for the conclusion that any of the three residuals proposed for listing should be listed. However, assuming for the sake of discussion that there were record support for listing CSO sediment or spent hydroprocessing catalysts under some circumstances, EPA should list such residuals only in those specific circumstances, *i.e.*, EPA should employ conditional listings or the "contingent management" concept.

As API pointed out in previous comments, a listing that encompasses wastes found to pose substantial hazards, as well as substantial quantities of wastes that do *not* pose substantial hazards, is not likely to survive scrutiny under the court's analysis in *Dithiocarbamate Task Force v. EPA*, 98 F.3d 1394 (D.C. Cir. 1996). *See* Supplemental Comments of the American Petroleum Institute on the Proposed Listing Determinations for Certain Petroleum Refinery Residuals 12-14 (April 23, 1997). Moreover, the method of management is a key variable that may distinguish a hazardous waste from a waste that is not hazardous. *See Dithiocarbamate Task Force*, 98 F.3d at 1405. Thus, to avoid regulating wastes that are not hazardous (and thus, to conform to the principles of the *Dithiocarbamate* decision), the Agency should list residuals as hazardous only where they are managed in a manner shown to pose substantial risks.

The Agency itself appears to have reached the conclusion that it has the authority to promulgate conditional listings or conditional exemptions from regulation under RCRA, and that it is appropriate to do so where "across-the-board" listings or regulation would not be necessary to protect human health and the environment. In the recently-issued military munitions waste rule,

EPA established a conditional exemption from RCRA regulation for the storage of military munitions that would otherwise be listed or exhibit a hazardous waste characteristic and therefore be subject to full RCRA regulation, no matter how treated, stored or disposed. (62 Fed. Reg. 6622, 6655-56, Feb. 12, 1997).

The Agency expressed its belief that “RCRA section 3001(a) provides the Agency with the flexibility to consider good management practice in determining the need to regulate waste as hazardous ...” *Id.* at 6636. It noted that “EPA has interpreted the statutory definition [of hazardous waste] as incorporating the idea that a waste that is otherwise hazardous does not require regulation (if properly managed).” *Id.* It acknowledged that its earlier approach to listing hazardous wastes has “focused on the inherent chemical composition of the waste,” *Id.* at 6637, but concluded that: “After more than 15 years of experience with the management of hazardous wastes, EPA believes that it is no longer required -- nor is it accurate and fair -- to assume that all inherently hazardous wastes will be mismanaged, thus creating the necessity to regulate them under subtitle C.” Thus, there should be no disagreement regarding whether EPA has the authority and duty to promulgate conditional listings or conditional exemptions in appropriate circumstances. As shown below, if despite all the information provided by API on these and earlier comments EPA decides to list any of the residuals at issue in this rulemaking, EPA should employ conditional listings. (API, 00009, pg 20)

Response: EPA agrees with the commenter that EPA has the legal authority to promulgate conditional listings under RCRA. However, the Agency has decided not to proceed with a conditional listing for CSO sediment. This is discussed in response to comment 1 in Section V.A. of the proposed rule response to comment document.

Comment 5: If EPA Lists CSO Sediment, It Should Only List CSO Sediment that Is Subject To Land Treatment

As discussed above, to the extent population risk is considered (as API maintains it should be), CSO sediment does not pose substantial risk under any management scenario. However, even if individual risk is considered alone, and the negligible population risk is ignored, EPA’s risk assessments still reveal that CSO sediment arguably poses substantial potential risks only when managed in land treatment units. Therefore, assuming for the sake of argument that there is any basis for listing CSO sediment, EPA should list this residual only where it is land treated. EPA should *not* list CSO sediment disposed of in landfills.

In response to comments, EPA considered whether such a conditional listing might lead to much higher volumes of CSO sediment going to landfills, and if so, whether risk projections would be affected. EPA’s contingent management risk assessment of CSO sediment results in total on-site risks of 1.7×10^{-6} and total off-site risks of 2.5×10^{-6} . In the case of the Monte Carlo analysis, total risks are well below 1×10^{-6} for all scenarios at or below the 95th percentile. Consistent with EPA policy for listing determinations, the risk values calculated for CSO sediment clearly support a contingent management determination.

In order to calculate contingent management risks, EPA made several conservative assumptions. First, EPA assumed that the total amount of CSO sludge produced at a refinery was sent to that facility's on-site landfill. In the case of off-site landfills, EPA assumed that for each refinery, the total amount of CSO sludge produced was sent to the off-site landfill. If several refineries sent waste to the same landfill, then the total waste received was set equal to the combined totals.

Second, the assessment of high-end risk is based on three high-end parameters. In order to calculate risks, EPA set the waste volume and the Y-well distance as the high-end parameters; however, by assuming the waste concentration to be equal to the TC cap, EPA essentially added another high-end parameter. The resulting risk calculations, therefore, are likely an overestimate of potential risks. Even under these conservative assumptions, however, disposal of CSO sediment will not pose an unacceptable risk to nearby residences. Based on this analysis, API urges EPA to consider a contingent management listing for CSO sediments, if it determines that any listing is needed at all. (API, 00009, pg 21)

Response: EPA thanks the commenter for their support and recognizes they favor Options 1 and/or 2. However, as a direct result in responding to comments, EPA determined that the disposal of CSO sediment in landfills, without any consideration of codisposal, results in some groundwater risks. Therefore, the Agency will not be applying a conditional exemption to the CSO sediment listing. This issue is discussed further in response to comment 1 in Section V.A. of the proposed rule response to comment document.

Comment 6: If EPA Decides To List Spent Hydroprocessing Catalysts at All, It Should Only List those Catalysts that Are Land Disposed

Again, as discussed above, given a proper consideration of the negligible population risk, there is no basis to find that spent hydroprocessing catalysts pose substantial hazards to human health or the environment. However, even if individual risk is considered alone, and population risk is ignored, EPA's risk assessment arguably projects substantial potential risks only where spent hydroprocessing and hydrotreating catalysts are disposed of in landfills.

Although EPA did not perform a formal risk assessment as to recycling (metals reclamation) -- the management method to which some *80 percent* of the catalyst volume is subject -- EPA concluded that, "based on EPA's preliminary review of [the metals reclamation] industry, the spent catalysts appear to be managed and processed in a way that controls risks." USEPA, Listing Background Document for the 1992-1996 Petroleum Refining Listing Determination at 79 (Oct. 31, 1995). Thus, even if the record supported listing the catalysts when they are land disposed (which it does not), it still would not support listing the catalysts when recycled.

Although not entirely conclusive, the evidence of record strongly suggests that recycling of these catalysts does not pose substantial risks. At a minimum, given the fact that the lion's share of the catalysts are subject to recycling, it would be arbitrary to ignore EPA's conclusion that when recycled, "the spent catalysts appear to be managed and processed in a way that controls risks."

Thus, in the absence of a showing of substantial risk from the recycling of spent catalysts, EPA should not list spent hydroprocessing catalysts which are subject to recycling.

API's research into reclamation for spent hydrotreating/hydrorefining catalysts clearly supports EPA's initial finding that the recycling process is environmentally sound. Management of spent catalysts both on-site at the refinery and off-site at the reclamation facility is carefully controlled and is not expected to be associated with off-site exposures under normal management practices. As indicated by EPA, "most refineries place [spent catalysts] directly into closed containers such as 55-gallon drums or flow-bins" (SAIC, 1995, p.77). In a container, the residual cannot impact off-site groundwater or residential properties. In other words, there is no potential exposure and therefore, no potential risk. (An exception to that practice is one facility at which spent catalyst is placed on a RCRA permitted pad where it is allowed to oxidize to reduce the self-heating characteristics. However, given that this process is already regulated under RCRA, it should not be considered as part of the listing determination.)

Similar to on-site management, off-site management of hydrotreating/hydrorefining catalysts is conducted so that off-site exposures are negligible. Again, EPA agrees that "the spent catalysts appear to be managed and processed in a way that controls risks" (SAIC, 1995, p. 90). Information provided by the two U.S. reclamation facilities, CRI MET and Gulf Chemical and Metallurgical Company clearly support this initial finding by EPA. API could not identify any scenario associated with these companies' management practices which might result in off-site exposure. The absence of any exposure scenario clearly indicates that the risks from both these facilities is either non-existent or insignificant.

EPA has suggested that the pyrophoric nature of the spent catalysts may provide additional rationale to justify a listing determination. (60 FR 57747) API disagrees with this rationale. Both generators and reclaimers of spent catalyst are aware of the pyrophoric nature of these materials and take great care to handle them accordingly. In the absence of any other potential risks, the pyrophoric nature of the spent catalysts alone is not sufficient to justify a listing. Until EPA actually quantifies the risk, if any, of these residuals, it cannot make a sound listing determination.

In addition to the absence of substantial potential risks to justify an across-the-board listing, a contingent management listing for spent catalysts would clearly support the goals and objectives of RCRA. Again, EPA acknowledges that "the practice of spent catalyst reclamation is valuable because it is consistent with the intent of RCRA..." (SAIC, 1995, p. 90). If reclamation of spent catalysts were to become a RCRA hazardous waste practice it is extremely likely that landfilling, a process potentially associated with increased risks, would become a more prevalent process. Costs associated with reclamation range from \$100 to \$1000/ton while landfill disposal only costs \$50 to \$350/ton (Clifford, 1997). In the absence of any other incentives, cost will become a determining factor. (API, 00009, pg 22)

Response: See response to comment 1c in this section.

Comment 7: Contingent Management of Hydrotreating and Hydrorefining Catalysts Should Be Considered for On-site Landfill Disposal

Although API disagrees with the proposed listing decision for spent catalysts, in the event that EPA does list either hydrotreating or hydrorefining catalysts, API urges EPA to strongly consider a conditional listing that differentiates between on-site and off-site disposal. Both the risk assessments performed by EPA and supporting data on well distance indicate that risks from on-site landfill disposal are clearly negligible. As discussed Supra, data obtained by EPA in the RCRA 3007 Survey for on-site landfills clearly suggests that the OSW survey data greatly underestimates well distance. As calculated by API, EPA's evaluation of risks from on-site landfill disposal are likely to overestimate actual risks by a factor of 5. Actual high-end risks are expected to be on the order of 1×10^{-6} . In addition, the results of EPA's population analysis indicate that the sum of the population exposed across all on-site landfills is limited to one individual (EPA, 1995b). In other words, for most on-site landfills, there is no exposure and, therefore, no risk. In the absence of a complete exposure pathway, risks from on-site landfill disposal are nonexistent, even in the event that all wastes were disposed of on-site. (API, 00009, pg 23)

Response: EPA responds to this idea for a conditional listing for spent catalysts in its response to comment 2 in this Section. Concerning comments related to distance to wells, see response to comment 1 in Section I.A.6.a of this document. See also response to comments 7 and 8 in Section I.A.5 of this document for further discussion of the basis for listing these wastes.

Comment 8: Sun Continues to Recommend Conditional Listings to Control Only Those Management Methods that Pose Unacceptable Risks.

Although Sun does not believe that EPA has justified listing any wastes, those management methods that have been established by EPA to be the bases for listing should be the only methods that cause the wastes to be considered hazardous wastes. Therefore if these wastes are listed, they should only be listed under a conditional listing. (Sun, 00008)

Response: The Agency has decided not to proceed with a conditional listing for CSO sediment. This is discussed in response to comment 1 in Section V.A. of the proposed rule response to comment document.

Comment 9: Assuming EPA Decides To List Any of the Residuals Under Any Circumstance, EPA Should Employ Conditional Listings

After considering and correcting the technical flaws in the risk modeling, we believe that EPA will likely lack the necessary information to support the conclusion that any of the three residuals proposed for listing should be listed. However, assuming for the sake of discussion that there were record support for listing CSO sediment or spent hydroprocessing catalysts under some

circumstances, EPA should list such residuals only in those specific circumstances, *i.e.*, EPA should employ conditional listings or the “contingent management” concept.

