

## CLUES TO INTERPRETATION OF RCRA REGULATIONS

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### ABSTRACT

Waste waters from industrial facilities are often treated at waste water treatment plants and then discharged to streams or rivers, or may be reused. Discharges of pollutants to waterways are regulated under the Clean Water Act, and require a permit. The Resource Conservation and Recovery Act (RCRA) regulates the management of solid wastes. This paper discusses the status of waste water treatment plant discharges and sludges pursuant to RCRA. It concludes that some exceptions to RCRA allow waste water treatment plants to accept dilute solvent mixtures, treat them, and discharge effluent without needing a RCRA permit. If residual sludges do not exhibit a hazardous characteristic, then they may be managed as nonhazardous solid waste. For DOE and other generators of mixed waste (both radioactive and hazardous), this may allow sludges to be managed as low level radioactive waste.

### THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

RCRA was designed to delegate regulatory authority to State agencies. Since regulations are not uniform among the States, this paper will discuss the regulation under Federal RCRA, on which State regulations are (sometimes loosely) based.

In 1984, responding to some perceived weaknesses in EPA's promulgating and enforcing regulations for hazardous waste, Congress enacted the Hazardous and Solid Waste Amendments (HSWA). Among other things, HSWA required EPA to ban the land disposal of untreated hazardous waste and to specify the treatment standards or processes to use for the waste.

### HAZARDOUS WASTE REGULATIONS

RCRA divides waste regulation into subtitle D, which regulates nonhazardous wastes (principally trash and industrial waste that can be disposed in sanitary landfills) and subtitle C, which regulates hazardous waste. In addition, subtitle I regulates non-waste underground storage tanks. Regulation of hazardous waste is much more rigorous than that of nonhazardous waste; regulations determine how it is to be stored, transported, accumulated, treated, and disposed. This is known as "cradle to grave" regulation.

#### Listed Waste

Regulations define hazardous waste as a subset of solid waste that is either specifically listed by EPA as hazardous, or exhibits hazardous characteristics. EPA's waste lists include some wastes from specific sources (K-list, 40 CFR 261.31)(1), wastes from nonspecific sources (F-list, 261.32), and commercial chemical products (when they become wastes, the P- and U-lists, 261.33). EPA has assigned a 4 character alphanumeric code to each waste that allows waste managers to track the specific management requirements.

#### Characteristic Waste

Wastes that are not included on EPA's lists of hazardous wastes may also be regulated as hazardous if they exhibit hazardous characteristics. These characteristics include ignitability, reactivity, corrosivity, and toxicity (261.20-.24).

Some specific laboratory tests allow waste generators and managers to determine whether a waste exhibits any of these hazardous characteristics.

#### Mixtures of Listed & Solid Waste

One difference between listed and characteristic waste is that the regulations require that all mixtures of listed waste and other wastes to be managed as if the mixture is the listed waste (261.3(b)). Since there is no minimum (or de minimis) concentration of listed waste that can make a mixture hazardous, this results in large quantities of dilute mixtures being managed as hazardous waste. Most of the materials that are managed as hazardous waste are required to be so managed because of this mixture rule.

#### Residuals from Listed Waste Treatment

If listed wastes (or mixtures of listed wastes and solid wastes) are treated, the residuals of that treatment remain regulated as hazardous waste (261.3(c)(2)). Thus, for example, ash from incineration of hazardous solvents must be disposed at a hazardous waste disposal site, even though the incineration destroys the hazardous substances. Residuals can be delisted, but this is a difficult, expensive, and time-consuming process. Residuals that are discharged into waters pursuant to a Clean Water Act permit (261.4(a)(2)), used or reused as effective substitutes for commercial products (261.2(e)(1)(ii)), or reclaimed and used beneficially (261.3(c)(2)(i)) are not solid wastes, and thus are exempt from the RCRA regulations.

