Session 13 How to Write a Permit

Booz | Allen | Hamilton

Session 13 Agenda:
How to Write a Permit

- Introduction
- General Permit Condition Modules
- General Facility Condition Modules
- Unit-Specific Modules
- Groundwater Modules
- Closure/Post Closure Modules
- Hazardous and Solid Waste Amendments (HSWA) Permit Modules
- Public Participation During the Permitting Process

Introduction

- Permit development
  - Submission of the Part B application
  - Determined to be complete and/or technically adequate, based on permit writer's review
- Writing a Draft RCRA Permit
  - Incorporate, by reference or as an attachment, part(s) of the application as permit conditions
  - Develop permit conditions for those issues that were not addressed in Permit Application
  - Incorporate other information (by reference)
- Draft permit/final review

Organization of the Example Permit

- General review of modules in the example permit
  - Module I - General Permit Conditions
  - Module II - General Facility Conditions
  - Module III - Containers
  - Module IV - Tanks
  - Module V - Landfills
  - Module VI - Groundwater Detection Monitoring
  - Module VII - Groundwater Compliance Monitoring
  - Module VIII - Corrective Action for Regulated Units
  - Module IX - Post-Closure

Organization of the Example Permit (cont.)

- The example permit does not have modules that address:
  - Mobile Treatment Units
  - Research, Development and Demonstration (RD&D) Permits
  - Miscellaneous Units
  - Boilers and Industrial Furnaces (BIFs)
  - Containment Buildings
  - Incineration and Short-Term Test Incineration
  - Land Treatment Operations and Demonstrations
  - Waste piles
  - Surface impoundments

General Permit Conditions (cont.)

- Effect of permit
  - Specifies where the facility is allowed to treat, store, or dispose of waste on site
  - Prohibits any treatment, storage, or disposal not authorized by permit
- Permit actions
  - Permit modification, revocation, and issuance and termination
  - Permit renewal
  - Permit expiration
    - Usually a ten-year duration
    - Allows the permit to remain in effect after the expiration date if the Agency was unable to issue a new permit

General Permit Conditions (cont.)

- Severability
  - Ability to sever permit
- Definitions
  - Areas of concern
  - Compliance period
  - Corrective action
  - Hazardous waste management unit

General Permit Conditions (cont.) Duties and Requirements

- Duty to Comply
  - Requires compliance with all conditions of the permit)
- Duty to Reapply
- Duty to Mitigate
  - Minimizes release to environment
- Proper Operation and Maintenance
  - Necessary to achieve compliance with permit
- Duty to Provide Information
  - Requires the Permittee to submit requested information
- Inspection and Entry
  - Allows representative access to documents, allows EPA to enter and inspect facility, and monitor sampling at the facility
- Monitoring & Records
  - Samples taken by facility must be representative
  - Maintain records of monitoring

General Permit Conditions (cont.)
Duties and Requirements (cont.)

- Reporting Planned Changes
  - Notify EPA of alteration in permitted facility
- Certification of Construction
  - Only applied to new or modified facility
  - Requires submission of modification
  - Professional Engineer (PE) certification
- Transfer of Permits
  - Not transferable until Regional Administrator has been notified
  - 24-Hour Reporting
  - Report any noncompliance that endangers health or the environment
  - Require a description of occurrence
  - Written submission in 5 days
- Other Noncompliance
  - Require reporting of other instances
  - A "catch all" condition
- Other Information
  - Another "catch all" condition

General Permit Conditions (cont.)

- Signatory Requirement
- Reports, Notifications, and Submissions to Regional Administrator
- Documents to be submitted prior to operation
  - Important section; requires submittal of any document not complete or ready at time of issuance
  - Often used by engineer as building plans
  - Groundwater monitoring data
- Confidential Information
  - Right to claim certain information as confidential

General Permit Conditions (cont.)

- Documents to be Maintained at the Facility
  - Waste Analysis Plan
  - Permit Application
  - Training Records
  - Operating Record
  - Contingency Plan
  - Post-Closure Plan, if applicable
  - Annually adjusted cost estimates
  - Groundwater monitoring records
  - Installation records
    - Monitoring wells and groundwater elevations during the life of the permit
  - Inspection schedules

General Facility Conditions

- Design and Operation of Facility
  - To minimize the possibility of fire, explosions, or unplanned releases
- General Waste Analysis
  - Permittee shall follow waste analysis procedures described in waste analysis plan of the approved Permit Application
    - Usually referenced and incorporated into permit as an attachment

General Facility Conditions (cont.)

- Example of Part II General Facility Conditions, when Waste Analysis Plan is incomplete

  A. Design and Operation of Facility

  B. Required Notices

  C. General Waste Analysis

  The Permittee shall follow the waste analysis procedures required by 40 CFR 264.13, as described in the attached Waste Analysis Plan, Permit Attachment _____, as amended herein

  C.1. The Permittee shall incorporate into the Waste Analysis Plan the following test parameters for the waste stream identified as _____

  i) parameter 1 (name)

  ii) parameter 2 (name)

General Facility Conditions (cont.)

- Example of Part II General Facility Conditions, when Waste Analysis Plan is incomplete (cont.)

  C.2. The Permittee shall incorporate into the Waste Analysis Plan the following SW-846 test methods for parameter 1, parameter 2, etc.

  i) SW-846 method ____ for parameter 1

  ii) SW-846 method ____ for parameter 2

  C.3. The Permittee shall sample the waste stream identified ____, for parameters 1, 2, etc., in accordance with SW-846 ____. The waste will be sampled in the following manner (you will need to get specific depending on site-specific issues), using ____ type of sample equipment

  C.4. The Permittee shall analyze the waste stream identified in permit condition II.C.1 on an annual basis

General Facility Conditions (cont.)