A listing that encompasses wastes found to pose substantial hazards, as well as substantial quantities of wastes that do *not* pose substantial hazards, is not likely to survive scrutiny under the court’s analysis in *Dithiocarbamate Task Force v. EPA*, 98 F.3d 1394 (D.C. Cir. 1996). *See* Supplemental Comments of the American Petroleum Institute on the Proposed Listing Determinations for Certain Petroleum Refinery Residuals 12-14 (April 23, 1997). Moreover, the method of management is a key variable that may distinguish a hazardous waste from a waste that is not hazardous. *See Dithiocarbamate Task Force*, 98 F.3d at 1405. Thus, to avoid regulating wastes that are not hazardous (and thus, to conform to the principles of the *Dithiocarbamate* decision), the Agency should list residuals as hazardous only where they are managed in a manner shown to pose substantial risks.

The Agency itself appears to have reached the conclusion that it has the authority to promulgate conditional listings or conditional exemptions from regulation under RCRA, and that it is appropriate to do so where “across-the-board” listings or regulation would not be necessary to protect human health and the environment. In the recently-issued military munitions waste rule, EPA established a conditional exemption from RCRA regulation for the storage of military munitions that would otherwise be listed or exhibit a hazardous waste characteristic and therefore be subject to full RCRA regulation, no matter how treated, stored or disposed. (62 FR 6622, 6655-56, Feb. 12, 1997). Phillips fully supports this approach, believing that listings should address situations where risk is demonstrable. When a residual is appropriately managed there is no need for a listing, especially, as is the case for spent hydroprocessing catalyst, the constituents of concern are already regulated by the Toxicity Characteristic (TC).

The Agency expressed its belief that “RCRA section 3001(a) provides the Agency with the flexibility to consider good management practice in determining the need to regulate waste as hazardous ...” *Id.* at 6636. It noted that “EPA has interpreted the statutory definition [of hazardous waste] as incorporating the idea that a waste that is otherwise hazardous does not require regulation (if properly managed).” *Id.* It acknowledged that its earlier approach to listing hazardous wastes has “focused on the inherent chemical composition of the waste,” *Id.* at 6637, but concluded that: “After more than 15 years of experience with the management of hazardous wastes, EPA believes that it is no longer required -- nor is it accurate and fair -- to assume that all inherently hazardous wastes will be mismanaged, thus creating the necessity to regulate them under subtitle C.” Thus, there should be no disagreement regarding whether EPA has the authority and duty to promulgate conditional listings or conditional exemptions in appropriate circumstances. As shown below, if despite all the information provided by API on these and earlier comments EPA decides to list any of the residuals at issue in this rulemaking, EPA should employ conditional listings. (Phillips, 00014)

Response: EPA agrees with the commenter that EPA has the legal authority to promulgate conditional listings under RCRA. However, the Agency has decided not to proceed with a

conditional listing for CSO sediment. This is discussed in response to comment 1 in Section V.A. of the proposed rule response to comment document.

Comment 10: The Agency has stated on numerous occasions, the intent to offer regulatory relief for legitimate manufacturing, recycling, and reuse activities within rulemaking actions. Such regulatory relief actions serve as incentives and provide true benefit for the regulated community to conduct waste minimization, which is mandated by Congress and consistent with National Policy. Therefore, AMRI is utilizing this comment submittal to restate its interest and justification for the Agency to reconsider the establishment of specific exemptions for the recycling of spent hydrotreating and hydrorefining catalysts. AMRI's requested action is both appropriate and warranted, since under 40 CFR 261.2(f), individuals and facilities engaged in exempted regeneration operations have the burden of proof that they are engaged in legitimate management activities. Furthermore, such regulatory relief is specific to, and within the Agency's intended scope and confines of the listing determination for residuals from petroleum refining operations. (CRI-MET, 00007)

Response: Catalyst wastes are "spent materials." Under RCRA, the definition of spent material is "any material that has been used and as a result of contamination can no longer serve the purpose for which it was produced without processing." EPA has consistently interpreted this definition to include materials that have been used and are no longer fit for use without being regenerated.⁹⁰ "Contamination" as used in the definition of spent material means any impurity, factor, or circumstance which causes the material to be taken out of service for reprocessing (i.e., treatment for reclamation).⁹¹ When a material is no longer serving its original purpose and is being reprocessed, EPA considers the material to be meeting the "can no longer serve the purpose for which it was produced" condition of the definition of spent material.

EPA asserts that this is the only interpretation of the definition of spent material that makes environmental sense. Once a material such as a catalyst is taken out of service and is sent for reclamation, the material poses the same risk to human health and the environment regardless of the reason for taking the material out of service. Petroleum catalysts that are used and can no longer be used for their original purpose without regeneration are spent materials. As a result of today's rule, spent hydrotreating and hydrorefining catalysts are listed hazardous wastes.

EPA notes that given the hazardous nature of this waste, EPA believes it is entirely appropriate for it to be transported and stored as hazardous before recycling.

Comment 11: The feedstock exemption proposed by the Agency for spent caustic solutions from petroleum refining liquid treating processes used as a feedstock to produce cresylic or naphthenic acid states that "...the spent caustic constitutes a valuable commercial feedstock which is used in

⁹⁰ 50 FR 618 (January 4, 1985); 48 FR 14476 (April 4, 1983).

⁹¹ 50 FR 624.

the manufacture of commercial chemical products." Also stated as rational for the exclusion was (1) the economic value of caustic and the commodity like management, (2) shipment of spent caustics from individual refiners is like other petroleum products, (3) applicable DOT, Coast Guard, and railroad transportation rules are in effect, (4) storage in permitted tanks is provided at the facility, (5) spill control containment and air pollution controls are in place, (6) the spent caustic is directly pumped after storage into the plant's chemical manufacturing process, and (7) no reportable spills/releases of spent caustics have occurred over the past ten years.

The proposed rule further stated that "Based on the manner in which these materials are routinely handled and processed, this recycling practice more closely resembles a manufacturing operation than a reclamation process." Within the proposed rule, the Agency stated that "... in our effort to redefine "solid waste," EPA has concluded that spent caustic from liquid treating is not a waste when recycled in this manner even though it does have an element of reclamation associated with it. Rather, the spent caustic constitutes a valuable commercial feedstock which is used in the manufacture of commercial chemical products."

The Agency's interpretation of what constitutes manufacturing is identical in concept and practice to AMRI's manufacturing processes. Each condition identified within the Agency's interpretation applies to AMRI's facility, which was the first commercial facility to offer to the petroleum refining industry a "total reuse" option for spent catalysts, based on manufacturing. AMRI has routinely paid for spent catalyst feedstocks, based on the international metals market. The shipments are covered by DOT regulations and storage is maintained in units to prevent reportable spills and releases. Materials movement and inventory is evaluated using a bar code tracking system and the facility's feedstocks analysis plan insures that the incoming materials match the pre-acceptance samples before introduction to the on-going manufacturing process. Furthermore, AMRI's environmental record is superb and has operated for over ten years without a single feedstock or product related CERCLA release, and has never exceeded metals related NPDES permit limits. AMRI has also logged over nine years of continuous compliance with hazardous waste regulations and exemplifies a facility worthy of regulatory relief, similar to the Agency's proposed feedstock exemption for spent caustics.

Therefore, AMRI agrees with the Agency's proposal "... to amend the regulations at 40 CFR 261.4(a)(14) to provide an exclusion from the definition of solid waste, clarifying that spent liquid treating caustics from petroleum refineries used as feedstock in the manufacture of naphthenic and cresylic acid products are not solid wastes." AMRI is also encouraged by the Agency's position that "EPA may identify additional "commodity-like" materials as we proceed with other Agency efforts to redefine the definition of solid waste and revise the existing RCRA regulations."

The Agency has stated on numerous occasions that it is not the intent of RCRA to regulate manufacturing processes. If one applies the Agency's acknowledged intent of RCRA, the direct use made of spent catalysts by AMRI is no different from the thousands of other industrial chemicals that are used as feedstocks with which to make other chemical products. Based on the Agency's statements and the intent of RCRA, AMRI requests that the Agency "identify" AMRI's

manufacturing process as "commodity-like," and amend the regulations at 40 CFR 261.4 to provide an exclusion from the definition of solid waste, clarifying that spent catalysts from petroleum hydrotreating and hydrorefining operations used as feedstock materials in legitimate manufacturing operations are not solid wastes. Therefore, AMRI proposes the following regulatory language:

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:

* * * * *

() Spent catalysts from petroleum refining hydrotreating and hydrorefining processes used as a feedstock in legitimate manufacturing operations, unless the material is accumulated speculatively as defined in 261.1(c)(8) of this chapter. (CRI-MET, 00007)

Response: The Agency disagrees with the commenter. Spent catalysts from petroleum refining operations that are removed from the refinery process regenerated or reclaimed in another process are spent materials being reclaimed. Under RCRA, the definition of spent material is "any material that has been used and as a result of contamination can no longer serve the purpose for which it was produced without processing." EPA has consistently interpreted this definition to include materials that have been used and are no longer fit for use without being regenerated.⁹² "Contamination" as used in the definition of spent material means any impurity, factor, or circumstance which causes the material to be taken out of service for reprocessing (i.e., treatment for reclamation).⁹³ When a material is no longer serving its original purpose and is being reprocessed, EPA considers the material to be meeting the "can no longer serve the purpose for which it was produced" condition of the definition of spent material.

EPA asserts that this is the only interpretation of the definition of spent material that makes environmental sense. Once a material such as a catalyst is taken out of service and is sent for reclamation, the material poses the same risk to human health and the environment regardless of the reason for taking the material out of service. Petroleum catalysts that are used and can no longer be used for their original purpose without regeneration are spent materials. As a result of today's rule, spent hydrotreating and hydrorefining catalysts are listed hazardous wastes.

EPA notes that given the hazardous nature of this waste, EPA believes it is entirely appropriate for it to be transported and stored as hazardous before recycling.

The Agency also notes that although the regeneration process is not regulated, hazardous secondary materials must be managed as hazardous wastes prior to being inserted into the regeneration process. In addition, residuals generated as a result of the process retain the

⁹² 50 FR 618 (January 4, 1985); 48 FR 14476 (April 4, 1983).

⁹³ 50 FR 624.

hazardous waste listing. Regeneration or reclamation to recover metals or other constituents in the catalysts is not considered an "on-going manufacturing process."

Comment 12: The Agency's proposed listing of spent hydrotreating and hydrorefining catalysts is based on a risk analysis which was applied to a limited set of waste management practices (off-site Subtitle D landfills) which represented only a small portion of the spent hydrotreating and hydrorefining catalysts managed on an annual basis (7.2 percent of the hydrotreating catalysts and 17 percent of the hydrorefining catalysts). In addition, the calculated risk values used to support the listing determination were within the Agency's discretionary range.

Within the proposed rule, the Agency stated that "... the regeneration and reclamation of spent hydrotreating/hydrorefining catalysts is an environmentally sound alternative to disposal ..."; the Agency continued by stating that "... EPA does not believe that these off-site recycling activities present significant risk ...". The Agency's statements were confirmed and reenforced by the Section 3007 survey which documented that approximately 80 percent of the hydrotreating and 75 percent of the hydrorefining spent catalysts are presently being reclaimed or regenerated.

However, 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.

The Agency's unconditional listing is not warranted, given the fact that the Agency acknowledged that only a small portion of spent hydrotreating and hydrorefining catalysts, i.e., less than 15 percent, are managed under conditions used to support the listing determination.

Furthermore, within the proposed rule, the Agency stated that "Where EPA has characterized a specific waste, modeled the associated management practices and found specific management practices (and not others) to present significant risks to human health or the environment, EPA could list as hazardous only those wastes managed in a manner that presents significant risk." The Agency continued by stating that "Alternatively, EPA could list wastes unless they are managed by the method that does not exhibit significant risk."

