

Department of Chemical Engineering
School of Infrastructure and Process Engineering Technology

Federal University of Technology Minna, Niger State

CHE 516: Loss Prevention in Process Industry

Assignment

11th August, 2023

BY:

Group D

S/N	MATRIC NUMBER	NAME
1	2017/1/64767EH	Ademola John Kayode
2	2017/1/65595EH	Ahmed Abiona Kareem
3	2017/1/64748EH	Muhammad King Yakub
4	2017/1/68189EH	Ifechukwu Chinweoke Asugo
5	2017/1/65566EH	Abdulmujeeb Bolaji Abdullateef
6	2017/1/68204EH	Samuel Olayinka Ogundairo
7	2017/1/64754EH	Victoria Nkiruka Chukwuma
8	2017/1/64766EH	Gideon Adujo James
9	2017/1/64747EH	Odun Precious Enimola
10	2017/1/68163EH	Stephen Onyekachukwu Ajibo

11	2018/2/74007EH	Sunday Nwoye
12	2017/1/67673EH	Grace Ibrahim James
13	2018/2/74011EH	Helen Opayemi
14	2017/1/65570EH	Ridwan Babatunde Ibikunle
15	2018/2/73989EH	Waheed Sanusi
16	2017/1/68180EH	Waliulahi Ayomide Olanbiwoninu
17	2018/2/73995EH	Abdulsalam Yahaya
18	2017/1/65588EH	Amarachi Maryam Usman
19	2017/1/68172EH	Tivere Levi Smart
20	2016/1/59258EH	Matthew Ukwa Onyukwu
21	2017/1/64776EH	Bright Rikin
22	2018/2/73991EH	Chindedu Iloba
23	2017/1/68199EH	Kamil Ohinoyi Abubakar
24	2017/1/68200EH	Juliet Ojoma Okpanachi
25	2017/1/64756EH	Abdulfarid Olakunle Biliaminu

Submitted to:

Prof. O.D Adeniyi

[Question 4]

Explains the regulatory laws that governs the following form of pollution in Nigeria:

- a. Air pollution
- b. Water pollution
- c. Solid waste pollution
- d. Industrial pollution

Regulatory Laws in Nigeria Governing:

Air Pollution:

NESREA

The **National Environmental Standards and Regulations Enforcement Agency (NESREA)** Act of 2007 is the primary legislation governing air pollution. It empowers NESREA to set and enforce standards for ambient air quality, emissions, and pollutants. The agency collaborates with other relevant bodies to monitor and regulate air pollution sources.

NESREA establishes emission limits for various pollutants, such as sulfur dioxide (SO₂), nitrogen dioxide (NO₂), particulate matter (PM), and volatile organic compounds (VOCs). Industries and vehicles must adhere to these limits to minimize air pollution.

Associated Gas Re-injection

The **Associated Gas Re-injection** Act is a regulatory law in Nigeria that directly relates to air pollution by addressing the flaring of associated gas during oil production. This act was enacted to minimize environmental pollution and economic waste resulting from the practice of gas flaring.

The Associated Gas Re-injection Act was passed in 1979 and amended in 1985 to address the issue of associated gas flaring in the oil and gas industry. Associated gas refers to the natural gas that is produced along with crude oil during the extraction process. Historically, much of this associated gas was flared or burned off into the atmosphere, contributing to air pollution, environmental degradation, and economic loss.

Key provisions and implications of the Act in relation to air pollution include:

1. **Gas Re-injection Requirement:** The Act mandates oil and gas companies to re-inject associated gas back into the oil reservoirs for enhanced oil recovery or for other useful purposes. This requirement aims to prevent the release of harmful pollutants into the atmosphere and reduce air pollution resulting from gas flaring.
2. **Flaring Fees:** The Act imposes financial penalties on oil and gas companies that fail to comply with the gas re-injection requirement. These penalties are intended to create a

financial incentive for companies to adopt practices that reduce air pollution through gas flaring.

3. **Regulatory Oversight:** The Act designates the Department of Petroleum Resources (DPR) as the regulatory authority responsible for enforcing the provisions of the Act. The DPR monitors gas flaring activities, ensures compliance with re-injection requirements, and assesses penalties for non-compliance.
4. **Gas Utilization:** In addition to re-injection, the Act encourages the utilization of associated gas for beneficial purposes such as power generation, industrial processes, and other commercial uses. This promotes more sustainable and environmentally friendly practices, reducing air pollution by minimizing gas flaring.
5. **Environmental Protection:** By addressing associated gas flaring, the Act contributes to reducing the emission of pollutants such as sulfur dioxide (SO₂), nitrogen oxides (NO_x), and particulate matter (PM) into the atmosphere. This has a positive impact on air quality and public health.