- Security
  - Specifies the security requirements for the facility
  - Usually referenced and incorporated into the permit
- General Inspection Requirements
  - Usually referenced and incorporated into permit as an attachment
  - Requires that the Permittee address any problems or malfunctions found during an inspection
  - If no inspection schedule is in application, must create a permit condition
- Personnel training
  - Usually an attachment
  - Requires Permittee to maintain training documents

General Facility Conditions (cont.)

- Required Notices
  - Hazardous waste from off-site sources
    - Inform generator and have appropriate permits in writing
    - Keep notice as part of operating record
  - Hazardous waste imports
    - Provide notice if receiving hazardous waste from foreign source

General Facility Conditions (cont.)

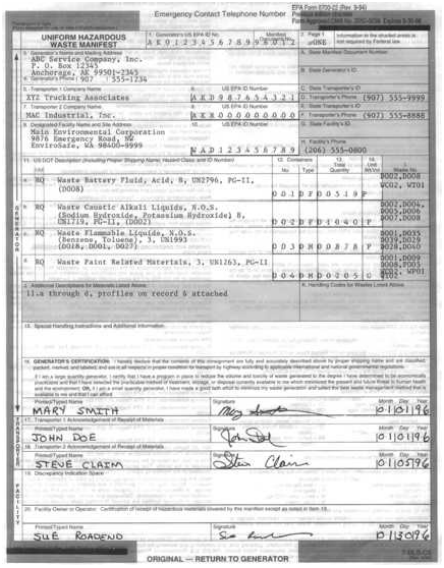
- Contingency Plan
  - Implementation of Plan
    - Requires that the Contingency Plan in the application be referenced and incorporated as an attachment
    - Requires wording that specifies that the contingency plan will be implemented if there is a fire, explosion, or release
  - Copies of Plan
  - Amendments to Plan
  - Emergency Coordination
    - Specify Emergency Coordinator and an alternate
    - Name, address, and phone number of persons qualified to act as Emergency Coordinator
    - New facilities may need to supply this information (not hired yet). Place a permit condition also in General Standards - documents to be submitted

General Facility Conditions (cont.)

- Special provisions for ignitable, reactive, or incompatible waste
  - May be an attachment
  - Special permit conditions may be needed, if it is only generally addressed by the applicant and more detail is needed
  - Should include specific handling procedures that are tailored to the type of waste and type of facility
- Location standards
  - For facilities located in sensitive locations
  - If in a sensitive area, may need special operation procedures
  - Also for facilities located in 100-year flood plain

General Facility Conditions (cont.)

- Recordkeeping and Reporting
  - Operating Record
    - Maintain written operating record
  - Required reports
    - Comply with biennial or quarterly reporting requirements
- Manifest System
  - Only if off-site waste is accepted



General Facility Conditions (cont.)

- Preparedness and Prevention
  - Required equipment
  - Fire alarm system
  - Testing and maintenance of equipment
  - Access to communications or alarm systems
  - Required aisle space
  - Arrangements with local authorities

- General Closure Requirements
  - Performance Standard
    - Requires that the Closure Plan (in the application) be referenced and incorporated as an attachment

General Facility Conditions (cont.)

- General Closure Requirements
  - Amendment to Closure Plan
    - Whenever necessary, such as change in units, facility operations, etc.
  - Notification of Closure
    - 60 days prior to closure (landfills, surface impoundments, waste piles, land treatment units)
    - 45 days prior to closure (tanks, container, incinerators)
    - Specify unit(s) or facility to be closed
    - Partial or final closure
    - Notify Regional Administrator
  - Disposal or Decontamination of Equipment, Structures, and Soils
    - Required decontamination/disposal of all contaminated equipment, structures and soils

General Facility Conditions (cont.)

- General Closure Requirements (cont.)
  - Certification of Closure
    - Signed by owner/operator and independent registered PE
  - Survey Plat
    - Only for disposal units
    - Submit prior to or by closure certification submission
- Time Allowed for Closure
  - Usually a closure schedule specified in application and then incorporated as a reference
  - Regional Administrator can grant longer time frame if needed

General Facility Conditions (cont.)

- Cost Estimate for Facility Closure (and Post-Closure)
  - Revise cost estimate if closure (or post-closure) plan is changed
  - Keep most recent estimate at facility
- Financial Assurance for Facility Closure (and Post-Closure)
  - Demonstrate continuous compliance with 40 CFR 264 requirements
  - Changes in financial assurance mechanisms require Regional Administrator approval

General Facility Conditions (cont.)

- Liability Requirements
  - Coverage for sudden and accidental occurrences
  - At least $1 million per occurrence, $2 million annual aggregate (excluding legal defense costs)
  - At least $3 million per occurrence, $6 million annual aggregate if facility contains surface impoundments, landfills, or land treatment units
  - Regional Administrator may grant variance from above financial requirements
- Incapacity of Owners or Operators, Guarantors, or Financial Institutions

General Facility Conditions (cont.)

- Post-Closure
  - Example of units requiring post-closure care

Regulated Unit	Dates Unit(s) Operated	Total Maximum Capacity	Description of Wastes Contained	Hazardous Waste Code
Surface Impoundment	1978 - 2001	2000 Cubic Meters	Spent Halogenated Solvents	F001
Waste Pile	1980 - 1990	3000 Cubic Meters	Spent Non-Halogenated Solvents	F005

General Facility Conditions (cont.)

- General Post-Closure Requirements
  - Post-Closure Care Period
    - 30 years after completion of closure
  - Post-Closure Security
    - Security maintained during post-closure care period
  - Amendment to Post-Closure Plan, as needed
  - Post-Closure Notices
    - Submit records of hazardous waste type, quantity, and location in each disposal unit (60 days after certification)
    - Record notice on deed and certification of recording of notice on deed (60 days after certification)
    - Obtain permit modification prior to post-closure removal of hazardous wastes, residues, liners, or contaminated soils

General Facility Conditions (cont.)