An industry coalition has successfully challenged EPA on its procedures for promulgating the mixture and derived from rules. At the time of this paper, this challenge was not yet final. Thus its effects, though potentially far-reaching, could not be determined.

#### Land Disposal Restrictions

The land disposal restrictions (LDR) specify how hazardous waste must be treated before it can be land disposed. These treatment standards (best demonstrated available technology, or BDAT) are expressed as required technologies or as required maximum concentrations after treatment. The LDR also forbid storage of waste, requiring instead that waste be merely accumulated until sufficient quantities are available

to treat. Where treatment is available, this "treat as you go" requirement makes some sense. However, as with mixed waste, a lack of treatment capacity makes interim storage necessary, although forbidden by the LDR provisions.

#### INTERPRETING WHAT REGULATIONS APPLY TO SPECIFIC FACILITIES

Various documents can be used as sources of clues to interpretation of hazardous waste regulations. These include:

1. 40 CFR (Code of Federal Regulations). This paperback volume of RCRA regulations is updated annually in July.
2. Federal Register notices. These contain the text of the proposed and final regulatory language (that will be added to the CFR the succeeding July). In addition, these contain preambles that offer explanations to the meaning of the text. The preambles are not published in the CFR.
3. Regulatory interpretation letters from EPA and the State regulatory agencies.
4. Permit conditions for permitted facilities.
5. Judicial opinions. These are the final word on what the regulations mean and whether they apply.

#### RCRA REGULATION OF WASTE WATER TREATMENT PLANT RESIDUALS

For the sake of discussion, assume that a waste water treatment plant treats effluent that drains liquid waste from about 1000 sources at a large research laboratory. As required by the plant's state pollution discharge elimination system (SPDES) permit, the plant operator samples the influent to the treatment plant, and has found that some RCRA hazardous Appendix VIII (261 appendix 8) constituents are present at low g/L (ppb) levels. The plant operator does not know how these constituents entered the sewer system. They may have been disposed to the sewer system as hazardous waste, as product components, or otherwise.

#### Water Discharges are Not RCRA Regulated

Ordinarily, the "mixture rule" regulates mixtures of listed hazardous wastes and solid wastes as hazardous wastes (261.3(b)(2)), and residues from treatment of hazardous wastes remain hazardous wastes (261.3(c)(2)). The liquid effluent from the waste water treatment facility is excluded from RCRA regulation because it is a SPDES-permitted Clean Water Act §402 discharge (261.4(a)(2)). At another waste water treatment facility, the treated water is reused as a substitute for water that would be otherwise purchased, and thus qualifies for the recycled product exclusion (261.2(e)(1)(ii)). This interpretation has been confirmed by the state regulatory agency.

#### Sludges May Remain Regulated as RCRA Hazardous Waste

Whatever the regulatory status of the treated waters, the residual sludge remains solid waste. Thus, if the treatment plant influent is RCRA listed hazardous waste, then the sludge is also hazardous. Even if it is not listed hazardous waste, the sludge must be tested to determine whether it exhibits a hazardous characteristic. If so, then the land dis-

posal restrictions of 40 CFR Part 268 require treatment before disposal, and limit storage.

#### EXCEPTIONS

Fortunately, the mixture rule contains some exceptions that are relevant to this situation. First, it is possible that the constituents have entered the sewers without being hazardous waste. They may be rinsates from empty containers or product constituents, for example. If so, then they are not hazardous wastes and the mixture rule does not apply (261.7). On the other hand, they may be F-listed or P- and U-listed commercial chemical products (or residues from spills of such products), that would be hazardous wastes. If so, then the mixture remains a hazardous waste. Although the laboratory has administrative controls (operating procedures) that forbid this type of introduction of these constituents into the sewer system, these constituents are still being found in the influent to the treatment plant. The treatment plant operator has no way of knowing whether they are present as waste, or merely present as hazardous constituents from non waste sources.