If conditional listings are an option to be utilized by the Agency, then the opportunity exists to demonstrate a practical and beneficial use for that option. The Agency has documented within the proposed rule that "... EPA believes that any potential risks associated with regeneration and reclamation are unlikely to be significant, and would be less than the risks found to exist for the management practices modeled." Therefore, since the majority of spent hydroprocessing catalysts are presently being managed under environmentally sound practices, the Agency's listing determination should be targeted to discourage the use of higher risk management practices. (CRI-MET, 00007)

Response: EPA responds to the issue of waste volumes modeled in detail in the proposed rule response to comment document (see Section IV.C.3, comment 1). While EPA agrees that much of these wastes are being recycled, shifts might occur in management practices away from recycling and toward less expensive landfilling. In any case, the data for these wastes clearly shows that the practice of landfilling is plausible for both of these wastes, thus, EPA believes that the risks found from landfilling justify an unconditional listing. Furthermore, as noted above in response to comment 1c, this waste is not a good candidate for a conditional listing.

Comment 13: In determining the national capacity, the Agency assumed that facilities such as AMRI would continue to operate successfully, including any required expansion, following the promulgation of an "unconditional" listing for spent hydroprocessing catalysts. While, AMRI supports the general intent of the Agency's proposed rulemaking, AMRI is concerned regarding the potential economic impact of such an "unconditional" listing on facilities which the Agency is relying on to provide the required treatment capacity for the spent hydrotreating and hydrotreating catalysts.

By proposing an "unconditional" listing for spent hydrotreating and hydrotreating catalysts, the Agency has failed to recognize the merits and benefits of demonstrated and available waste minimization, recycling, and reuse management practices which have been acknowledged and documented within the proposed rule. The Agency's "unconditional" listing is not warranted, based on Agency data which documents that less than 15 percent of spent hydroprocessing catalysts are managed under conditions that warrant listing. Furthermore, within the proposed rule, the Agency stated that "Where EPA has characterized a specific waste, modeled the associated management practices and found specific management practices (and not others) to present significant risks to human health or the environment, EPA could list as hazardous only those wastes managed in a manner that presents significant risk." The Agency continued by stating that "Alternatively, EPA could list wastes unless they are managed by the method that does not exhibit significant risk."

If promulgated as final, the Agency's unconditional listing will mandate the application of the "mixture" and "derived from" rule for all management activities after the point of generation, placing additional regulatory burden (LDR treatment standards, up-grading of storage areas, Subpart CC compliance, and obtaining permits/variances) on environmentally sound management practices. AMRI has estimated that the time required to comply with such additional regulatory burdens and associated permitting requirement will greatly exceed the Agency's specified 6 month period prior to the rules effective date, and result in the majority of the Agency's calculated national capacity being unavailable to the regulated community for a significant period of time. Therefore, based on the facts and opinions represented, it would be prudent for the Agency to consider the option of issuing a two-year capacity variance, specific to recycling facilities. (CRI-MET, 00007)

Response: LDR treatment standards become effective when promulgated unless the Agency grants a national capacity variance from the statutory date because of a lack of available national 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" if there is inadequate alternative treatment/recovery capacity. 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 capacity analysis methodology, please see the discussion for these wastes in the Capacity Analysis Background Document in this docket. So an LDR capacity variance only exempts the wastes from meeting treatment standards prior to land disposal (including derived-from residuals generated from the catalyst recycling process) if EPA finds there is inadequate available treatment capacity.

LDR treatment standards for these newly listed wastes are based on the following treatment technologies. For nonwastewaters, incineration and fuel substitution for K170; recovery/reuse, incineration, stabilization, and vitrification for nonwastewater K171 and K172. For wastewaters, UTS standards for constituents of concern are based on the following technologies for K170-K172: biological treatment, activated sludge biological treatment, steam stripping, lime conditioning plus sedimentation plus filtration, chemically assisted clarification, wet air oxidation, chemical precipitation plus sedimentation, electrochemical treatment plus chemically assisted clarification. However, EPA does not preclude use of any other technologies that can meet the treatment standards, so long as the treatment is not considered impermissible dilution.

Note that 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. Also, 40 CFR Section 260.31(b) provides for a mechanism for these recycling and reclamation facilities to obtain a variance from the Regional Administrator (or designated state official in duly authorized states) stating that these recycling residuals are commodity-like and therefore exempt from the definition of solid waste (therefore, the residuals would not be subject to LDR treatment standards).

As the Listing and LDR regulations are being co-finalized with the same effective date, TSD facilities that manage these wastes must also comply with the LDR treatment requirements contained in 40 CFR Part 268 prior to land disposal by this rule's effective date. Based on the results of the Capacity Analysis, adequate commercially available capacity exists to treat K171 and K172 residuals. Therefore, EPA is not granting a national capacity variance for these wastes.

Comment 14: Reclaiming

Consequence if Listed: The cost of reclaiming will increase dramatically making it less attractive to reclaim and more likely that catalyst will be disposed.

Current System: Recycling catalyst that has already been treated to remove the characteristics of concern means it will be safer to handle at the refinery, on the highways, and at the recycling facility. The cost of reclaiming is likely to be lower as the reclaimer won't have RCRA compliance requirements (catalyst storage and handling). Thus, reclaiming should remain a viable and continuing attractive option.

Discussion: The reclaimers must prepare to manage all listed catalyst as hazardous. This will significantly increase costs. We were informed by one of the major metal smelters that recycle our catalyst metals, that reclaiming costs for one of our spent catalysts would increase from \$50,000 to \$500,000 per catalyst dump when the catalyst becomes listed. For this ten fold increase in reclaiming charges, there would be almost no increase in environmental protection. In fact, listing will likely cause most all recycling of the listed catalysts to cease. This will increase the demand for virgin metals. Thus, the overall environmental benefits from the listing determination are likely to be negative.

Response: EPA does concludes that an increased cost burden is not an appropriate basis for not listing residuals, when the Agency's risk assessment models and tools indicate that these materials pose a risk to human health and the environment. While recycling costs may increase as a result of this rule, EPA continues to believe that it is completely appropriate to bar these materials from Subtitle D disposal because of the risk levels identified through the Agency's risk assessment procedures. The Agency also does not believe that refineries will stop safe management practices as a result of this listing determination.

Comment 15: We understand EPA is recalculating its risk assessments for disposal scenarios related to CSO sludge management. Our experience of late is that those doing modeling of landfills for regulatory purposes do not adequately account for the protective controls provided by the municipal solid waste landfill (MSWLF) regulations promulgated on October 9, 1991 (56 FR 50978).

These controls address location restrictions, facility design and operation standards, groundwater monitoring and corrective action measures, closure and post-closure care, and financial responsibility requirements. In particular, run-off controls, daily cover, composite liners, access control, air controls, among others make disposal in these MSWLF landfills far safer than would be estimated from modeling an open dump. Thus, it is necessary to consider these controls when estimating risk. When properly considered, we believe you will find that disposal of CSO sludge in MSWLFs is a safe and effective practice with no realistic routes of exposure available. We again request that the listing, if needed at all, be narrow and only list CSO sludge that is applied to the ground outside of a MSWLF.

The pathway of greatest concern appears to be related to runoff from the landfill. This is not a plausible route of exposure from a MSWLF given the controls that exist. In particular, the daily cover requirement and the run-on run-off controls prevent this.

40 CFR Section 258.21 requires that at the end of each operating day, a cover of at least six inches of soil be placed over exposed waste in a MSWLF (Section 258.21). Six inches of daily cover will prevent the migration of CSO sediment or contaminants from the disposed waste.

To prevent the flow of surface water onto or from a landfill unit, Section 258.26(a)(1) requires all MSWLF units to have run-on and run-off control systems. The intent of the design, construction, and maintenance of a run-on control system is to prevent the flow of surface water onto the active portion of a unit during the period of greatest precipitation in a 25-year storm. These system controls are intended to mitigate erosion, reduce surface discharge of wastes in solution or suspension, and minimize run-on available to percolate down through waste which creates leachate (56 FR 51054; October 9, 1991). A run-off control system, likewise, must be designed and operated to collect and control the water volume resulting from a 24-hour, 25-year storm (Section 258.26(a)(2)). These controls will prevent CSO contaminants from migrating outside of the landfill.

Run-off collected from the active portion of a landfill unit must be managed in accordance with Section 258.27, which requires that all MSWLFs be operated in compliance with the Clean Water Act.

The MSWLF uniform design criteria require a composite liner and a leachate collection system. The composite liner system consists of an upper component which is a flexible membrane liner (FML) that satisfies specific thickness standards. The lower component must be constructed of at least a 2-foot layer of compacted soil and must exhibit a hydraulic conductivity of no more than 1×10^{-7} cm/sec. EPA believes that the combination of an FML and a compacted soil layer ensures adequate protection by providing both a highly impermeable upper liner to maximize leachate collection and removal, and a lower soil layer to serve as a back-up in the event of FML failure (56 FR 51060; October 9, 1991). The leachate collection system must be designed and constructed to maintain less than a 30-cm depth of leachate over the liner (Section 258.40(a)(2)). Studies have shown that such liner/leachate collection systems capture over 99.7% of the leachate generated providing over 300 times the protection of an unlined "open dump". Thus, contaminants are not likely to leave the landfill containment.

MSWLFs require groundwater monitoring and corrective action. Similar to the regulations for hazardous waste treatment, storage, and disposal facilities (TSDFs) in Subpart F of Part 264, MSWLF groundwater monitoring and corrective action requirements consist of three sequential phases. Detection monitoring, minimally required for all units, is designed to measure concentrations of certain indicator parameters. Statistically significant increases (SSI) in these indicators trigger groundwater assessment monitoring for hazardous constituents. Finally, a corrective action program is required if remediation of contaminated groundwater is necessary. Thus, in the unlikely event that contaminants did migrate away from the landfill, procedures are in place to assure that it does not pose a risk.

Closure standards require owners/operators to install a final landfill cover system that is designed to minimize soil erosion and infiltration of liquids through the cover. The cover's infiltration layer, consisting of at least 18 inches of earthen material, must be at least as impermeable as any bottom liner system or natural sub-soils, but in no case may the permeability be greater than 1×10^{-5} cm/sec. The erosion layer must be a minimum of six inches of earthen material that can sustain native plant growth. Thus, the long term potential for materials migrating for the landfill has been nearly eliminated.

For the above reasons, we are certain that when accurately modeled, this method of disposal will be found safe for CSO sediments and a very sound basis for a conditional listing that excludes waste disposed in this way. We ask that the Agency consider the state of Subtitle D technology and standards in its modeling.

Exempting other Listed Wastes

Given that the Subtitle D safety net has been substantially improved, it would be appropriate to consider conditionally exempting other refinery listed wastes (F037-38, K048-52) that are disposed in a modern MSWLF and that are not ignitable, corrosive, or reactive (ICR). The toxicity characteristic was derived assuming an open dump scenario among many other conservative assumptions. Given the protections of a modern MSWLF, wastes that do not exhibit an acute hazard can be safely handled and disposed in a MSWLF, saving industry and the nation significantly while still adequately protecting human health and the environment. The availability of these landfills should be a fundamental consideration in any further evaluation of Subtitle C requirements. Clearly, the lack of an adequate subtitle D program in the past has been the driver for a stringent hazardous waste program. That has now changed.

Considering this change is most relevant to wastes which are defined as hazardous due to an assumed long-term exposure (chronic) such as drinking contaminated water over a lifetime. Placement in a modern MSWLF reduces the intensity of these possible exposure by orders of magnitude.

The Agency should recognize the opportunity that the improved subtitle D program offers. There is the opportunity to improve the quality of industry's disposal while decreasing the economic and administrative burden of managing hazardous and industrial wastes.