- General Post-Closure Requirements
  - Certification of Completion of Post-Closure Care
    - Within 60 days of end of post-closure for each unit
    - Signed by owner/operator and independent registered PE
- Cost Estimate for Facility Closure (and Post-Closure)
  - Most recent estimate(s)
  - Adjust for inflation within anniversary date of financial instrument or establishment (or as required by state)

Containers

- General Description
  - Reference permit application
  - General discussion of activities, including:
    - Description and dimensions of each container area
    - Maximum amount and types of wastes handled
    - Container description
    - Description and capacities of primary/secondary containment systems
    - Unique or special features
    - Reference to special permit conditions

Containers (cont.)

- Permitted and Prohibited Waste Identification
  - The Permittee may store and/or treat (as applicable) the following wastes in containers at the facility as shown in the following example:

Container Storage Area	Description of Hazardous Waste	EPA Hazardous Waste Code	Maximum Volume	Maximum Number and Type of Container
CSA-1	Spent Halogenated Solvents	F001	10,000 gallons	200 50-gallon drums

Containers (cont.)

- Condition of containers
  - Hazardous waste stored in containers that are not in good condition or begin to leak shall be stored in containers that are in good condition or are otherwise managed to comply with permit conditions
- Compatibility of waste with containers
- Management of containers
  - Containers shall be kept closed during storage, except to add or remove waste
  - Containers shall not be opened, handled, or stored in a manner that would cause leakage or rupture

Containers (cont.)

- Containment systems
  - Included only if secondary containment is required under 40 CFR 264.175
- Inspection schedules and procedures
  - Weekly inspections
  - Detect leaking/deteriorating containers and containment systems
- Recordkeeping
  - Waste analyses, trial tests, and other compliance documents in facility operating record

Containers (cont.)

- Closure
  - Remove all hazardous waste and hazardous waste residues
- Special Container Provisions for Ignitable or Reactive Waste
  - Containers must be located more than 15 meters (50 feet) from facility property line
  - Use specified procedures to prevent accidental ignition or reaction

Containers (cont.)

- Special Container Provisions for Incompatible Waste
  - Use specified procedures if placing incompatible wastes/materials in same container
  - Wash container prior to emplacing incompatible hazardous waste
  - Separate containers of incompatible wastes
  - Plans/procedures should address:
    - Layout of hazardous waste storage facility
    - Aisle space
    - Stacking height of containers

Containers (cont.)

- Compliance Schedule
  - Included in permit if Permittee is required to perform specific task within a specified time period (beyond other permit conditions) in order to retain permit
  - Permit writer should prepare schedule if it is not included in application
- Example—The Permittee shall provide the following information to the Regional Administrator:

Item	Date Due to Regional Administrator
Construct two-inch curb around drum storage area	January 5, 2008

Tanks – General Description

- Brief description of each tank system, including:
  - Feed systems
  - Safety cutoffs
  - Bypass systems
  - Pressure controls (e.g., valves)
- Tank system capacity
- Location of tank system and ancillary equipment (e.g., above ground, on ground, in ground, or underground)
- Age of existing tank system
- Waste types stored and/or treated
- Description of any treatment processes
- Description and capacity of secondary containment system
- Unique or special features of tank systems
- Reference to special permit conditions

Tanks – Permitted and Prohibited Waste Identification

- Permittee may [specify store and/or treat] a total volume of [specify number] gallons of hazardous waste in [specify number] tanks, subject to terms of this permit and as follows:

Example Table

Storage Tank No. and Location	Capacity (Gallons)	Tank Dimensions	Secondary Containment Required	Hazardous Waste Description	Hazardous Waste Code
Tank System A: C-10, Room B1	5,000	10 ft. (diam) x 20 ft.	In place	Waste organic solvents	F005
Tank System B: C-17, Room B1	5,000	10 ft. (diam) by 20 ft.	In place	Wastewater treatment sludge	F006
C-18, Room B1	6,000	18 ft. (diam) x 16 ft.	Due March 15, 2001	Waste organic solvents	F005

- Permitee is prohibited from storing or treating hazardous waste not identified above

Tanks – Secondary Containment and Integrity Assessments

- For tank systems storing newly regulated waste without secondary containment
  - Permittee shall obtain a written assessment of existing tank system integrity (certified by independent qualified registered PE) within 12 months of date the waste is defined as hazardous
- For tank systems with a secondary containment variance
  - Permittee shall design, operate, construct, and maintain tank according to the detailed plans and engineering and hydrogeologic reports in section ___ of the approved permit application to maintain the variance requirements
- For tank systems with secondary containment
  - Permittee shall design, operate, construct, and maintain tank according to the detailed plans and engineering and hydrogeologic reports in section ___ of the approved permit application

Tanks – Secondary Containment and Integrity Assessments (cont.)

- For tank systems with a schedule for secondary containment
  - Permittee shall comply with following conditions until required secondary containment is provided:
    - For non-enterable underground tanks, an annual leak test (or other Regional Administrator-approved tank integrity method) shall be conducted
    - For other than non-enterable underground tanks, a leak test (or other Regional Administrator-approved tank integrity method) shall be conducted at a frequency determined by Permit Writer
    - For ancillary equipment, an annual leak test (or other Regional Administrator-approved integrity method) shall be conducted
    - For tank system or component found leaking or unfit for use as a result of a leak test (or other assessment), Permittee will notify Regional Administrator and comply with leak/spill response conditions

Tanks – Operating Requirements

- Damage protection
  - Permittee shall not place hazardous waste or treatment reagents in a tank system if they could cause failure of tank, ancillary equipment, or containment system as specified in Section __ of the approved permit application
- Air emissions standards
  - Permittee will ensure that hazardous waste placed in tank is managed to comply with air emissions regulations
- Spill and overflow protection
  - Permittee shall prevent spills and overflows from tank or containment systems as specified in Section __ of the approved permit application

Tanks – Response to Leaks or Spills

- In the event of a leak or spill from the tank or secondary containment system, or if the system becomes unfit for continued use, Permittee shall remove system from service immediately and complete following actions:
  - Spill or leak cessation - Stop hazardous waste flow into system, and inspect system to determine cause of release
  - Spill or leak removal - Remove waste and accumulated precipitation from system within 24 hours of release detection to prevent further release and allow inspection/repair of system
  - Spill or leak cleanup - Contain visible releases to environment and, based on visual inspection: prevent further leak/spill migration to soils or surface water, and remove and properly dispose of visible soil or surface water contamination

Tanks – Response to Leaks or Spills (cont.)