Second, if the constituents are (or are assumed to be) present in the influent as hazardous waste, other exceptions apply to dilute mixtures of hazardous waste and RCRA may not apply. These exceptions are found at 261.3(a)(2)(iii) and (iv). Five different exceptions include:

1. constituents listed because of a characteristic, if the mixture no longer exhibits any characteristic,

It is a mixture of a solid waste and a hazardous waste that is listed in Subpart D solely because it exhibits one or more of the characteristics of hazardous waste identified in Subpart C, unless the resultant mixture no longer exhibits any characteristic of hazardous waste identified in Subpart C; 261.3(a)(2)(iii)(emphasis added)

2. some specific spent solvents (carbon tetrachloride, tetrachloroethylene, trichloroethylene) at total concentrations of 1 ppm or less,

One or more of the following spent solvents listed in §261.31 -- carbon tetrachloride, tetrachloroethylene, trichloroethylene [sic] -- provided that the maximum total weekly usage of these solvents (other than the amounts that can be demonstrated not to be discharged to wastewater) divided by the average weekly flow of wastewater into the headworks of the facility's wastewater treatment or pre-treatment system does not exceed 1 part per million; 261.3(a)(2)(iv)(A)

3. other specific spent solvents at total concentrations of 25 ppm or less,

One or more of the following spent solvents listed in §261.31 -- methylene chloride, 1,1,1-trichloroethane, chlorobenzene, o-dichlorobenzene, cresols, cresylic acid, nitrobenzene, toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, spent chlorofluorocarbon solvents -- provided that the maximum total weekly usage of these solvents (other than the amounts that can be demonstrated not to be discharged to wastewater) divided by the average weekly flow of wastewater into the headworks of the facility's wastewater treatment or pre-treatment system does not exceed 25 parts per million; 261.3(a)(2)(iv)(B)

4. wastes from *de minimis* losses, or rinsate from empty containers, of P- and U- listed commercial chemical products,

A discarded commercial chemical product, or chemical intermediate listed in §261.33, arising from *de minimis* losses of these materials from manufacturing operations in which these materials are used as raw materials or are produced in the manufacturing process. For purposes of this subparagraph, "*de minimis*" losses include those from normal material handling operations (e.g. spills from the unloading or transfer of materials from bins or other containers, leaks from pipes, valves or other devices used to transfer materials; minor leaks of process equipment, storage tanks or containers; leaks from well-maintained pump packings and seals; sample purgings; relief device discharges; discharges from safety showers and rinsing and cleaning of personal safety equipment; and rinsate from empty containers or from containers that are rendered empty by that rinsing; 261.3(a)(2)(iv)(D), and

5. laboratory waste waters containing 1 ppm or less of total toxic listed wastes.

Wastewater resulting from laboratory operations containing toxic (T) wastes listed in Subpart D, provided that the annualized average flow of laboratory wastewater does not exceed one percent of total wastewater flow into the headworks of the facility's wastewater treatment or pre-treatment system, or provided the wastes, [sic] combined annualized average concentration does not exceed one part per million in the headworks of the facility's wastewater treatment or pretreatment facility. Toxic(T) wastes used in laboratories that are demonstrated not to be discharged to wastewater are not to be included in this calculation. 261.3(a)(2)(iv)(E)

A plant manager needs to examine each of these exceptions to determine whether any apply, and thus allow the sludge to be managed as nonhazardous waste. These exceptions are applicable to the influent constituents, depending on whether the constituents have their origins as spent solvents or have some other source. If one or more of these exceptions apply, then the influent is not hazardous waste, and the sludge is not a "derived from" hazardous waste. It can be managed as nonhazardous solid waste.