Response: As noted previously in this section, EPA will not be promulgating a conditional exemption to the CSO sediment. Therefore, the Agency believes that the commenter's suggestions for conditional listings based on disposal in a municipal solid waste landfill are moot. However, the Agency notes that the regulations cited by the commenter for municipal landfills do not apply uniformly to all such landfills. Existing units are not required to meet the full design requirements, and other type of facilities (e.g., small landfills or units in rural areas) may not have to comply with all standards. Furthermore, many of the off-site landfills receiving the wastes under study were reported in the §3007 Questionnaire to be industrial Subtitle D landfills, and thus, would not be

subject to the regulations cited by the commenter (see *Additional Listing Support Analysis*, 1998 in the docket, for a summary of the data from the Questionnaire for off-site landfills).

IV.B. Individual versus Population Risk

Comment 1: Population Risk Estimates for Landfilled Residuals are Overstated

In addition to the fact that EPA's existing population risks for the residuals in question are already low, they are likely to be further overstated due to overestimates of the population size exposed to contaminated ground water. To estimate the total population exposed to contaminated ground water near a landfill receiving refinery residuals, EPA first calculated the total population living within one mile of every landfill receiving refinery residuals. This value was then multiplied by the proportion of the one mile radius occupied by the plume and then divided by the average fraction of the population served by domestic wells (EPA, 1995c).

In making these calculations, EPA attempted to use assumptions describing transport and exposure that reflect "typical" conditions at a Subtitle D landfill and not a "worst case" situation. (EPA, 1995c) However, the analysis performed still explicitly or implicitly makes a number of assumptions about landfills that are not likely to be true at all or even most facilities. In many instances, these assumptions apparently result from simplified factors used by EPA in its fate and transport or exposure models. EPA has failed to recognize that models used to estimate hypothetical individual exposures are not necessarily applicable to estimates of the population exposures across multiple facilities. Models of population exposure must take into consideration factors that could be ignored in hypothetical individual exposure assessments. Examples of such factors include, the likelihood of a drinking water well intercepting a contaminated ground water plume and the presence of partial leachate controls at a landfill. In other instances, the Agency simply has not taken advantage of the available data (e.g., well location) in its risk assessments.

In any event, these assumptions bias the estimates of exposure for some or all of the modeled facilities. Because the population exposures are a sum of the exposures at all facilities, the presence of these biases at one or more facilities results in bias in the final estimate of population exposures. The key, but erroneous, assumptions made by the Agency are described below. (API, 00009, pg 7)

Response: EPA agrees with the commenter that such factors could affect the population risk estimates. However, there are other factors which may lead us to underestimate risk, such as the possibility of karst terrain or contaminated subsurface which could result in more rapid flow of groundwater or constituents than our models predict. EPA does recognize that, on balance, the population risks presented likely overestimate risk, since one of the objectives of the analysis was to provide an estimate of the greatest number of people which could be affected. Since these estimates came out so low and, as has historically been the case in hazardous waste listing determinations, the Agency based its decision to propose to list the wastes affected by this

determination primarily on the significant individual risk estimates and other factors, the Agency did not consider it necessary to further refine the population risk estimates .

Comment 2: 1. EPA Assumes that Residential Properties Are Directly Adjacent to the Landfill

EPA's description of the ground water model does not clearly identify the location of the plume in relation to the landfill and other residences. Specifically, it is not clear whether the distance used to establish the concentric rings that define the 400 m bands begins at the center of the landfill or at the downgradient edge of the landfill. The landfills receiving the residuals are reported to range in size from 30,000 to 162,000 m². (SAIC, 1995) If the distance used in setting the bands is defined as beginning at the center of a landfill, then a substantial portion of the first band (0 - 400 m) will be filled with the landfill itself and would not be available for residential properties. If the distance is defined as beginning at the center of the downgradient side of landfill, then a substantial portion of the area in the first band is still directly adjacent to the landfill. Contrary to EPA's modeling assumptions, landfills typically have some buffer area around them which limits residential development; landfills are not desirable land uses and tend to discourage residential development. Data on well distance collected by EPA in the RCRA 3007 survey for this rulemaking clearly indicates that wells are not located in areas directly adjacent to on-site landfills (Vierow, 1995). Instead, the nearest well location was more than 300 meters from the landfill and the median distance was greater than 1,700 meters. (Vierow, 1995) (API, 00009)

Response: With respect to a couple of the specific issues raised, the nearest well location for the deterministic analysis was 102 meters from the edge of the landfill. Also, as was discussed in the 1997 Notice of Data Availability, EPA chose not to use the information on distances to wells provided in the RCRA 3007 questionnaires because only a limited number of facilities provided this information, and the Agency had no way to evaluate whether those facilities could be considered representative of all facilities (see Section I.A.6.a, comment 1, of this document for more discussion on well distance).

In the population risk calculation presented in the 1995 Background Document for the Groundwater Pathway Analysis, the concentric rings begin at the down-gradient edge of the landfill. In the absence of detailed population data and to provide a conservative risk assessment, it was assumed in the analysis that the population was uniformly distributed from the edge of the landfill to the one-mile radius.

Comment 3: 2. EPA Assumes that the Aquifer Receiving Leachate from the Landfill Is Potable and Provides Adequate Supply for Domestic Purposes

EPA's assessment of landfills assumes that drinking water wells will exist in an aquifer contaminated by landfill leachate. (EPA, 1995c) However, in many instances ground water is not suitable for drinking due to saltwater intrusion, naturally occurring minerals, or because the aquifer is not sufficiently productive. In other cases, ground water may be drawn from an aquifer deeper than the aquifer receiving landfill leachate. As a result, a ground water well situated within the

plume would not be affected by landfill contamination. EPA's estimates of the fraction of homes affected by ground water contamination from a landfill are, therefore, likely to be overestimates. (API, 00009)

Response: EPA agrees with the commenter that such factors could affect the population risk estimates. However, there are other factors which may lead us to underestimate risk, such as the possibility of karst terrain or contaminated subsurface which could result in more rapid flow of groundwater or constituents than our models predict. EPA does recognize that, on balance, the population risks presented likely overestimate risk, since one of the objectives of the analysis was to provide an estimate of the greatest number of people which could be affected. Since these estimates came out so low and, as has historically been the case in hazardous waste listing determinations, the Agency based its decision to propose to list the wastes affected by this determination primarily on the significant individual risk estimates and other factors, the Agency did not consider it necessary to further refine the population risk estimates.

The Agency agrees with the commenter that in some instances groundwater is not suitable for drinking due to saltwater intrusion, naturally occurring minerals, or because the aquifer is not sufficiently productive. However, as part of a conservative risk assessment, it is assumed that all aquifers in the vicinity of the landfill could potentially be used for water supply in the present or future, whether or not they are currently in use as a potable water supply.

Comment 4: 3. EPA Assumes that Leachate from the Landfill Reaches Ground Water

The population exposure assessments assume that all landfills do not have a liner, clay cap, or leachate collection system. (EPA, 1995c) While these assumptions may not be unreasonable for boundary or high-end analyses of hypothetical individual exposure, it is erroneous to apply these assumptions to all facilities.

Response: See EPA's response to comment 1, above, for discussion concerning how EPA evaluated factors overestimating and underestimating population risk.

The Agency performed groundwater modeling analyses considering landfills without engineered hydraulic barriers such as liners, caps, or leachate collection facilities. Furthermore, there are no Federal regulations mandating such containment systems in industrial landfills, and the requirements for municipal landfills may not apply to all such units (see response to related comment 15 in Section IV.A). Finally, the Agency believes that the engineered structures cited by the commenter may deteriorate over time and may not provide the level of containment assumed by the commenter.

Comment 5: 4. EPA Assumes that there Are No Surface Water Bodies Between the Landfill and Domestic Wells

In the absence of detailed data on landfills receiving refinery residuals, EPA substituted data from the OSW database of industrial Subtitle D landfills. However, due to the lack of site-specificity in that database, EPA assumed that the plume travels for one mile in a relatively homogeneous aquifer. (EPA, 1995c) In reality, plumes are often affected by changes in hydrogeology that limit their extent. For example, if a landfill was located 500 m from a stream that received ground water, the plume would be limited to the area between the unit and the stream. Wells beyond the stream may have little or no contamination. As a result, the area of a plume and the associated population may be much smaller than the assessment suggests for some of the facilities.

As a result of these assumptions, EPA's analysis of the population risks and number of individuals exposed to levels of contamination above the HBN are likely to be grossly overestimated. EPA's assumption that all landfills will have residential properties directly adjacent to the landfill is likely to result in a large overestimate in the size of the exposed population. (API, 00009)

Response: See EPA's response to comment 1, above, for discussion concerning how EPA evaluated factors overestimating and underestimating population risk.

The interaction of surface water bodies and groundwater is usually site-specific and complex. In order to simplify the analysis and perform a conservative risk assessment the presence of surface water bodies between landfills and drinking water wells was not considered in the groundwater risk analysis. However, while the presence of surface water bodies may affect plume configuration, their role is expected to be minimal because of the bottom layer of surface water bodies often has low permeability which limits flow between surface water bodies and the aquifer. If gaining streams are located between the landfills and domestic wells, risks are simply diverted to the surface water pathway (and other pathways). For the case of recharging streams, similarly located, the flux from the surface water bodies may force the plume to greater depths, but may not necessarily dilute the plume. The consideration of surface water bodies may not reduce the impact of contamination down-gradient from the surface water body and is unnecessarily complex. Therefore, the presence of surface water bodies was not included in the risk analysis.

Comment 6: Population Exposed Does Not Justify a Public Policy Decision to Regulate Hydrotreating and Hydrorefining and Clarified Slurry Oil Sediment as Hazardous Wastes.

The risk to the population living near landfills containing hydrotreating catalysts is 0.00003 cancer cases per year. This corresponds to a cancer incidence rate of 0.3 cases of cancer in 10,000 years.

The risk to the population living near landfills containing hydrorefining catalysts is 0.00002 cancer cases per year. This corresponds to a cancer incidence rate of 0.2 cases of cancer in 10,000 years.

The risk to the home gardeners at off-site and on-site units containing clarified slurry oil sediment are 0.0003 and 0.00005 cancer cases per year, respectively. The risk to adult residents at off-site and on-site units containing clarified slurry oil sediment are 0.0001 and 0.0004 cancer cases per

year, respectively. The highest value represented by these annual incidence rates corresponds to 4 cancer cases in 10,000 years. In addition, NPRA believes that the risk determination for the home gardener which is discussed below is flawed. (NPRA, 00004, pg 1)

Response: In response, EPA notes that "population risk" is not explicitly used in either the RCRA statute or the hazardous waste listing regulations in 40 CFR 261.11. EPA does not believe it is appropriate to allow contamination from waste management units to cause substantial risk to nearby residents simply because it is a sparsely populated area. The Agency's decision to list these wastes is based primarily on the concern over risks to those individuals who are significantly exposed, even if there are relatively few of them. Population risk is only one of many factors to be considered in Agency decisions, and there are numerous precedents where the Agency has taken action, for example at Superfund sites and in previous listing determinations, when there are relatively few people potentially affected. See, for example, the report entitled *Land and Soil Health Risks from CERCLA (Federal Superfund), and WQARF (State Superfund) Sites*, Arizona Department of Environmental Quality, 1995, in the docket for today's rule, which concluded that population risks were low because the number of people exposed to groundwater contamination is small. For waste management situations, population groundwater risks are often expected to be low, since often only a limited number of domestic wells will be near these facilities, and groundwater moves very slowly. EPA's *Guidance for Risk Characterization* (USEPA Science Policy Council, February, 1995) states that, when small populations are exposed, population risk estimates may be very small, however, "in such situations, individual risk estimates will usually be a more meaningful parameter for decision-makers." Finally, it is important to note that the Agency is also concerned about the loss of the groundwater resource for the future, which could be of particular concern if land use patterns were to change and there were a future demand for the resource. In this case, beneficial uses would be precluded or, if the potential users were unaware of the contamination, risks could occur.