- Tank System Closure or Repair
  - Close system according to Closure Plan in Section __ of the approved permit application, unless the following actions are taken:
    - For release that has not damaged tank system integrity, remove released waste and make necessary repairs to fully restore system integrity prior to return to service (applies to all tank systems)
    - For release from primary tank system to secondary containment system, repair primary system prior to its return to service (applies to systems with secondary containment)
    - For release from below-grade component without secondary containment, provide secondary containment to achieve compliance prior to returning component to service
    - For release from above-grade component without secondary containment that can be visually inspected, repair tank system prior to its return to service

Tanks – Inspection Schedules and Procedures

- Permittee shall inspect the tank system in accordance with the inspection schedule approved in Section __ of the approved Permit Application
  - Inspect overfill controls according to schedule
  - Inspect following tank system components daily:
    - Above-grade portions of system for corrosion/release detection
    - Data from monitoring/leak detection equipment to ensure that system is operating according to design
    - Construction materials and externally accessible portion of system (e.g., secondary containment system) for erosion/release detection

Tanks – Inspection Schedules and Procedures (cont.)

- Inspect cathodic protection system
  - Confirm proper operation of system within six (6) months of initial installation and annually thereafter
  - Inspect and test all impressed current sources every other month
- Documentation of compliance with relevant permit conditions is part of facility operating record
  - Minimum tank wall thickness
  - Measurement of tank wall thickness
  - Visual tank inspection
    - Open tank every two years for visual inspection

Tanks – Recordkeeping and Reporting

- Report leak or spill from tanks or secondary containment to Regional Administrator within 24 hours of detection
  - No report required if volume of hazardous waste <1lb, or if it is immediately contained/cleaned up
  - No report required if release contained by secondary containment
- Report following information to Regional Administrator within 30 days of detecting leak or spill from tanks or secondary containment:
  - Likely migration route
  - Characteristics of surrounding soil
  - Monitoring/sampling results associated with release
  - Proximity of downgradient drinking water sources, surface water, and populated areas
  - Description of response actions planned or taken

Tanks – Recordkeeping and Reporting (cont.)

- Submit to Regional Administrator certifications of major repairs to correct leaks within 7 days of returning tank system to service
- Obtain written statements by certifying personnel regarding design and installation of tank system, and keep at facility
- Maintain written assessments of tank system integrity at facility
- Maintain record of leak test and integrity test results at facility

Tanks – Closure and Post-Closure Care

- Closure procedures
  - At closure of tank systems, Permittee shall follow Closure Plan procedures approved in Section __ of the approved permit application
- Inability to close by removal or decontamination
  - Contingent closure and post-closure care procedures in Closure Plan and Post-Closure Plan must be followed if it is demonstrated that not all contaminated soils can be practically removed or decontaminated
  - Contingent Post-Closure Plan required at permit issuance if no secondary containment system is present

Tanks – Special Tank Provisions for Ignitable or Reactive Wastes

- Permittee shall not place ignitable or reactive waste in tank or secondary containment systems unless waste is treated, rendered, or mixed before or immediately after placement in tank system so that one of following applies:
  - Resulting waste, mixture, or dissolved material no longer meets definition of ignitable or reactive waste, and 40 CFR 264.17(b) precautions are complied with
  - Waste is managed so that it is protected from any material or conditions which might cause ignition or reaction
  - Tank system is used solely for emergencies
- Compliance with requirements for maintenance of protective distances between waste management area and any public ways, streets, alleys, or adjoining property lines that can be built upon

Tanks – Special Tank Provisions for Ignitable or Reactive Wastes (cont.)

- Placement in same tank
  - Permittee shall not place incompatible wastes, or incompatible wastes and materials in the same tank system or secondary containment system unless procedures specified in the Section __ of the approved permit application are followed [40 CFR 264.17(b) and 40 CFR 264.199(a)]

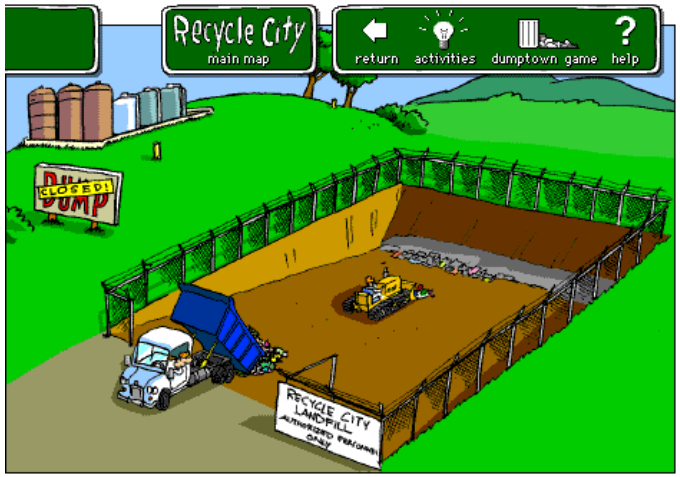
- Placement in undecontaminated tank
  - Hazardous waste shall not be placed in tank system that has not been decontaminated that previously held an incompatible waste unless precautions in 40 CFR 264.17(b) are met

Tanks (cont.)

- Compliance Schedule Example
  - Permittee shall provide following information to Regional Administrator:

Compliance Item	Date due to Administrator or State Department
As-built construction drawing for the secondary containment system for Tank B	January 25, 2008
Engineering design report for the secondary containment system for Tank B	January 5, 2008

Landfills



- General description includes
  - Brief description of each landfill unit
    - Dimensions and capacity
    - Liner description
    - Leachate collection and detection systems
  - Waste types to be disposed
  - Unique or special features of landfill
  - Reference to special permit conditions
- Permitted and Prohibited Waste Identification
  - Permittee may dispose of the following hazardous wastes in [specify landfills and/or landfill cells], subject to the terms of this permit

Landfills (cont.)