Nuclear Safety and Radiation Protection Act

The Nuclear Safety and Radiation Protection Act is a regulatory law in Nigeria that has implications for air pollution, particularly in relation to the release of radioactive substances into the atmosphere and the overall safety of nuclear activities.

Enacted to establish a framework for nuclear safety and radiation protection in Nigeria, the Nuclear Safety and Radiation Protection Act addresses various aspects of preventing and controlling air pollution associated with radioactive materials and nuclear activities. An overview of how this act affects air pollution is given below

1. **Licensing and Authorization:** The Act outlines procedures for obtaining licenses and authorizations for activities involving the use of radioactive materials, nuclear installations, and nuclear-related facilities. This regulatory process includes evaluating potential air pollution risks from radioactive emissions and ensuring that adequate measures are in place to prevent such pollution.
2. **Radiation Monitoring and Control:** The Act mandates the establishment of a comprehensive radiation monitoring and control system. This system monitors radioactive emissions, including those that could potentially lead to air pollution. It

ensures that radiation levels in the atmosphere remain within acceptable limits to prevent harm to public health and the environment.

3. **Emission Standards and Safeguards:** The Act sets emission standards for radioactive substances released into the air during nuclear activities. These standards are designed to minimize air pollution from radioactive emissions, which can have far-reaching environmental and health impacts.
4. **Emergency Preparedness and Response:** The Act requires the development of emergency preparedness and response plans for nuclear incidents or accidents. This includes provisions to address situations where radioactive substances could be released into the atmosphere, potentially causing air pollution. Prompt and effective response measures aim to mitigate the consequences of such incidents.
5. **Regulatory Authority:** The Act designates a regulatory body responsible for overseeing nuclear safety and radiation protection. This authority ensures compliance with emission standards, monitors air quality for radioactive substances, and enforces measures to prevent air pollution resulting from nuclear activities.
6. **Public Information and Participation:** The Act emphasizes the importance of public information and participation in nuclear safety and radiation protection matters. This ensures that the public is informed about potential air pollution risks, and their concerns are taken into account in decision-making processes.

Water Pollution:

Water Resources Act

The Water Resources Act, enacted in 2004, provides a comprehensive legal framework for the management, conservation, and regulation of water resources in Nigeria. While the primary focus of the act is on water resource management, it indirectly addresses water pollution by establishing measures to prevent and mitigate pollution of water bodies.

Key provisions and implications of the Water Resources Act in relation to water pollution include:

1. **Water Quality Standards:** The Act empowers the National Water Resources Institute (NWRI) and State Water Agencies to establish and enforce water quality standards. These standards specify permissible levels of pollutants and contaminants in water bodies, thereby addressing water pollution and maintaining water quality.
2. **Pollution Control Measures:** The Act outlines measures to prevent, control, and abate water pollution. This includes regulating discharges of pollutants into water bodies and requiring industries and other sources to implement pollution control technologies and practices.
3. **Water Allocation and Licensing:** The Act establishes a framework for the allocation and utilization of water resources, including provisions for obtaining water abstraction licenses. This process ensures that water users adhere to specified quality standards, preventing the contamination and pollution of water sources.
4. **Pollution Prevention and Control:** While the Act doesn't explicitly address water pollution, it indirectly promotes pollution prevention by requiring water users to adhere to environmentally sound practices. The act's emphasis on sustainable water use inherently includes measures to prevent activities that could lead to water pollution.
5. **Waste Discharge Regulation:** The Act empowers relevant authorities to establish regulations for discharges into water bodies. This includes setting standards for effluent quality and discharge limits, which helps control industrial, agricultural, and domestic waste discharges that could contribute to water pollution.
6. **Erosion and Sedimentation Control:** The Act includes provisions related to soil erosion and sedimentation, which can impact water quality by introducing pollutants into water bodies. Measures to control erosion indirectly contribute to preventing sediment-related water pollution.

Oil Pipelines Act

The Oil Pipelines Act is a regulatory law in Nigeria that pertains to the transportation of oil through pipelines, which can have implications for water pollution in cases of pipeline leaks or spills. The Oil Pipelines Act is designed to regulate the construction, operation, and maintenance of pipelines used for the transportation of oil and petroleum products. While the primary focus of this act is on pipeline infrastructure and safety, its provisions can indirectly impact water

pollution, especially when pipeline leaks or spills occur near water bodies. Below is an overview of its provisions and how they relate to water pollution:

1. **Pipeline Design and Construction:** The Act outlines standards and requirements for the design, construction, and installation of pipelines. Proper design and construction help minimize the risk of leaks or spills that could potentially lead to water pollution.
2. **Inspections and Maintenance:** The Act mandates regular inspections and maintenance of pipelines to ensure their integrity and prevent leaks. Effective maintenance practices contribute to reducing the likelihood of pipeline failures that could contaminate water bodies.
3. **Emergency Response:** The Act requires pipeline operators to have emergency response plans in place to address accidents, spills, or leaks. A swift and effective emergency response is crucial to minimizing the impact of spills on water quality and aquatic ecosystems.