Comment 7: The Results of EPA's Own Conservative Risk Assessment Support Decisions Not to List Clarified Slurry Oil Sediment and Spent Hydrotreating and Hydrotreating Catalysts

Under the listing criteria in 40 CFR § 261.11, which are binding upon EPA in this proceeding, EPA may list a waste as hazardous only if EPA concludes that the waste "is capable of posing a *substantial* present or potential hazard to human health or the environment." 40 CFR § 261.11(a)(3) (emphasis added). See *Dithiocarbamate Task Force v. EPA*, 98 F.3d 1394, 1400 (D.C. Cir. 1996).

EPA has based its proposal to list CSO sediment, spent hydrotreating catalyst, and spent hydrotreating catalyst exclusively on risks or hazards to human health. As demonstrated below however, the data in the record establish that the actual risks to human health posed by these residuals are near zero; as a result, EPA cannot rationally conclude that any of these residuals poses a "substantial" hazard to human health, and may not list any of these residuals as hazardous wastes.

Throughout the preamble to the proposed rule, the NODA, and various background documents, EPA's discussion of risk tends to focus on so-called "individual risk." In calculating individual risk, EPA calculates the chance that a theoretical individual exposed under worst-case conditions will become ill (e.g., develop cancer) as a result of the management of the waste. Because EPA projects that a theoretical individual exposed under worst-case conditions has something greater than a one-in-one million chance of developing cancer as a result of the three residuals under consideration, EPA proposes to list them as hazardous wastes (although apparently EPA has not made an express finding that such theoretical risks constitute "substantial hazards"). However, as discussed below, EPA's estimates of potential individual risk from these residuals are overstated and, when properly considered (especially in light of Monte Carlo analyses) do not warrant listing under EPA's own criteria.

Moreover, although receiving much less attention than individual risk, EPA's projections of so-called "population risk" are even more relevant in determining not to list these residuals. In projecting population risk, EPA considers how many persons are actually subject to elevated risk of illness or are truly expected to become ill. These estimates clearly are more useful in determining whether there is a *substantial* hazard to human health than are projections about what could happen to a theoretical individual.

As discussed in detail below, the *highest* expected annual cancer incidence that EPA projects using population risk analysis for any of the three residuals proposed to be listed is 0.0004 or four cases in 10,000 years (associated with CSO sediment). Moreover, as discussed below, even these incredibly low projections are likely to be overstated.

EPA's failure up to this point to give any serious consideration to the low levels of population risk is at odds with the statute, the listing criteria, and as discussed below, substantial regulatory precedent within the federal government, including EPA. Serious consideration of the population risks in this proceeding would lead to the conclusion that the three residuals do not pose substantial hazards to human health, and should not be listed as hazardous wastes. (API, 00009)

Response: See Response to Comment 6 above.

Comment 8: Proper Consideration of Population Risks Also Supports Decisions Not To List Clarified Slurry Oil Sediment and Spent Hydrorefining and Hydrotreating Catalysts as Hazardous Wastes

EPA's proposal to list clarified slurry oil sediment and spent hydrotreating/hydrorefining catalysts did not consider the extremely low population risks calculated for these residuals. As reported by EPA, the maximum annual cancer incidence for any of these residuals (i.e., clarified slurry oil sediment) is 0.0004 or 4 cases in 10,000 years. (EPA, 1995a) If EPA considers these risks properly it should decide not to list these residuals. Indeed, there is ample precedent provided by other regulatory evaluations for EPA to rely on population risk estimates in this rulemaking. (Travis et al., 1987)

In an analysis of 132 federal regulatory decisions, Travis et al. reported that for small population effects, regulatory action was never taken for individual risk levels below 1×10^{-4} . The primary reason cited for not regulating chemicals below this risk level is insignificant population risk. Among the decisions reviewed by Travis et al. was a decision not to regulate natural radionuclide emissions from elemental phosphorus plants as a hazardous air pollutant under the Clean Air Act (CAA). Although individual risks ranged up to 1×10^{-3} , EPA declined to regulate, stating that "the risks must be weighed against both the low aggregate risk (0.06 cancer deaths per year) and other factors such as cost." (Travis et al., 1987) Similarly, in the decision not to regulate vinylidene chloride as a toxic air pollutant under the CAA, EPA states that, based on a cancer risk of 8.3×10^{-4} and an aggregate (i.e., population) risk of 0.07 cases per year, "the magnitude of the public health cancer risk is low" (50 FR 32633, August 13, 1995). Likewise, in the case of small populations exposed to formaldehyde, EPA determined (under the Toxic Substances Control Act) that individual risks ranging from 1 in 1,000 to 1 in 10 million did not present a significant risk of serious harm and that over the lifetime of the population there was very little risk (49 FR 21891, May 23, 1984). These cases illustrate that, in other regulatory contexts, at population risks greater than those reported in the proposed petroleum refining listing, EPA decided that further regulation was unwarranted.

EPA's Discussion of Population Risks in the Proposed Rule Is Incomplete and Does Not Reveal that Such Risks Are Exceedingly Low

EPA guidance provides two alternatives for the presentation of population risks for carcinogens and noncarcinogens (EPA, 1992; 1995b). The first approach, which is appropriate for carcinogenic compounds where risk varies linearly with dose (including benzene and arsenic), results in a projection of the number of cases (of effect) that can be expected. The second approach, used for compounds whose risk does not vary linearly with dose (including most noncarcinogenic compounds and a select few carcinogens), predicts the number of people (or fraction of the population) exposed to a dose above a certain risk value of interest. In the Federal Register notice for the proposed rule, EPA elected not to use the first approach to present population risks for the three refinery residuals proposed for listing and used neither approach for the land treatment of CSO sediment. In so doing, EPA's representation of population risks is incomplete and therefore, misleading. Nonetheless, using EPA's own suggested approaches for calculating population risks, the population risks are exceedingly low (as described in more detail below).

Spent Hydrotreating Catalyst

In the proposed rule (60 FR 57747), EPA reported that for off-site landfills receiving spent hydrotreating catalyst, 300 people are expected to be exposed to benzene levels above the health-based number (HBN) (at 1×10^{-6} risk) and that 12 people are expected to be exposed to arsenic at levels above the HBN. This exposure would lead to only 0.00003 cancer cases per year for the population near landfills receiving hydrotreating catalyst (EPA, 1995c). This cancer incidence rate corresponds to 0.3 cases of cancer in 10,000 years. Cancer incidence rates for on-site landfills are

vastly smaller, because the total population living within one mile of all on-site refinery landfills receiving hydrotreating catalyst is reported to be one person (EPA, 1995c).

Spent Hydrorefining Catalyst

In the proposed rule (60 FR 57747), EPA reports that for off-site landfills receiving spent hydrorefining catalyst, three people are expected to be exposed to benzene levels above the HBN (at 1×10^{-6} risk) and that 25 people are expected to be exposed to arsenic at levels above the HBN. Again, this corresponds to only 0.00002 cancer cases per year for the population near landfills receiving hydrotreating catalyst or 0.2 cases of cancer in 10,000 years. Cancer incidence rates for on-site landfills are vastly smaller, because, like hydrotreating catalyst, the total population living within one mile of all on-site refinery landfills receiving hydrorefining catalyst is reported to be only one person (EPA, 1995c, p. 39).

Clarified Slurry Oil Tank Sediment

In contrast to spent catalysts, EPA reports population risks for exposure to CSO sediment as follows: "For the same scenario (off-site land treatment), the central tendency risks for CSO sediment/solids were 3×10^{-9} for up to 90 home gardeners and 6×10^{-6} for up to 235 adult residents. . . For on-site land treatment of CSO sediment/solids, central tendency risks from PAHs were 7×10^{-7} for up to 76 home gardeners and 2×10^{-6} for up to 200 adult residents" (60 FR 57789). This results in annual cancer incidence rates of 0.0003 and 0.00005 for home gardeners at off-site and on-site units, respectively, and cancer incidence rates of 0.0001 and 0.0004 for adult residents at off-site and on-site units, respectively. Thus, the highest value represented by these annual incidence rates corresponds to four cancer cases in 10,000 years.

As described above, EPA's existing estimates of population risks for spent hydrotreating/hydrorefining catalysts and CSO sediment approach zero. In comparison to other regulatory decisions (see Travis et al., 1987), the population risks from these residuals are well below the levels that EPA has considered negligible in past regulatory actions. Moreover, even these low risks are overestimates. According to EPA's own population risk guidance, "most cancer potency values (used to calculate the annual rates) represent plausible upper bounds on risk. When such a value is used to estimate numbers of cancer cases, it is important to understand that the result is also an upper bound" (EPA, 1995b, p. 17). Furthermore, as discussed below, EPA has overestimated both exposure and population sizes for landfilled and landtreated residuals, resulting in further overstatements of the population risks. (API, 00009)

Response: As previously discussed (see response to comment 6 above), for listing determinations, the Agency has used primarily the individual risk estimates as the basis for its decisions. To the extent the Agency has evaluated population risks, they have always been low due to the limited potential impact of contaminated groundwater. However, the Agency again emphasizes its concern over the loss of the groundwater resource. In addition, the economic impacts of this regulation are very minimal.

There are any number of ways to present population risk, and the Agency does not believe that its presentation is misleading, particularly since the Agency and the commenter have both reached the same conclusion, namely that population risks are low.

IV.C. Waste Management Practices Assessed

Comment 1: In its comments on the 1995 proposal, EDF identified a large number of waste management practices documented by EPA that were not evaluated by the Agency in its risk assessments. These unevaluated practices include surface impoundment management,⁹⁴ use of wastes as landfill cover, use of wastes as onsite road material, and the storage of off-spec products and fines on piles prior to reuse onsite or shipment offsite. These deficiencies remain insofar as the NODA materials do not include evaluations of these practices.

However, the NODA materials do contain information that are relevant to these scenarios, and therefore warrant comment on the issue of whether risk evaluations of these scenarios are still necessary and appropriate.

Response: Modeling of surface impoundments is discussed further below in Comment 2. Use of wastes as onsite road material is discussed in response to Comments 1a through 1d. Storage of off-spec product and fines on piles is discussed in Comment 3 below, as well as in Section II.B.1.

EPA notes that the waste management method of use as landfill cover was only reported by one refinery in 1992. EPA determined that one facility managed its crude oil tank sludge as "cover for onsite landfill" in 1992⁹⁵. In this particular case, the waste was mixed with soil, weathered, and then used as cover. EPA also found that the landfill no longer accepts wastes. The fact that only one facility was found to conduct this activity, and has since discontinued the practice, does not lend credence to the commenter's opinion that such practices could become more widespread in the future. It is reasonable to expect that they would be rarely conducted by facilities based on the 1992 data.

Comment 1a: For example, EPA has claimed its modeling of land treatment units would account for the risks posed by roadspreading or other uses constituting disposal.⁹⁶ However, in the NODA,

⁹⁴ EPA evaluated only one waste for surface impoundment management (FCC fines).

⁹⁵ 1992 RCRA 3007 Survey for Sinclair Oil, Sinclair, WY, Facility 182.