- Design and operating requirements
  - Two (or more) liners, leachate collection and removal system above top liner, leachate detection system between each liner shall be provided. Design plans and engineering reports should be provided as a permit attachment.
  - Collected leachate management plan should be included as attachment and/or described in permit
  - Run-on and runoff control system plans and operating practices should be included as a permit attachment (must be capable of handling peak discharge resulting from a 24-hour, 25-year storm)
  - Wind dispersal control systems or procedures should be included as a permit attachment
  - For landfills granted an exemption from minimum technology requirements or operating practices, detailed design and operating plans, hydrogeologic reports, and location information must be included as an attachment to the permit.

Landfills (cont.)

- Inspection Schedules and Procedures
  - Inspect condition and structures, run-on and runoff control systems, wind dispersal control, and leachate collection and detection systems at least weekly, and after storms
  - Attach schedule for inspecting all other items (e.g., monitoring wells, cover, liners, gas collection system)
  - Inspect liners and covers during construction
  - Inspect landfill immediately after construction

Landfills (cont.)

- Cell Location Surveying
  - Note in operating record
    - Exact location and dimensions of each cell
    - Types of hazardous wastes in each cell and approximate location of each waste type in each cell
- Closure and Post-Closure Care
  - Attach Closure Plan
  - Attach Post-Closure Plan

Landfills (cont.)

- Special Landfill Provisions for Ignitable or Reactive Wastes
  - Specific procedures for management of ignitable or reactive wastes should be included as a permit attachment
  - Ignitable wastes in containers may be disposed if:
    - Containers are non-leaking when placed
    - Containers are managed to avoid ignitable conditions
    - Ignitable wastes covered daily with six-inches non-combustible material
    - Co-managed wastes in cell will not generate heat sufficient to ignite wastes

Landfills (cont.)

- Special Landfill Provisions for Incompatible Wastes
  - Specific procedures to manage incompatible wastes in same landfill cell should be included as a permit attachment
- Special Landfill Provisions for Hazardous Wastes F020, F021, F022, F023, F026, and F027
  - Specific procedures for managing these "F" listed wastes should be included as a permit attachment
  - Permit writer should determine whether additional requirements are necessary to protect groundwater, surface water, or air

Landfills (cont.)

- Special Landfill Provisions for Hazardous Wastes Restricted from Landfill Units
  - Permit writer must document the basis for granting all exceptions to the land disposal restrictions
  - Information on specific wastes granted a case-by-case extension, and the expiration date of that extension must be specified
  - Information on specific wastes granted an exemption from land disposal restrictions must be specified

Landfills (cont.)

- Special Landfill Provisions for Liquid Wastes
  - No bulk or non-containerized wastes with free liquids allowed
  - Containers of wastes with free liquids prohibited unless
    - All free standing liquid is decanted or absorbed
    - Container is a lab pack or no larger than an ampule
    - Container is designed to hold free liquids for other than storage (e.g., batteries)
- Special Requirements for Empty Containers
  - Containers (larger than ampules) shall be at least 90% full
  - Empty containers must be crushed or shredded

Landfills (cont.)

- Provisions for Containerized Landfill Disposal of Lab Packs
  - Specific procedures for lab-pack disposal should be included as a permit attachment
- Compliance Schedule
  - Identify specific activities and milestone or completion dates

Groundwater Detection Monitoring

- Detection monitoring includes:
  - Development of list of indicator parameters
  - Establishment of sampling and statistical analyses
  - Establishment of additional requirements if statistically significant release occurs
- General description in permit includes:
  - Brief description of waste management units needing detection monitoring
  - Number, location, and depth of wells
  - Upgradient vs. downgradient wells
  - Indicator parameters and monitoring constituents
  - Background levels
  - Unique or special features
  - Reference to any special permit conditions

Groundwater Detection Monitoring (cont.)

- Well Location, Installation, and Construction
  - Specify number of monitoring wells; attach map showing uniquely identified wells to permit
  - Construction and maintenance plans and specifications should be attached to the permit
  - If wells are to be abandoned, permit writer may include specific procedures and require report documenting abandoning procedures to be submitted to Regional Administrator
- Indicator Parameters and Monitoring Constituents
  - Specify parameters and constituents and their established background concentrations (if known)
  - Specify procedures for establishing background concentrations if they are not known

Groundwater Detection Monitoring (cont.)

- Sampling and Analysis Procedures
  - Specify procedures and techniques for obtaining and analyzing groundwater samples
    - Collection
    - Preservation
    - Analysis
    - Chain-of-custody
- Elevation of Groundwater Surface
  - Permittee must determine groundwater elevations each time sampling occurs
  - Well elevation must be surveyed when well is installed

Groundwater Detection Monitoring (cont.)

- Statistical Procedures
  - Specify statistical method to be used to evaluate detection monitoring groundwater data
    - Parametric ANOVA
    - ANOVA based on ranks
    - Tolerance or prediction interval procedure
    - Control chart approach
    - Students t-test
    - Other approved method

Groundwater Detection Monitoring (cont.)

- Monitoring Program and Data Evaluation
  - Specify monitoring frequency (at least semi-annually)
  - Permittee must determine groundwater flow rate and direction (at least annually)
  - Permittee must determine, for each constituent, whether detected levels are above background
  - Permit should specify the number of days following a sampling event that a statistical evaluation report must be submitted

Groundwater Detection Monitoring (cont.)