## ANALYSIS

### Characteristic Hazards

Acetone, xylene, and ethyl benzene are present in the influent at concentrations that do not cause the influent to exhibit the characteristic of ignitability. These compounds are listed (261.31) only for the characteristic of ignitability. Since the influent does not exhibit the characteristic of ignitability, it does not retain the F003 listing. This analysis assumes that the influent doesn't exhibit any other hazardous characteristics (corrosivity, reactivity, toxicity). If it did, then these characteristics would cause it to remain listed (F003), in addition to being characteristically hazardous.

### Carbon Tetrachloride

Carbon tetrachloride has been detected at the 16.5 g/L (16.5 ppb) level in the influent. If the carbon tetrachloride was present as a spent solvent hazardous waste, then this mixture of wastewater and carbon tetrachloride is not a hazardous waste because 16.5 ppb is less than 1 ppm. If the carbon tetrachloride is not present as a spent solvent, and is a U-211 commercial chemical product or spill residue disposed to the sewer, then this exception does not apply. Rather, exceptions (4) and (5) below might still be applicable.

### Other Solvents

Other constituents that might have originated as spent solvents are present at a total concentration of 25 ppm (25,000 g/L) or less:

<u>solvent</u>	<u>concentration</u>
1,1,1-trichloroethane	90-111 g/L
methylene chloride	6.1-440 g/L
toluene	5.7 g/L

The regulatory language for the 1 ppm and 25 ppm limits (discussed in #'s 2 & 3, above) includes making a materials balance for solvent use at the facility, subtracting solvent use that can be demonstrated not to be discharged to wastewater, and dividing the difference by the volume at the headworks. This calculation is not possible for the treatment plant operator, because he has no way of knowing the total solvent use at the laboratory, nor the quantity of solvent not discharged to wastewater. However, the preamble to the regulation clearly states that this technique is included because the more difficult technique of actually measuring the concentrations of these solvents at the headworks would be too onerous a burden for waste generators (46 FR 56585, Nov 17, 1981). Rather, the plant operator has performed the more technically difficult task of actually measuring influent concentrations. While not specifically allowed by the regulations, this method is not forbidden and is clearly more accurate. Moreover, this monitoring procedure is required as part of the plant's SPDES waste water discharge permit, if process knowledge cannot verify the absence of listed hazardous waste solvents.

### De Minimis Losses

Minor losses from manufacturing or raw materials use, or rinsate from "empty" containers, etc. are exempt. Just as the total quantities of solvents used at the laboratory are unknown, so are the sources of hazardous constituents in the sewers. If these constituents are manufactured or used as raw materials at the laboratory, this exception for *de minimis* losses from use as raw materials or manufacturing production probably applies. Empty container rinsate is already not hazardous waste (261.7), so including it in this exception is superfluous, but non-empty container rinsate might account for some of the hazardous constituents detected in the wastewater influent. While this exception applies to all P- and U-listed commercial chemical products, these constituents may come from sources other than empty container rinsates or *de minimis* losses that qualify for this exception.

### Laboratory Effluents

This exception is potentially the broadest available. It applies to all U-listed (toxic) constituents present at a total

concentration of less than 1 ppm at the headworks (plant influent). As such, it does not include acute toxic constituents (P-listed). It applies to laboratories where total toxic constituents are 1 ppm or less in the influent. If additional analytical data support the supposition that total toxic U-listed constituents are 1 ppm or less, then this exception applies. Since the F-listed solvent constituents are also (when unused commercial chemical products) U-listed constituents, then this exception applies if (2) or (3) above don't apply.

#### CONCLUSION

Industrial waste water treatment plants may treat influents with hazardous constituents. A treatment plant operator

may not be able to determine the source of the constituents, or know whether their source is a hazardous waste. As this paper has shown, exceptions to the usually all inclusive RCRA regulations allow some sludges to be managed as nonhazardous solid wastes. Plant operators should look to all sources of regulatory interpretation, and not rely solely on the regulatory language of 40 CFR, when deciding the appropriate management for their waste streams.

#### REFERENCES

1. References in the paper are to volume 40, Code of Federal Regulations (40 CFR).