⁹⁶ See e.g., 60 FR 57766 (November 20, 1995). EPA also claims roadspreading risk evaluation is unnecessary because "of the small number of facilities using this practice". *Id.* However, as discussed below, landspreading (including roadspreading) is a substantial industry practice. Moreover, EPA has modeled practices not reported in 1992, as discussed below, let alone practices reported by a relatively small number of refineries. In any event, the issue is whether the management practice is "plausible", a determination not wholly dependent upon the number of facilities employing that practice in a given year.

only six onsite land treatment units were evaluated for individual wastes, and only one unit was evaluated for the onsite codisposal scenario, therefore site-specific modeling inputs are unlikely to be representative of all roadspreading or landspreading locations.⁹⁷

Response: EPA disagrees with the commenter that the use as road material scenario was not adequately considered. First, EPA reiterates that only two refineries managed CSO sediment as road bed material in 1992: one managing 97 metric tons and the other managing 314 metric tons.⁹⁸ These data demonstrate that this is a rare management practice (i.e., 1 percent of the U.S. refineries used CSO sediment for road bed in 1992). EPA also notes that CSO tank sediment will be listed and any use as road material will be prohibited (unless the material is treated to meet land disposal restriction standards and other requirements as specified in §266.20).

Second, EPA contacted these two facilities, plus two others who reported this management practice in other years to better understand this management practice. Based on these contacts, two of the four facilities no longer manage this residual as roadbase material. One facility, which reported a total generation of 3 MT of residual, *may* mix a small percentage of the de-oiled residual with dirt to be used onsite for road repair. The fourth facility plans to manage approximately 97 metric tons per year of oily residual by transferring it to an off-site facility that will use it in the production of roadbase material.

In presenting its results of the high end risk assessment in the preamble for the management of CSO sediment in a land treatment unit (60 FR 57765), EPA did not assume that any runoff controls were present⁹⁹ which is comparable to what would have been assumed if a road bed scenario had been modeled. The significantly lower volumes reported for road bed management would accordingly have lower risk when compared with land treatment models. Furthermore, CSO sediment is mixed with other materials such as dirt, gravel, and/or asphalt, which may result in even lower risks through adherence of CSO sediment to these materials retarding the rate of release. Refineries did not report any other of the residuals evaluated for listing as being managed as road material.

Thirdly, EPA disagrees that the number of land treatment units modeled is insufficient to reflect a broad range of conditions. With respect to land spreading, EPA's review of the existing land treatment units, as characterized in the 1992 PRDB, indicates that the majority of these units are in fact permitted and thus not appropriately considered in EPA's modeling input. Areas for each of the six modeled units ranged in size over three orders of magnitude, from 0.6 to 15.8 acres. The

⁹⁷ See NODA Background Document, Chapter 7; NODA LTU Risk Assessment, p. 25.

⁹⁸ 1992 RCRA §3007 Survey.

⁹⁹ See also 60 FR 57763, "one of the major assumptions in the Agency's run-off model for releases from land treatment units (LTUs) is that the unit does not have controls for run-on and run-off waters from precipitation." This statement refers to the high end modeling assumptions for land treatment.

six units were drawn from the larger set of approximately 28 onsite land treatment units (hazardous and nonhazardous) managing any of these six wastes.¹⁰⁰ EPA believes that its modeling input are fully reflective of land treatment conditions in the industry.

In summary, EPA continues to assert that the modeled land treatment conditions are adequate surrogates for road spreading because:

- the land treated volumes greatly exceed the reported road spread volumes
- the land treatment areas are likely to be much greater than the areas subjected to road spreading and are likely to result in much higher modeled receptor point concentrations¹⁰¹
- road spreading generally requires mixing with other materials (e.g., gravel, asphalt), diluting the concentration of the toxicants of concern and reducing risk
- road spreading is generally conducted in a manner to create a stable road base that will not wash away due to precipitation or erode away due to road traffic, unlike land treatment units which are operated to allow for precipitation and oxygen infiltration to maximize biodegradation¹⁰²
- material used as base is less likely to be released in nongroundwater pathways than material managed by land treatment because it is covered by additional fill, aggregate, or pavement.
- EPA used six of six non-hazardous waste LTUs identified by the petroleum refining industry in the 1992 survey as model inputs. This represents 100 percent of the possible conditions, as well as a wide range of model input values, as discussed above.

Comment 1b: In addition, only risks from PAHs were covered by the NODA LTU Risk Assessment codisposal scenarios, while risks from other contaminants may be significant if

¹⁰⁰While the 1992 survey was not designed to collect information on ALL land treatment units, EPA is confident that the modeling input reflects all non-hazardous waste management units that accepted any of the modeled residuals.

¹⁰¹For example, the commenter referenced one residual of 97 MT of CSO sediment being road spread. This residual would likely be managed over an area much less than 1 acre which is less than the size of the area used in modeling nongroundwater pathways (i.e., see NODA nongroundwater document). This estimate is based on a specific gravity of 1.4 (from 1995 Listing Background Document) and a thickness of 6 to 12 inches. The area required (assuming no mixing with other materials) would be 0.06 to 0.11 acres. Even assuming that the CSO sludge is mixed with other soil or aggregate at a ratio of 10 percent waste to 90 percent soil, the area would still be approximately one-half acre to one acre.

¹⁰²Michael H. Huesemann. Guidelines for Land-Treating Petroleum Hydrocarbon-Contaminated Soils. Journal of Soil Contamination, 3(3): (1994).

roadspreading was evaluated, particularly if the roadspreading is conducted close to surface water bodies and ecologic effects are considered.

Response: The initial screening risk assessment analyses considered the full range of contaminants for which health effects data existed. If risk was not indicated using the worst case screening parameters for a given contaminant, further consideration during the two-high end deterministic risk assessment was not warranted. Ecological effects from waste management practices, including land treatment, are presented in the 1995 Nongroundwater Background Document. EPA believes that the conclusions and uncertainties regarding ecological risk from land treatment can be applied to ecological risk from road use for the same reasons, listed in response to Comment 1.a, that EPA believes makes the land treatment scenario representative of the road use scenario. The surface water runoff scenario was evaluated as part of the subsistence fisher scenario. Therefore, EPA has no indication that other constituents would be of concern, nor did the commenter identify any such contaminants.

Comment 1c: Moreover, EPA justifies not summing the risks posed by both LTU and landfilling at the same onsite facilities because in the vast majority of instances the LTUs are hazardous waste units with runoff controls.¹⁰³ Since roadspreading may also co-occur with landfills at the same of different locations, and would not involve hazardous waste units with runoff controls, the Agency's rationale for not summing risks is irrelevant in the case of roadspreading or other uses constituting disposal.

Response: EPA asserts that the many reasons listed above point toward the risk from land spreading being significantly less than the risk from land treatment. EPA could not identify any facilities where landfilling and roadspreading occurred for the same residuals and, therefore, has no obligation to model such a scenario. Risk assessment results demonstrated that the risk from landfilling was also significantly less than the risk from land treatment, and in fact the indirect pathways associated with landfilling were not evaluated beyond the initial screening analyses because it was assumed that landfills would be covered and sludges would not generate dust during waste hauling activity. See, for example, Section 2.2.1 and Section 6.4 of the 1995 "Assessment of Risks from the Management of Petroleum Refining Wastes." EPA concluded that without these release pathways nongroundwater risks from landfills would be negligible. Therefore, any nongroundwater risks from landfills and road beds in close proximity would result from road beds alone.

EPA notes that it has no information regarding the location of roadspreading operations and knows of no reason why the probability of such operations being adjacent to landfills without runoff controls would be greater than the probability of non-hazardous waste land treatment units and landfills without runoff controls being co-located. Given the infrequency with which roadspreading was reported, such probabilities are expected to be very small.

¹⁰³ NODA Background Document, Chapter 3.

Comment 1d: Finally, the waste volumes evaluated both for the individual waste and codisposal scenarios are not indicative of the volumes of wastes that may be used for roadspreading or other landspreading activities, as discussed immediately below.¹⁰⁴

In API's annual reports on residuals, land treatment and landspreading activities are reported separately, the latter activity included with other disposal practices. Accordingly, landspreading can be considered as inclusive of roadspreading and other uses constituting disposal. For 1993, API reports 170,439 tons of refinery wastes were landspread that year, including 4,882 tons of "nonleaded tank bottoms".¹⁰⁵ In all, landspreading was employed for 10 different waste categories in 1993, indicating widespread application in the industry.¹⁰⁶ Further, the amount of waste landspread in 1993 increased by over five-fold when compared to 1992, the year on which EPA's management data is based.¹⁰⁷ Clearly, landspreading is an important waste management practice in the refinery industry that EPA has inappropriately ignored in this rulemaking to date. The landspreading or roadspreading of oily residuals covered in this rulemaking is both an actual and plausible mismanagement practice, and EPA's 1992 volumes are not representative of actual and potential industry practices. (EDF, 00006, pg 60)

Response: EDF misinterpreted API's data regarding management of residuals by means of road spreading. The "landspreading" category used in the API report cited by EDF includes *all* landspreading activities, only one of which is road spreading. The use of landspread quantities is therefore not necessarily indicative of quantities road spread. EDF also stated that the quantities landspread could increase dramatically from the 1992 data used by EPA. The increase between 1992 and 1993 landspread quantity data was due almost exclusively to an increase in biomass and contaminated soils/solids,¹⁰⁸ residuals which are not even under consideration for this listing determination. While there was a small increase in nonleaded tank bottoms landspread from 1992 to 1993, only one facility reported managing nonleaded tank bottoms via landspreading.¹⁰⁹

¹⁰⁴ For example, EPA's unleaded gasoline tank sludge LTU modeling is based upon an annual median volume of only 2 tons, and a high-end value of 57 tons; and the analogous volumes for crude oil tank sludge are only 29 and 181 tons respectively. See NODA LTU Risk Assessment, Table 2.1. Similarly, the only onsite codisposal scenario evaluated involved 50 tons of sulfur complex sludge, 65 tons of crude oil tank sludge, and 34 tons of off-spec products and fines. See NODA LTU Risk Assessment, Table 7.1.

¹⁰⁵ API 1992-1993 Residuals Report at B-38.

¹⁰⁶ Six different refineries reported using four different refinery wastes covered in this rulemaking (and the associated study) as onsite road material in response to EPA's RCRA Section 3007 survey.

¹⁰⁷ *Id.* at 35. For comparison purposes, landspreading of only 20 tons of unleaded storage tank sludge was reported for 1992. *Id.* at B-18.

¹⁰⁸ API. *Generation and Management of Residual Materials: 1992-1993*. February, 1995. pp. B-18, B-38.

¹⁰⁹ *Id.* pp. B-19, B-39

Comment 2: Finally, regarding the lack of surface impoundment modeling, it is instructive that EPA modeled the onsite land treatment of sulfuric acid alkylation sludge in a nonhazardous waste unit even though no refinery reported using that practice in EPA's 1992 database. EPA determined "any facility that reported the presence of an operational sulfuric acid alkylation unit and the presence of an onsite land treatment unit that could be used for disposal of this waste were considered appropriate for disposal of this waste."¹¹⁰

Unfortunately, EPA fails to carry through on that approach with respect to surface impoundment management, notwithstanding the availability of surface impoundments at many refineries. In 1993, API reports "disposal" surface impoundments were used for the management of 42,553 tons of refinery wastes. Nine different categories of wastes were managed in surface impoundments that year, including "nonleaded tank bottoms" and "residual oils/spent solvents."¹¹¹ In 1994, API reported 31 refineries had nonhazardous waste impoundments ranging in size from 1-350 acres.¹¹² Therefore, surface impoundment disposal is both an actual and potential plausible mismanagement scenario at petroleum refineries.¹¹³

The Agency's continuing failure to model the surface impoundment management of HF alkylation sludge is particularly inappropriate given the waste is sometimes generated in "pits", samples were collected from these "pits", and the practice was reported for 1992.¹¹⁴ While the NODA materials provide no explanation for this failure, EPA staff indicated orally that they believe surface impoundment modeling is not necessary because the "pits" are concrete-lined, and therefore may meet the regulatory definition of tank.