- Recordkeeping and Reporting
  - All monitoring, testing, and analytical data must be entered into operating record
  - Established background values and statistical comparisons must be submitted to regulatory authority (Note: this is optional, permit writer may require reporting only when statistically significant results are noted)
    - Specify sampling and analysis and reporting schedule
  - If a statistically significant increase above background is detected
    - Notify Regional Administrator in writing within seven days
    - Immediately resample all wells
    - Establish background values for Appendix IX constituents
    - Within 90 days, Permittee must submit permit modification to establish a compliance monitoring program
    - Within 180 days, Permittee must submit a corrective action feasibility plan

Groundwater Detection Monitoring (cont.)

- Recordkeeping and Reporting
  - If Permittee determines statistically significant increase is due to source other than regulated unit
    - Notify Regional Administrator in writing within seven days of intended demonstration
    - Permittee shall submit demonstration within 90 days
    - If necessary, within 90 days, submit permit modification for any monitoring changes
    - Permittee shall continue detection monitoring
- Assurance of Compliance
  - "Boiler plate" language that monitoring and corrective action will comply with groundwater protection standard

Groundwater Detection Monitoring (cont.)

- Special Requirements of Significant Increases Occur in Values for Parameters or Constituents
  - Submission of a corrective action feasibility plan is not required if concentrations do not exceed values in Table 1 of 40 CFR 264.94, or Permittee has sought an Alternate Concentration Limit (ACL) variance
- Request for Permit Modification
  - Required within 90 days, if detection monitoring is no longer appropriate

Groundwater Compliance Monitoring

- Compliance monitoring includes
  - Development of list of 40 CFR Part 261 Appendix IX constituents that may be derived from facility
  - Specification of concentration limit for each constituent
  - Establishment of groundwater protection standard at compliance point
  - Establishment of duration of compliance period
- General description in permit includes
  - Same information identified in Module VI for compliance monitoring wells
- Well location, installation, and construction
  - Same requirements as described in Module VI

Groundwater Compliance Monitoring (cont.)

- Groundwater Protection Standard
  - Specify hazardous constituents and their concentration limits
  - Under certain circumstances, the Permittee may establish a concentration limit by sampling upgradient wells during each sampling event
  - Specify wells requiring compliance monitoring
  - Specify duration of compliance monitoring period
- Sampling and Analysis Procedures
  - Same as described for Module VI
  - Compliance monitoring is to be conducted at least quarterly (specify if more frequently)
  - Annual resampling of compliance point wells for all 40 CFR Part 261 Appendix IX constituents

Groundwater Compliance Monitoring (cont.)

- Elevation of Groundwater Surface
  - Same as described for Module VI
- Statistical Procedures
  - Same as described for Module VI to evaluate whether migration of hazardous constituents into and through the aquifer is detected

Groundwater Compliance Monitoring (cont.)

- Monitoring Program and Data Evaluation
  - Specify monitoring frequency (at least quarterly)
  - Permittee to determine groundwater flow rate and direction (at least annually)
  - Permittee to monitor all compliance permit wells for all 40 CFR Part 261 Appendix IX constituents (at least annually)
  - Permittee to determine, for each compliance monitoring constituent, whether levels are above concentration limits
  - Specify number of days following sampling that a report on statistical evaluations, required above, must be submitted

Groundwater Compliance Monitoring (cont.)

- Reporting and recordkeeping
  - All monitoring, testing, and analytical data must be entered into operating record
  - Permittee must submit analytical results of compliance monitoring in accordance with a [specified] schedule
  - If statistically significant increase above concentration limits is detected, must notify Regional Administrator in writing within seven days
  - If additional 40 CFR Part 261 Appendix IX constituents are detected, they must be reported within seven days of completing analysis

Groundwater Compliance Monitoring (cont.)

- Assurance of Compliance
  - "Boiler plate" language ensuring compliance with groundwater protection standards
- Special requirement if groundwater protection standard is exceeded
  - Notify Regional Administrator in writing within seven days
  - Submit permit modification for a corrective action program within 180 days (or 90 days if engineering feasibility study has previously been submitted)
- Request for Permit Modification
  - Submit a permit modification for a corrective action program within 180 days (or 90 days if engineering feasibility study has been prepared)
  - Submit permit modification for changes to compliance monitoring within 90 days, if the compliance monitoring program is no longer appropriate

Corrective Action for Regulated Units

- Corrective action is required to bring a regulated unit back into compliance when a groundwater protection standard has been exceeded
- General description in permit includes
  - Same information described in Module VII for corrective action wells
- Well location, installation, and construction
  - Same requirements as described in Module VII

Corrective Action for Regulated Units (cont.)

- Groundwater Protection Standard
  - Specify hazardous constituents and their concentration limits
  - Specify hazardous constituents to be monitored and duration of compliance period
- Corrective Action Program
  - Specify when corrective action is to begin
  - Corrective action must be implemented, including
    - Removing hazardous waste constituents, or
    - Treating them in place
  - Permit writer must specify corrective action measures required for constituents exceeding concentrations between compliance point and downgradient facility boundary

Corrective Action for Regulated Units (cont.)

- Corrective action program
  - Corrective action compliance period may be extended, as necessary, to ensure protection
- Sampling and Analysis Procedures
  - Same as described in Module VII
- Groundwater Surface Elevation
  - Same as described in Module VII
- Statistical Procedures
  - Same as described in Module VII

Corrective Action for Regulated Units (cont.)

- Monitoring Program and Data Evaluation
  - Specify monitoring frequency (at least quarterly)
  - Permittee to monitor all compliance point wells for all 40 CFR Part 261 Appendix IX constituents (at least annually)
  - Permittee to determine groundwater flow rate and direction (at least annually)
  - Permittee to determine, for each monitored constituent, whether levels are above concentration limits

Corrective Action for Regulated Units (cont.)

- Recordkeeping and Reporting
  - All monitoring, testing, and analytical data must be entered into operating record
  - Semi-annual reporting of effectiveness of corrective action program [specify report due dates] is required
  - Permittee must submit analytical results of corrective action monitoring in accordance with a [specified] schedule
- Request for Permit Modification
  - Submit a permit modification with 90 days, if corrective action program is no longer appropriate

Post Closure

- General description in permit
  - Brief description of activities covered
  - Identification of affected units
  - Types of wastes in each unit
  - Anticipated date of closure
  - Anticipated length of post-closure period
  - Monitoring and maintenance activities
  - Special features of post-closure operations
  - Reference to any special permit conditions

Post Closure (cont.)

