Course Learning Outcomes for Unit II

Upon completion of this unit, students should be able to:

3. Characterize the hazardous waste problem in the United States.
   3.1 Describe the physical, chemical, and hazard categories used to classify hazardous wastes.

4. Describe properties of various types of hazardous waste.
   4.1 Identify examples of hazardous wastes that are generated in a vehicle maintenance facility.
   4.2 Explain the specific hazardous properties of wastes that are generated during manufacturing in the service industries.

Course/Unit Learning Outcomes	Learning Activity
3.1	Unit Lesson Chapter 4 Chapter 11 Unit II Essay
4.1	Chapter 12, 12.1 – 12.3, pp. 371-379 Web page: "Household Hazardous Waste (HHW)" Unit II Essay
4.2	Unit Lesson Chapter 12, 12.1 – 12.3, pp. 371-379 Web page: "Typical Wastes Generated by Industry Sectors" Unit II Essay

Reading Assignment

Chapter 4: Characterization of Solid Waste

Chapter 11: Identification of Hazardous Waste

Chapter 12: Hazardous Waste Generator Requirements, 12.1 – 12.3, pp. 371–379

In order to access the following resources, click the links below.

The following Environmental Protection Agency websites are for further enhancement of the lesson. Only read the applicable sections as outlined below.

Read these sections at the below website: Safe management of HHW, Reducing HHW in your home, and Regulating HHW.

Environmental Protection Agency. (n.d.). Household hazardous waste (HHW). Retrieved from https://www.epa.gov/hw/household-hazardous-waste-hhw

Read only the Vehicle Maintenance section at the below website.

Environmental Protection Agency. (n.d.). Typical wastes generated by industry sectors. Retrieved from https://www.epa.gov/hwgenerators/typical-wastes-generated-industry-sectors

Unit Lesson

It is important to understand and to have a command of the definitions and meanings of the key terms and phrases used in the field of environmental waste management. This is not as simple as memorizing a few words or assuming the meaning of the term based on life experiences. Each term must be considered and understood within the context in which it is used. It may be best to use an example to put the importance of this into context. If we consider the term *solid waste*, Pichtel (2014) has a practical definition that most people will understand. Look at page 627 of the textbook to see a common meaning for what comprises solid waste. It is fairly easy to differentiate solid wastes from liquid and gaseous wastes in which the definitions are primarily based on the physical and chemical properties of the waste. However, when it comes to Congressional legislation and the regulations published by the Environmental Protection Agency (EPA) to implement the legislation, the common definition in the textbook cannot be relied on. In 40 CFR 261.2 (2011), the term solid waste is defined within the implementing regulation of the Resource Recovery Conservation Act (RCRA). The definition as published here only relates to the RCRA regulation. Other regulations will define their key terms in other ways so that the intended purpose of their regulation is understood by all stakeholders: the regulated community, the agency (EPA), and the courts.

In 40 CFR 261.2, the definition of solid waste is very technical with associated criteria that describe what will and will not qualify to be classified as a solid waste. Here is the first criterion: “A solid waste is any discarded material that is not excluded under §261.4(a) or that is not excluded by a variance granted under §§260.30 and 260.31 or that is not excluded by a non-waste determination under §§260.30 and 260.34” (40 C.F.R. § 261.2, 2011, pp. 31-32).

We first notice that a solid waste is any discarded material. There is no limitation that prohibits liquids, slurries, and gases from being defined as a solid waste within the RCRA regulation. A drum of product contaminated with a waste oil and a liquid slurry containing metal files from the filter of a washing operation are both solid wastes in RCRA terms. Then, we see five sections within the RCRA regulation that need to be consulted to see if the discarded material is exempt from being defined as a solid waste within the guidelines of the RCRA. The definition goes on to provide clarity as to what qualifies as a discarded material. The definition attempts to cover a variety of scenarios and cases describing when a discarded waste is and is not exempt from being classified as a solid waste.

The solid waste definition does not stop here. It goes on to describe some situations when a material is not a solid waste. Near the end of 40 CFR 261.2 (2011), EPA makes it clear that if a regulated actor (e.g., an industry, a professional service provider, the military, etc.) makes a claim that a discarded material is not a solid waste because they claim that it is recycled or reused, then the exemption must be documented and records must be kept to defend the claim. When an EPA inspector comes to a site and asks to review the records, companies can find themselves out of compliance if they cannot produce the records and/or if the documentation fails to convince the inspector that the exemption was properly applied. It may be prudent to put a copy of the recycling contract in the files to show that the recycling activities were legitimate and not a sham. If the EPA rules against a company, the fines can be as high as $35,000 per day for each violation. The violations are assumed to continue each day until the company can show that the violations ceased. It only takes one month to get to $1 million in fines and 10 months to get to $10 million. The EPA will generally leverage these fines to get companies to agree to make changes to the manufacturing process, to spend capital, to hire qualified staff, and to do so at a level that will serve as an example to other industries that may also be noncompliant for misclassifying a waste as a solid waste.

You may be asking what the big deal is about what one chooses to call a discarded material. Here is the point to consider. Look at 40 CFR 261.3 (2011) regulation that defines a hazardous waste. The definition states that a solid waste is a hazardous waste if it is not exempt or if it meets certain conditions. Once a discarded waste is classified as a hazardous waste, the full regulatory force of RCRA goes into effect as to how the waste is generated, stored, transported, disposed, or repurposed back into commerce. If a waste is exempt from meeting the definition of a solid waste, then it cannot be a hazardous waste, and it is allowed to be disposed in a municipal nonhazardous landfill or to be thermally oxidized in an incinerator.