However, this rationale is too cute by half, since the fact that the waste is managed in a pit means surface impoundment management is certainly plausible and reasonable to project as a potential mismanagement scenario.¹¹⁵ Moreover, the Agency itself has recognized for years that its ambiguous definition of "tank" causes unintended consequences, including allowing surface

¹¹⁰ NODA LTU Risk Assessment at 3.

¹¹¹ API 1992-1993 Residual Report, p. B-38.

¹¹² API 1994 Residual Report, p. 8.

¹¹³ In previous listing determinations, EPA has argued surface impoundment modeling was not necessary where relevant facilities had no surface impoundments and EPA was unwilling to project the construction of new units. In the instant rulemaking, many refineries currently have both active and inactive nonhazardous waste impoundments that may be employed for this purpose, therefore whether or not it is appropriate for EPA to project the construction of new units is not at issue for refinery wastes.

¹¹⁴ 1995 Listing Background Document at 128-129, 135.

¹¹⁵ Indeed, EPA defines surface impoundment as a pit, pond or lagoon. See 40 CFR 260.10.

impoundments to masquerade as inground tanks.¹¹⁶ Therefore, even if the pits could legally qualify as tanks now, EPA should not compound the shortcomings in its rules by projecting the weakness forever into the future, or failing to consider the potential for management in pits that could not or should not satisfy the regulatory definition of tank. The issue in this context is not whether the particular pits used in 1992 could meet the admittedly flawed EPA definition of tank, but rather given the practice of using pit-like units for HF alkylation sludge and the ready availability of surface impoundments for this purpose, it is plausible that surface impoundments could be used to manage this waste sometime in the future. (EDF, 00006, pg 65)

Response: See response to comment 1 in Section IV.H.2 of the proposed rule response to comment document for a full discussion of why EPA does not believe modeling impoundments for HF alkylation sludge is warranted.

EPA continues to maintain that its 1992 data is representative of disposal practices and that to incorporate increased reliance of surface impoundments is not plausible, particularly in light of EPA's knowledge that such practices are being discontinued and the costs associated with construction and permitting.

With respect to the commenter's claim of the frequency of surface impoundments at refineries, EPA's data on the presence of surface impoundments at refineries is limited to those instances where a residual identified in the survey was managed in a surface impoundment, and refineries were in fact discouraged by the Agency from providing detail of their wastewater treatment train (where surface impoundments may be present). The basis for this instruction was that such wastes would be subject to the existing F037/F038 listings and units downstream from F037/F038-generating units were so far removed from the original 29 residuals of concern to this industry study that no benefit would be realized from further study. Based on its limited data, EPA identified 8 refineries with surface impoundments that are not part of the facility's wastewater treatment train. Of these 8 refineries, 4 exclusively manage FCC fines and 4 manage other wastes in their impoundments. EPA believes it is unreasonable that a refinery would begin to co-manage HF alkylation wastes with FCC fines because the ponds were constructed specifically for managing FCC fines. EPA does not believe that the remaining 4 refineries (some of which are known to have discontinued using their impoundments) represent an "ample number" of refineries with surface impoundments. EPA observed during its site visits that the HF pits were used to prevent fluorides and low pH wastes from being discharged to the wastewater treatment facilities in large quantities. Fluorides were described by several refineries during these site visits to create effluent compliance problems. Thus, removal in the HF pits associated with the units makes sense from a processing perspective. In addition, several refineries described changes that they had made or were contemplating regarding their methods of HF acid neutralization. Certain methodologies

¹¹⁶ The Nation's Hazardous Waste Management Program at a Crossroads: The RCRA Implementation Study, EPA Office of Solid Waste and Emergency Response, July 1990, pp. 64-65.

result in a higher purity fluoride salt which is amenable to off-site sales as a fluoride raw material. These process considerations also contribute to the unlikelihood that refineries would increase their use of impoundments for HF process waste neutralization.

The commenter is correct in stating that EPA modeled the onsite land treatment of sulfuric acid alkylation sludge in a nonhazardous waste unit even though no refinery reported using that practice in EPA's 1992 database. In this case EPA was simply attempting to complete the revised risk analysis for land treatment for wastes that were evaluated in the initial proposal. As noted in the NODA analysis, EPA had realized that most of the land treatment units used to establish area for modeling in the proposal were, in fact, permitted hazardous waste units. After correcting for this oversight, EPA was left with few nonhazardous units to use for defining land treatment areas. Thus, in this case, EPA used the volume of the onsite land treatment unit for the only facility that also reported the presence of an operational sulfuric acid alkylation unit. In any case, this analysis had no impact on EPA's final decision because under either scenario, no significant risk was found from land treatment of this waste.

Comment 3: Similarly, in response to a FOIA request on off-spec products and fines, EPA provided information on interim and final management methods for this waste, as reported in the industry survey. According to this EPA data, several respondents reported storing off-spec products and fines in surface impoundments as an "interim" management method. Moreover, storage in a surface impoundment, followed by storage in a pile, and subsequent transfer for fuel use, was considered a "treatment train of interest".¹¹⁷ Yet EPA still refuses to model the management of off-spec products and fines in surface impoundments. (EDF, 00006, pg 67)

Response: In regards to the FOIA request, only one respondent, not several, reported managing off-spec product and fines in a "surface impoundment" in 1992. Furthermore, in this one case this "surface impoundment" was actually a drilling water clarifier. All delayed coking units recycle their drilling water. To do so, any entrained fines in the drilling water must be recovered. Typically, the concrete coke storage pad is sloped so that drilling water drains to one end and proceeds through a series of baffles which separate out the coke fines. It is EPA's understanding that this is the type of "surface impoundment" the refinery is referring to and not a surface impoundment which is typically part of a wastewater treatment system but an integral part of the decoking process. These are lined (concrete) drilling water collection and recycle systems, confined within the coke battery, and would pose insignificant risk. Therefore, modeling of off-spec product and fines in an impoundment would not be appropriate. Furthermore, this particular waste is essentially solid coke material, and to project management of this waste in a true impoundment, which is for liquids, would be unreasonable.

¹¹⁷ See Letter from David Bussard, EPA to Karen Florini, EDF, dated March 25, 1997, Attachment 4.

IV.D BIF Rule Exemption

Comment 1: In the initial rulemaking notice for the proposed listing of K171 and K172, EPA noted that “[b]ecause reclamation of metals from . . . spent hydrotreating and hydrorefining catalysts involves thermal processing of RCRA hazardous wastes, there has been confusion regarding whether these catalyst recovery furnaces are subject to regulation as a type of industrial furnace (as defined in § 260.10 of the RCRA regulations).” 60 Fed. Reg. 57747, 57780 (November 20, 1995). EPA proposed “to clarify the regulatory status of these units by specifically excluding them from regulation as industrial furnaces under RCRA” (*see id.*) for the following reasons.

First, EPA did not specifically consider these units in developing the BIF rule. *See id.*

Second, these units “differ from the types of furnaces specifically considered in the BIF rule in that the process involves burning of hazardous waste solely for materials recovery as opposed to destruction or energy recovery.” *Id.* “In this sense,” EPA observed, “spent petroleum catalyst recovery units are analogous to smelting, melting, and refining furnaces that process hazardous waste solely for metals recovery.” *Id.* Such units, EPA pointed out, “are conditionally exempt from the Subpart H [BIF] regulations because the process does not involve burning either partially or wholly for destruction or energy recovery.” *Id.*

Third, “spent catalyst . . . metals recovery operations provide an environmentally sound alternative to disposal of spent petroleum catalysts.” *Id.* EPA did “not want to impose any unnecessary regulatory burden that may serve to discourage [such] environmentally safe recycling.” *Id.*

For these reasons, EPA proposed to formally exempt spent hydrotreating and hydrorefining catalyst recovery furnaces from the BIF rule by means of an amendment to 40 CFR § 266.100(b).

We agree fully with the rationale for this proposed exemption, and we believe it can be implemented effectively by amending 40 CFR § 266.100(b). However, the specific language EPA has proposed for this amendment is not well designed to achieve its objective. In particular, proposed subsection 266.100(b)(5) would exempt a catalyst recovery furnace if the only hazardous wastes burned are K171 and/or K172. *See* 60 Fed. Reg. at 57797. Presumably, this limitation was intended to ensure that industrial furnaces currently subject to BIF rule requirements would not suddenly gain an exemption from the BIF rule by adding K171 or K172 spent catalysts to their existing slate of hazardous waste feed materials.

We do not quarrel with that objective. Unfortunately, as drafted, the proposed limitation would have a much broader impact. In particular, smelting, melting, and refining furnaces that currently are conditionally exempt from the BIF rule under 40 CFR § 266.100(c) would not qualify for the catalyst recovery furnace exemption under proposed § 266.100(b)(5) because they process other hazardous waste for metal recovery. Surely EPA did not intend to force INMETCO and other HTMR facilities to choose between the § 266.100 (c) exemption for smelting, melting, and

refining furnaces and the § 266.100(b)(5) exemption for petroleum catalyst recovery furnaces. To the contrary, as noted above, the rationale that EPA advances for the proposed § 266.100(b)(5) catalyst recovery furnace exemption is the same one that supports the conditional exemption under § 266.100(c) for smelting, melting, and refining furnaces. It would be illogical and environmentally counterproductive to structure § 266.100(b)(5) in a way that precludes a currently exempt process like INMETCO's from qualifying for the exemption. Many K171 and K172 spent catalysts will have a high nickel content (some as high as 50% or more), and INMETCO has the capacity to process 2,000-4,000 tons of these catalysts annually. EPA should not force INMETCO to forego the reclamation of such materials in order to maintain its exempt status under the BIF rule.

The problem can be remedied by revising proposed § 266.100(b)(5) to read as follows:

“Furnaces that recover 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) if those are the only hazardous wastes burned or processed in the furnace, or if any hazardous wastes in addition to K171 and K172 are processed in the furnace solely for metal recovery in accordance with the conditional exemption of § 266.100(c), in which case the owner and operator of the furnace remain subject to §§ 266.101 and 266.112.” (INMETCO, 00003, pg 5)

Response: The Agency believes that the commenter's concern is moot. This is because 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.

IV.E. Implications of Listing Catalysts

Comment 1: We believe there are a number of unintended consequences that will result if hydrotreating and hydrorefining catalysts are listed. The status of water used to remove catalyst is very important, but is one of several potentially damaging consequences of listing this catalyst as hazardous. We believe the best solution to this problem is to not list these catalysts as hazardous.

The EPA assumes that listing these catalyst as hazardous will reduce management risks and encourage their recycling. However, a review of the logical consequences to listing suggests otherwise. Following is a stepwise discussion of the management consequences that can occur if the catalyst is listed. (Chevron, 00014)

Response: EPA discusses each of the commenter's points below.

Comment 1a: Reactor Shutdowns

Consequences if Listed: The shutdown process would no longer have the incentive of reducing benzene below the characteristic level. Catalysts sent to reclaimers will be generated and managed containing more characteristics of hazardousness. Much catalyst that is currently reclaimed would instead be disposed due to higher shipping and reclaiming costs.

Current System: A reactor shutdown for a catalyst change-out is a process that can take from one to seven days depending in part on how long the catalyst will be stripped. (Stripping is the use of process gas to purge the catalyst of volatile organics and to aid in the cooling of the reactor prior to shutdown. It is a closed process with the hydrocarbons recovered for further processing.) The stripping process will significantly influence the benzene content of the spent catalyst. At the Chevron Pascagoula, Mississippi Refinery, the refinery further treats the catalyst after it is removed from the reactor so that it is not ignitable or reactive. Deactivation also removes or significantly reduces the self heating characteristic of the catalyst. This is done to lower subsequent transportation and handling costs. However, RCRA permit and air emission limits for the treatment process require that the spent catalyst not be characteristically hazardous for benzene, or fail the benzene waste NESHAP. Therefore, there is currently an incentive to run the stripping cycle with a clean gas and long enough to remove benzene (and with it other organics) to levels that do not pose a TC or NESHAP problem.