National Environmental (Surface and Ground Water Quality Control) Regulations

The National Environmental (Surface and Ground Water Quality Control) Regulations are a set of regulatory guidelines in Nigeria that focus on the protection and management of both surface and ground water quality. These regulations provide standards and measures to control and maintain the quality of water resources to prevent pollution and ensure the sustainability of water bodies. It lay out specific guidelines and standards for monitoring, managing, and preventing water pollution. These regulations have a direct and significant impact on environmental protection, particularly in preventing water pollution. Here's how the regulations' provisions relate to these aspects:

1. **Water Quality Standards:** The regulations establish precise standards for various water quality parameters such as pH, dissolved oxygen, turbidity, heavy metals, pathogens, and other pollutants. These standards set limits that water bodies must meet to ensure water quality and prevent contamination.

2. **Pollution Control Measures:** The regulations outline measures to prevent, control, and mitigate pollution of both surface and groundwater. They may address various pollution sources, including agricultural runoff, industrial discharges, wastewater treatment, and domestic sewage, with the goal of minimizing pollution and its impact on water bodies.
3. **Monitoring and Reporting:** The regulations require regular monitoring of water quality parameters to assess the state of water bodies. These monitoring activities help identify pollution sources and trends, enabling prompt actions to prevent and address water pollution.
4. **Permitting and Compliance:** The regulations may establish a permitting system that requires industries, businesses, and activities with potential water pollution risks to obtain permits. These permits outline pollution control measures and conditions for discharge, ensuring compliance with water quality standards.
5. **Environmental Impact Assessment (EIA):** Projects with potential water pollution implications may be required to undergo an EIA to assess their potential impacts on water quality. This process helps identify measures to prevent or mitigate pollution before

Solid Waste Pollution

Harmful Waste (Criminal Offence act)

The Harmful Waste (Special Criminal Provisions) Act is a regulatory law in Nigeria that addresses the illegal dumping, transportation, and disposal of harmful waste materials, which can have significant implications for environmental protection, including the prevention of solid waste pollution. Enacted to deter and penalize the unlawful handling of harmful waste materials, the Harmful Waste (Special Criminal Provisions) Act establishes criminal provisions and penalties for offenses related to harmful waste. While its primary focus is on waste management and criminal actions, the act's provisions have direct implications for preventing solid waste pollution and protecting the environment. Here's how the act's provisions relate to these aspects:

1. **Prohibition of Harmful Waste Activities:** The act prohibits various activities related to harmful waste, including dumping, transportation, and disposal of such waste in a manner that could lead to environmental contamination, including solid waste pollution.
2. **Criminal Offenses and Penalties:** The act outlines specific criminal offenses related to harmful waste activities. Individuals or entities found guilty of violating the act's provisions may face substantial fines and imprisonment. These penalties aim to deter harmful waste practices and their potential to cause pollution.
3. **Waste Disposal Standards:** The act may include provisions related to waste disposal standards and guidelines. These standards ensure that harmful waste is managed and disposed of safely, minimizing the risk of solid waste pollution and environmental harm.
4. **Regulatory Oversight:** The act designates regulatory bodies responsible for overseeing and enforcing its provisions. These authorities play a crucial role in monitoring waste management practices and taking action against those engaged in harmful waste activities that could lead to solid waste pollution.
5. **Environmental Protection:** While the primary goal of the act is to address criminal activities related to harmful waste, its provisions contribute to environmental protection, including the prevention of solid waste pollution. By imposing legal consequences for improper waste handling, the act helps safeguard soil quality and prevent the accumulation of harmful waste.

National Environmental (Sanitation and Wastes Control) Regulations, 2009.

The National Environmental (Sanitation and Wastes Control) Regulations, 2009, which were enacted to control sanitation and waste management practices, set forth precise principles and requirements for the proper handling, disposal, and management of wastes. The avoidance of pollution and the preservation of the environment are directly and significantly impacted by these policies. The provisions of the regulations in relation to these areas are as follows:

1. **Waste Collection and Disposal:** The regulations outline procedures for waste collection, transportation, and disposal. Proper waste collection and disposal practices prevent pollution by minimizing the uncontrolled accumulation of waste in the environment.