- Unit Identification
  - Permittee shall provide post-closure care for the following hazardous waste management units, subject to the terms of the permit
- Post-Closure Procedures and Use of Property
  - Specify start and duration of post-closure care period (typically 30 years)
  - Groundwater monitoring required during post-closure period
  - For surface impoundments
    - Maintain final cover
    - Prevent run-on and runoff from damaging cover

Post Closure (cont.)

- Post-Closure Procedures and Use of Property
- For land treatment units
  - Continue operations to land treat hazardous constituents
  - Maintain vegetative cover over closed portions
  - Maintain run-on and runoff control systems
  - Control wind dispersal of wastes (if applicable)
  - Continue any prohibitions against growth of food-chain crops
  - Continue unsaturated zone monitoring

Post Closure (cont.)

- Post-Closure Procedures and Use of Property
  - For landfills
    - Maintain final cover
    - Continue operation of leachate collection systems
    - Maintain groundwater monitoring system
    - Prevent run-on and runoff from damaging cover
    - Protect surveyed benchmarks
  - Comply with security requirements during post-closure
  - Ensure subsequent use of property does not disturb final cover, liners, or monitoring systems during post-closure period
  - Include Post-Closure Plan as a permit attachment

Post Closure (cont.)

- Inspections
  - Attach post-closure inspection schedule to permit
- Notices and Certifications
  - 60 days following certification of closure of each unit, notify Regional Administrator and local land authority of type, location, and quantity of wastes in each unit
  - 60 days following certification of closure of final unit
    - Notation in deed to property
    - Survey plat showing unit locations
  - Permittee may submit a permit modification to remove all hazardous constituents from unit and demonstrate clean closure
  - 60 days following completion of post-closure care, submit certification signed by Permittee and independent registered professional engineer

Post Closure (cont.)

- Financial assurance
  - Permittee must maintain financial assurance through post-closure care period
  - Permit writer should include conditions and procedures for Permittee to be released from financial assurance

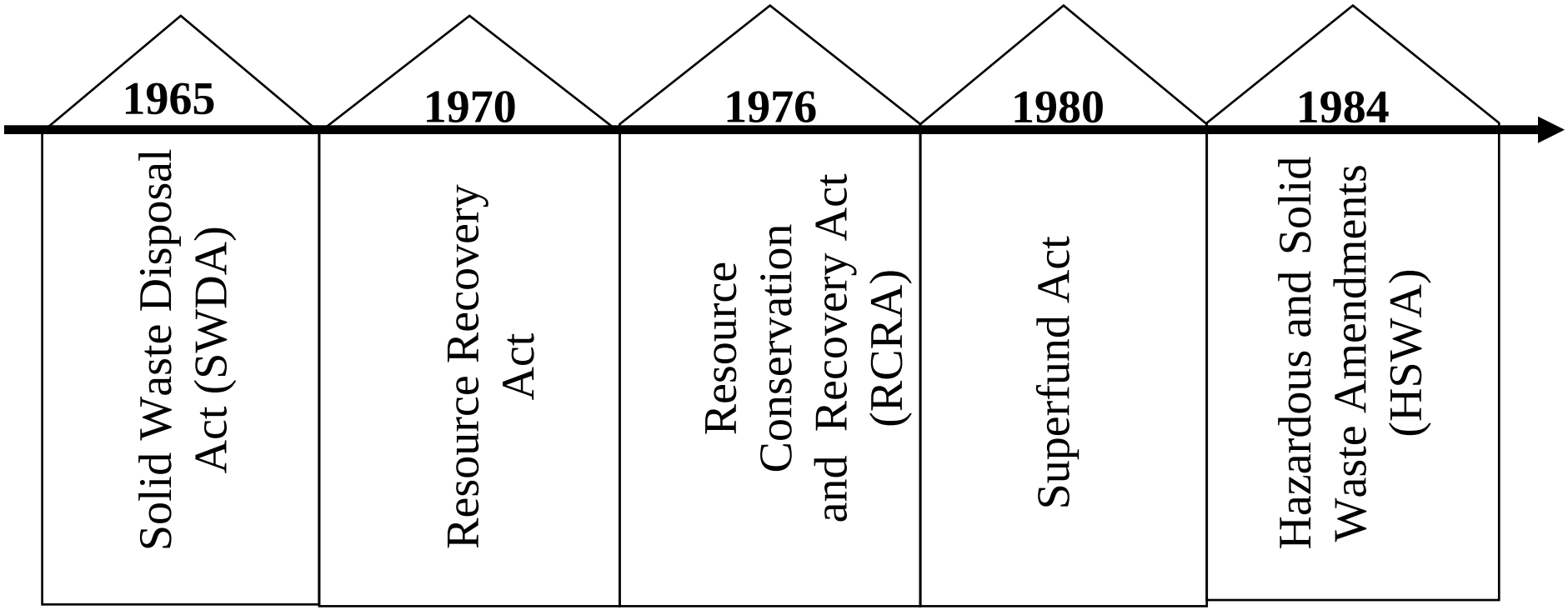
- Post-closure permit modifications
  - Permittee must submit a permit modification request within 60 days, if events occur that affect the post-closure plan or proposed changes will affect required post-closure activities

Organization of a HSWA Permit

- Introduction
- Hazardous and Solid Waste Amendment (HSWA) or Corrective Action Authority
- HSWA Permit

Introduction

- History of HSWA



HSWA authorized facility-wide corrective action

- Prior to HSWA, EPA could only require corrective action via two mechanisms
  - RCRA §7003 order
  - Groundwater monitoring provisions in §264.100, which govern releases from regulated units (e.g., landfills)
- HSWA added provisions for facility-wide corrective action
  - Specific cleanup authorities for permitted and interim status facilities
  - Codified corrective action for solid waste management units (SWMUs) in §264.101