Thus, the Pascagoula spent hydroprocessing catalyst is sampled regularly upon generation and is typically low in benzene and other organics as shown in Table 1 [of Chevron's comment]. In addition, we also test other spent catalysts that are not from hydroprocessing units. We have found that generator knowledge and proper characterization of waste is derived from an adequate sampling program. Pascagoula has over 200 lab analyses of spent catalyst from units that are not hydroprocessing units. Klaus Catalysts from Sulfur Recovery Units, Precious Metal catalysts from reformers, isomerization catalyst from chemical processes, spent alumina and molecular sieves from hydrating processes, FCC catalyst, and chloride guard, shift converter, and methanator catalyst from Hydrogen plants are also screened for hazardous characteristics.

Sampling of Pascagoula Spent Catalyst 1988-97

Analysis	No. Sampled	Results Above DL	Results Above Regulatory Limit	Log Average of Results Above DL
TCLP Benzene	39	7	2	0.086 mg/l
TCLP Arsenic	69	17	1	0.19 mg/l
Self Heating	139	na	49	na
Sulfide Reactive	184	na	13	na

Discussion: If the catalyst is listed as hazardous, many refineries would lose the incentives to generate a catalyst that is characteristically non-hazardous. At Pascagoula, the treatment step would be abandoned and the reactor shutdown would be optimized to reduce costs with little or no regard for the benzene content in the generated catalyst. Thus, if the catalyst is sent to a reclaimer, it will not contain several characteristics of hazardousness whereas before listing, it would have been shipped with no hazardous characteristics. Therefore, one consequence of listing is that catalyst being reclaimed will become more hazardous to manage.

However, another likely consequence is that catalyst that is currently reclaimed would instead be disposed when listed. Prior to listing, a method exists to treat and ship the catalyst as non-hazardous keeping shipping cost low. If hazardous, shipping costs to one of the few reclaimers may no longer be tolerable, depending on distance. Thus, disposal in a nearby Subtitle C landfill is likely to be attractive. If the catalyst is to be disposed in a nearby landfill, then the process might be operated to generate catalyst that will meet LDRs for organics.

An existing example of this situation is the case of California generated catalysts. Due to the California-only hazardous waste characteristic that includes nickel as a toxicity characteristic constituent, most California generated spent catalyst must be shipped as hazardous. While our Pascagoula refinery typically recycles its catalyst, our California refineries instead dispose of it as hazardous in a nearby RCRA permitted TSDF, rather than shipping the spent material to a facility in Texas for recycling. The higher shipping and recycling costs strongly influence this economic decision. Listing the catalyst will create the same situation around the country. Since the Pascagoula refinery is closer to hazardous waste TSDFs, than to Texas metal reclaimers, listing the catalyst will encourage them to choose the closer disposal option.

Another example of the incentive to remove or change a characteristic is Chevron's choice to change from a chromium based low temperature shift reaction catalysis ($\text{H}_2 + \text{CO} \rightarrow \text{CO}_2 + \text{H}_2$) to one without chrome to avoid the chromium characteristic. If it had been listed as hazardous, there would be no incentive for this change.

This discussion shows how listing removes incentives to avoid characteristics that actually cause the material to be hazardous. (Chevron, 00014)

Response: EPA has decided to finalize its listing of K171 and K172 because they contain mobile levels of benzene and arsenic. When listed, such wastes would require management as hazardous wastes such as proper containment during transport, and management in Subtitle C disposal units. These wastes will also be subject to BDAT controls for these constituents. Therefore, EPA believes that any increase in benzene levels in these wastes (as claimed by the commenter) would be mitigated by Subtitle C management. However, EPA does not believe that refineries would discontinue or otherwise severely shorten the stripping process because an additional purpose of stripping is to decrease levels of volatile materials such as hydrogen sulfide inside the reactor vessel (as well as for allowing recovery of saleable product). Through its site visits, EPA has observed that refineries operate stripping cycles to reduce levels of this constituent for worker

safety reasons (in fact, the uncertainty in predicting how long the stripping process takes to achieve the desired levels often resulted in uncertainty in scheduling record sampling trips by EPA).

Following promulgation of the listing, a refinery would be required to ship the waste as hazardous to a Subtitle C landfill, after compliance with all applicable BDAT standards, or to a catalyst reclamation facility. While the economics surrounding future catalyst management as a hazardous waste is complex, the Agency notes that (1) refineries include factors such as liability concerns to avoid land disposal, and (2) 25 percent of the catalyst received by one catalyst recycler is RCRA hazardous (1995 Listing Background Document). Therefore, at present at least some refineries elect to send their characteristic hazardous waste to a catalyst recycler (using Subtitle C shipping requirements) rather than to a Subtitle C landfill.

EPA does not believe the example cited by the commenter is relevant to the discussion. A catalyst performing such a reaction is not a hydrotreating or hydrorefining catalyst in the context of the rule. Such a discussion would be relevant if chromium (for example) was used as a raw material in hydrotreating and hydrorefining catalysts. Information available to EPA (in the 1995 Listing Background Document) shows little use of metals other than nickel, cobalt, and molybdenum in fresh hydrotreating and hydrorefining catalysts.

Comment 1b: Catalyst Dumping

Consequences if Listed: The complexity of managing large volumes of catalyst as hazardous would increase the injury rate during dumping from 0.55 injuries to 7.1 injuries per million tons, over a ten fold increase.

Current System: Catalyst being generated with intent of managing it as non-hazardous (both DOT and RCRA) will be low in benzene, not reactive or self heating, and not require a NESHAP tight container. This will allow dumping in large end dump trailers holding approximately 22 tons per load. In Pascagoula, the man-hours required to dump 900 tons (one reactor) is approximately 50 hours using these trailers. The refinery reportable injury rate is around 2 injuries per 200,000 hours. Thus, we can expect 0.55 injuries per million tons managed.

Catalyst that is listed hazardous waste will most likely be managed in TBC Type 56 flow bins. These hold approximately 3 tons per bin, are more labor intensive, and would require 4 employees 20 days to load (640 man hours) a 900 ton dump. For this mode of management, one can expect 7.1 injuries per million tons managed for this bin loading portion of the process.

Discussion: The significantly higher number of hours associated with managing these bins results in significantly more injuries per ton of catalyst due in part to the listing. These injury rates (per hour) are typical for refining and the higher rate of injury per ton are expected to be real. It is questionable, therefore, whether this listing can be argued to protect human health.

On a related note, Chevron has designed and is patenting a large NESHAP tight bin that is nearly the same capacity as end dump trailers. This may begin to mitigate these new risks. However, only one Chevron refinery currently has them available for use and there is no current indication that others, especially outside of Chevron, will use them. (Chevron, 00014)

Response: During its site visits and record sampling events, EPA has generally observed that hydrotreating and hydrotreating catalyst is dumped into flow-bins in drums. Based on these observations, EPA concludes that few refineries use the type of trailers cited by the commenter, and therefore disagrees that a general industry-wide shift in container practices will occur because most facilities already use the flow-bin containers (or similar) cited by the commenter.

In general, workers conducting operations involving hazardous wastes are required to undergo additional training than workers not involved in hazardous waste operations. Additionally, worker safety is generally under the purview of OSHA.

Comment 1c: Catalyst Deactivation:

Consequence if Listed: The catalyst would not be deactivated if listed. It would simply be shipped as generated as a RQ, Waste, Self Heating, Solid, Inorganic, n.o.s. 4.2, UN3190, III (K171, D018, D003) which is the proper shipping name for DOT self heating hazardous material that is also a RCRA reactive hazardous waste that contain benzene.

Current System: At the Pascagoula Refinery, the spent catalyst is dumped and then taken to a RCRA permitted pad (permitted to handle reactive materials). The catalyst is spread out in piles no more than 3 feet high and allow to air oxidize and cool. Heavy equipment is sometimes used to turn the catalyst, as turning the catalyst increases both the oxidation and the cooling after oxidation is complete. Treating the catalyst on the pad usually eliminates sulfide reactivity and eliminates or reduces self heating. The permit requires a pad liner, roof, concrete pad, ground water monitoring wells, and weekly inspections. The pad is covered to protect it from rain. The exposure of workers who work the catalyst are governed by OSHA requirements (29 CFR 1910.1000), which requires appropriate personnel protective equipment. Additionally, exposures are monitored using NIOSH published Sampling and Analytical Methods. Various types of protection are used to insure that exposures are below PEL limits. The catalyst typically remains on the pad for about 4 weeks.

Discussion: The catalyst would not be deactivated if listed as discussed under the reactor shutdown section above. It would simply be shipped as generated as a RQ, Waste, Self Heating, Solid, Inorganic, n.o.s. 4.2, UN3190, III (K171, D018, D003) which is the proper shipping name for DOT self heating hazardous material that is also a RCRA reactive hazardous waste that contains benzene. (Chevron, 00014)

Response: EPA has decided to finalize its listing of K171 and K172 because they contain mobile levels of benzene and arsenic. The treatment described by the commenter would remove the

reactivity characteristic. However, it would not necessarily address the potentially toxic levels of constituents that have been identified in these wastes. Therefore EPA believes that finalization of the listing is appropriate. Note that the BDAT standard for these wastes includes deactivation for reactive sulfides.

Comment 1d: Shipping

Consequence if Listed: The higher cost of shipping material as hazardous waste will provide strong incentives to find local solutions. Typically, this will mean disposal in a local Subtitle C landfill rather than shipping longer distances to a reclaimer.

Current System: Occasionally the deactivated catalyst will still fail the DOT self heating test. This is a very stringent test that requires heating to 140°C and monitoring for 24 hours to see if the temperature rises above 200°C. While this material is not ignitable, it may still require shipments as a DOT hazardous material due to self heating. The cost for shipping a hazardous material is about 2/3 of the cost for hazardous waste. Shipment as non-hazardous materials is about 1/3 of that for hazardous waste. Shipping of a hazardous waste can easily exceed \$100/ton (\$0.40 per ton-mile) and is often the largest cost factor in deciding whether to recycle or dispose of the material. If managed as non-hazardous, the economical management options reach over a much greater distance.

Discussion: The high cost of hazardous waste transportation typically means a refinery is limited to management options which are closer to home. As discussed above, the cost of recycling catalyst from our California refineries is high due in part to it being a California only hazardous waste. Thus, these materials are treated and disposed in a California hazardous waste TSDF.

The logical consequence of listing is that fewer people can now afford the higher shipping costs to one of the few reclaimers that exist, and will instead choose to dispose in a local hazardous waste TSDF. Thus, less catalyst will be reclaimed and more will be disposed. Another consideration is that at our Pascagoula Refinery, a listing would require us on an annual basis to generate at least 400 more hazardous waste manifests, 400 more Benzene NESHAP shipping notifications, and 400 more LDRs notifications. Since this would increase the hazardous waste shipments and paperwork burden for preparing these shipments from this facility tenfold, they would have an incentive to use a nearby TSDF, instead of a Texas metal reclaimer.

Most RCRA permitted TSDFs provide manifests, shipping labels, on site service support, and land disposal restriction notifications as part of their customer service. Competition between hazardous waste commercial facilities has caused their customer service departments to increase their level of service to their customers. This same level of service is not currently available from the major catalyst metal reclaimers, who are fewer in number than their rival TSDFs, and further distance away from much of their potential customer base. (Chevron, 00014)

Response: See response to Comment 1a.

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16. Abstract (Limit: 200 words) Responds to public comments concerning clarifications and corrections related to headworks exemption and jurisdictional explanation of off-specification product and fines from thermal processes used as product. Discusses revised treatment standards for spend catalysts from hydrotreating (K171) and hydrorefining (K172) under the LDR program. Addresses conditional listings, individual versus population risk, waste management practices assessed, the boilers and industrial furnaces rule exemption, and implications of listing catalysts.			
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