One of the many piles at the Nickerson Field collection area, Lido Beach, New York.
(Falvey, 2012)

The environmental professional must have a good handle on regulatory definitions to keep his or her company out of trouble with the EPA. Once the EPA comes in and issues a notice of violation, it is not long before they will find other violations subject to additional fines. If the violations have led to an adverse impact where people have been hurt or the environment has been significantly degraded, the EPA has the power to file criminal charges against the responsible party. We have all heard of the titles for senior management such as CEO and COO. Few have heard of the title jailable executive officer (JEO). This is the person under whom the environmental staff work, and this person is responsible for sufficiently funding projects and programs, for keeping employees current with regulatory changes, and for ensuring that the facility operates within the environmental regulations. If the EPA wants to send someone to jail or keep the fine at a high value, it will start by looking to see if the company has failed to have a formal and functioning management system, defined roles and responsibilities for the staff, and a staff that is qualified and capable to handle the workload at the facility. One way to build these functions into the company infrastructure is to implement Responsible Care (https://responsiblecare.americanchemistry.com/) and International Organization for Standardization (ISO) 14001 programs for the site (https://www.iso.org/iso-14001-environmental-management.html).

Hazardous wastes are generated by a variety of industries and services. The local service station and repair facility will generate hazardous fluids and oils that cannot go into municipal landfills. Pest control companies will have treatment chemicals that may need to be discarded. Not only is the chemical a hazardous waste, but the container itself is also designated to be a hazardous waste unless it goes through specified cleaning operations. Chemical companies will often have waste streams that cannot be recycled or reused, and these will qualify as a hazardous waste. If you look at the scale of the local service company, the pest control company, and the chemical company, do you think that they should all be regulated similarly? The EPA recognizes that the regulatory requirements for a drum of used oil that is disposed of once a month should not be the same as a company that generates a railcar of used solvent during the same month. Where companies get into trouble is when they generate a level of waste that puts them into a different waste generator category.

Envision a facility that gets a large order that needs to be filled before the end of the month. The production manager goes to a round-the-clock schedule and procurement puts a rush on ordering raw materials needed to manufacture the product. What is often overlooked is the waste that will be generated from the increase in production. Small quantity generators are limited to generating 1,000 kg of hazardous waste per calendar month. If they happen to produce 1,800 kg of hazardous waste because of the increased manufacturing

schedule, they have just become a large-quantity generator subject to increased regulatory requirements. Failure to meet the additional requirements can lead to a $35,000 per day fine for each violation. Even though the facility goes back to a normal schedule the following month, the facility must set themselves up as a large-quantity generator for the month that it exceeded the 1,000 kg threshold. In most cases, the staff at the facility will not be able to meet the additional requirements in the time available before the quantity of hazardous waste generated exceeds 1 tonne per annum (t/a or tonne per year). One way that experienced companies manage these variations in market demand is that they will wait until the end of the calendar month to start the 24-hour per day manufacturing and track the hazardous waste volumes as the month ends. Then, on the first of the next month, go back into production again tracking how much waste is generated. Other companies will outsource production to a contract facility to manufacture the increased quantity of product for the market. As companies come to understand the financial consequences for violating environmental regulations, they find it beneficial to make the environmental, health and safety (EHS) staff a full participant as a planning and implementation team within the facility.

It is important for the environmental professional at a company to anticipate the quantities of hazardous wastes generated. As there is no limit for nonhazardous wastes, it may be beneficial for an EHS colleague to participate on a research and development team to find ways to rid the manufacturing process of hazardous and toxic chemicals that ultimately end up as hazardous waste. Each success rids the company of hazardous waste regulatory obligations and the costs associated with transporting and treating these wastes to a hazardous waste treatment facility.

References

Definition of hazardous waste, 40 C.F.R. § 261.3 (2011).

Definition of solid waste, 40 C.F.R. § 261.2 (2011).

Falvey, J. (2012). *December 3, 2012 – Household hazardous waste separated for proper disposal* [Photograph]. Retrieved from https://commons.wikimedia.org/wiki/File:December_3,_2012_%E2%80%93_Household_Hazardous_Waste_separated_for_proper_disposal_(8268772840).jpg

Pichtel, J. (2014). *Waste management practices: Municipal, hazardous, and industrial* (2nd ed.). Boca Raton, FL: CRC Press.

Suggested Reading

In order to access the following resource, click the link below.

The following reading serves as a useful reference and catalog index to finding information on a variety of topics related to hazardous wastes and the regulations by which they are managed. This will be a useful resource when answering questions in upcoming unit assignments.

Environmental Protection Agency. (n.d.). A to Z index of hazardous waste topics. Retrieved from https://www.epa.gov/hw/z-index-hazardous-waste-topics

Learning Activities (Nongraded)

Nongraded Learning Activities are provided to aid students in their course of study. You do not have to submit them. If you have questions, contact your instructor for further guidance and information.

Chapter 11 in the textbook describes the criteria for distinguishing between municipal and hazardous wastes. Let’s put this to use.

Contact your local municipal government (or go online) and ask for information about how hazardous wastes are identified and managed in your community. Summarize the storage and disposal requirements for a small business (<10 people) and the requirements for residential units. Find out what penalties are assessed for small business that put hazardous wastes in the dumpsters designated to go to the local landfill.

Answer these questions:

1. How does this compare with the penalty for residential units that hide hazardous wastes in their curbside trash?

2. Based on what you have learned, make one suggestion that would improve the hazardous waste management program in your community.

The following presentation is an informative review of Unit II key content.

Click here to access a PowerPoint presentation of the unit material.

Click here to access a PDF version of this presentation.