2. **Waste Segregation:** The regulations may require waste segregation at source to separate different types of waste. Segregation facilitates proper waste management, recycling, and disposal, contributing to pollution prevention.
3. **Waste Treatment:** The regulations may provide guidance on waste treatment methods, including recycling, composting, and other environmentally friendly techniques. Proper treatment reduces the potential for pollution from untreated or improperly treated waste.
4. **Waste Storage:** The regulations may include standards for the storage of waste before collection. Proper storage prevents waste from being exposed to the environment, minimizing the risk of pollution.
5. **Hazardous Waste Management:** The regulations may specifically address hazardous waste management, including requirements for handling, storage, transportation, and disposal. Effective management of hazardous waste prevents contamination and pollution of soil and water resources.
6. **Enforcement and Penalties:** The regulations likely include provisions for enforcement, compliance, and penalties for violations. These measures ensure that waste management practices adhere to the standards set forth in the regulations.
7. **Public Awareness:** The regulations may emphasize public awareness and education about proper waste management and sanitation practices. Community involvement can contribute to pollution prevention by promoting responsible waste disposal.
8. **Regulatory Oversight:** The regulations establish roles and responsibilities for regulatory bodies and local authorities in enforcing waste management and sanitation standards. These bodies play a role in ensuring compliance and preventing pollution.

National Oil Spill Detection and Response Agency Act 2005 (NOSDRA Act)

Enacted to address the challenges posed by oil spills and environmental pollution in Nigeria, the NOSDRA Act empowers the National Oil Spill Detection and Response Agency (NOSDRA) to regulate and oversee various aspects of oil spill prevention, response, and management. While its primary focus is on oil pollution, the act's provisions have direct implications for preventing oil pollution and protecting the environment. Here's how the act's provisions relate to these aspects:

1. **Oil Spill Prevention:** The act mandates NOSDRA to develop and enforce regulations, standards, and guidelines for the prevention of oil spills during oil exploration, production, transportation, and related activities. These measures directly contribute to preventing oil pollution incidents.
2. **Oil Spill Detection and Reporting:** NOSDRA is responsible for detecting and monitoring oil spills. The act requires oil industry operators to promptly report oil spill incidents to NOSDRA, enabling swift response to prevent further pollution.
3. **Oil Spill Response and Management:** The act empowers NOSDRA to coordinate and oversee the response to oil spills and environmental emergencies. NOSDRA's role includes facilitating cleanup, containment, and remediation efforts to minimize the impact of oil pollution.
4. **Pollution Control Measures:** The act outlines measures for controlling and mitigating oil pollution. It may require the use of best practices, technologies, and methods to minimize the extent of oil spills and their impact on the environment.
5. **Environmental Protection:** While the primary goal of the act is addressing oil pollution, its provisions contribute to environmental protection by preventing oil spills, minimizing their impact, and ensuring responsible oil industry practices.

Industrial Pollution

Factories Act

Enacted to provide for the regulation of working conditions in factories and the welfare of workers, the Factories Act outlines various provisions related to workplace safety, health, and welfare. While its primary focus is on worker protection, the act's provisions have implications for pollution prevention and environmental health in the context of industrial waste. Here's how the act's provisions relate to these aspects:

1. **Waste Management and Disposal:** The act may include provisions related to waste management and disposal within factory premises. Proper waste management practices help prevent pollution and contribute to a safer and cleaner environment for workers and the surrounding community.

2. **Hazardous Substances:** The act may address the handling, storage, and disposal of hazardous substances within factories. Proper management of hazardous materials reduces the risk of environmental contamination and pollution.
3. **Ventilation and Air Quality:** The act may stipulate requirements for proper ventilation and air quality within factories. Ensuring adequate ventilation can help prevent the release of pollutants into the air and maintain a healthier working environment.
4. **Wastewater Discharge:** The act may have provisions related to the discharge of wastewater from factories. Regulations on wastewater quality and disposal can prevent water pollution and protect water resources.
5. **Health and Environmental Impact:** While the primary concern is worker health, certain activities that pose a risk to workers' health might also have environmental consequences. The act's provisions may indirectly influence the control of practices that could lead to environmental pollution.
6. **Occupational Health and Safety:** The Factories Act emphasizes creating a safe and healthy working environment for employees. These provisions can impact practices related to waste disposal and management, reducing the risk of pollution and exposure to hazardous materials.
7. **Emission Control:** The act may include provisions related to controlling emissions, fumes, dust, and other byproducts generated during industrial processes. These provisions help prevent air pollution and protect workers and the surrounding environment.
8. **Workplace Layout:** The act may prescribe guidelines for the layout of factory premises, including waste storage areas and disposal sites. Proper layout considerations can prevent waste spillage and contamination.
9. **Reporting and Compliance:** The act likely includes requirements for factories to report incidents, accidents, and unsafe conditions. By addressing potential issues promptly, the act indirectly contributes to pollution prevention.
10. **Enforcement and Penalties:** The Factories Act establishes mechanisms for enforcement, compliance, and penalties for violations. These measures ensure that waste management practices adhere to the standards set forth in the act, preventing pollution and promoting responsible waste disposal.