EPA can use the following statutory authorities to require corrective action:

- Permitted corrective action
  - RCRA §3004(u) - Releases from SWMUs
  - RCRA §3004(v) - Releases beyond the facility boundary
  - RCRA §3005(c)(3) - Omnibus provision
- Corrective action orders
  - RCRA §3008(a) - Compliance orders
  - RCRA §3008(h) - Releases at interim status facilities
  - RCRA §7003 - Imminent and substantial endangerment

A HSWA permit is typically organized as follows:

- Title page
- Five parts
  - Standard Conditions
  - Corrective Action
  - Waste Minimization
  - Land Disposal Restrictions (LDRs)
  - Air Emission Requirements for Process Vents and Equipment Leaks

A HSWA permit is typically organized as follows (cont.):

- Common Appendices
  - A. Summary of SWMUs and Areas of Concern (AOCs)
  - B. RCRA Facility Investigation (RFI) Work Plan Outline
  - C. Corrective Measures Study (CMS) Plan Outline
  - D. Schedule of Compliance
  - E. Waste Minimization Certification Requirements
  - F. Action Levels (ALs)

Part I: Standard Conditions

- "Boiler plate" language
- Specific items covered include:
  - Effect of permit
  - Permit actions
  - Severability
  - Duties and requirements
  - Signatory requirement
  - Confidential information
  - Definitions

Part I: Standard Conditions (cont.)

- Signatory Requirements
  - All information signed and certified in accordance with 40 CFR §270.11
- Confidential Information
  - Information may be claimed RCRA confidential business information (CBI) in accordance with 40 CFR §270.12
- Definitions
  - Permit definitions (e.g., AL, AOC, corrective action management unit [CAMU], facility, SWMU, solid waste)

Part II: Corrective Action

- Corrective Action for SWMUs and AOCs
  - "Boiler plate" language
  - Specific items covered include:
    - Applicability
    - Notification and assessment for newly identified SWMUs and AOCs
    - Notification requirement for newly discovered releases at SWMUs
    - Confirmatory sampling
    - RFI
    - Interim measures (IMs)
    - CMS
    - Remedy approval and permit modification
    - Modification of schedule of compliance
    - Work plan and report requirements
    - Approval/disapproval of submittals
    - Dispute resolution

Part II: Corrective Action (cont.)

- Applicability
  - Permit conditions apply to SWMUs and AOCs listed in Appendices and other contamination that has migrated off site
- Notification and assessment for newly identified SWMUs and AOCs
  - Notification to Regional Administrator within 15 days
  - Preparation of SWMU Assessment Report within 90 days
- Notification requirement for newly discovered releases at SWMUs
  - Notification to Regional Administrator within 15 days

Part II: Corrective Action (cont.)

- Confirmatory Sampling
  - Confirmatory Sampling Work Plan submitted within 45 days of permit issuance
  - Approval by the Agency required prior to implementation
  - Confirmatory Sampling Report
- RFI
  - RFI Work Plan submitted within 90 days of permit issuance
  - RFI Work Plan must meet the requirements of Appendix B
  - Approval by the Agency required prior to implementation
  - Submittal of draft and final RFI Reports

Part II: Corrective Action (cont.)

- IMs
  - If required by the Agency, submittal of IM Work Plan within 30 days of notification
- CMS
  - CMS Work Plan submitted within 90 days of notification by Agency
  - CMS Work Plan must meet the requirements of Appendix C
  - CMS Work Plan requires approval prior to implementation
  - Implementation of CMS to begin within 15 days of Agency approval
  - Submittal of draft and final CMS Reports

Part II: Corrective Action (cont.)

- Remedy approval and permit modification
  - Remedy selected from the CMS alternatives
  - Statement of Basis
  - Permit modification to incorporate the final remedy
  - Financial assurance within 120 days of permit modification
    - May be required earlier in the corrective action process
    - No statute or regulation requiring financial assurance
    - Mechanisms to determine costs of remediation are under development
      - Tools include Remedial Action Cost Engineering Requirements (RACER) System

Part II: Corrective Action (cont.)

- Corrective Measures Implementation
  - Work plan within 30 days
  - Operation and maintenance plan
  - Construction report
  - Progress reports
  - Remedy completion reports

Part II: Corrective Action (cont.)

- Modification of schedule of compliance
  - Regulatory authority may modify the compliance schedule
- Work plan and report requirements
  - All work plans, reports, and schedules require approval prior to implementation
  - All documents must be submitted in accordance with the approved schedule
- Approval/disapproval of submittals
  - The Agency shall approve/disapprove all facility submittals
- Dispute resolution
  - Provisions for resolution of permit condition disputes

Other HSWA Permit Parts (III-V)

- Part III: Waste Minimization
  - Permittee must certify that a program is in place to reduce the volume and toxicity of hazardous waste generated to the degree economically practicable
- Part IV: LDRs
  - Permittee must maintain compliance with the LDR requirements of 40 CFR Part 268
- Part V: Air Emission Requirements for Process Vents and Equipment Leaks
  - Permittee must provide specific Part B information required pursuant to 40 CFR § 270.24 and 270.25 prior to the construction of any equipment with process vents

The HSWA permit has six appendices

- Appendix A: Summary of SWMUs and AOCs
  - Provides a listing of all SWMUs and AOCs identified at the facility, and specifies which units require no further action, confirmatory sampling, or an RFI
- Appendix B: RFI Work Plan and Report
  - Outlines the RFI and RFI Work Plan requirements
- Appendix C: CMS Plan
  - Outlines the CMS and CMS Work Plan requirements

The HSWA permit has six appendices (cont.)

- Appendix D: Compliance Schedule
  - Provides a schedule of compliance for all required activities at the facility
- Appendix E: Waste Minimization
  - Outlines the waste minimization certification objectives
- Appendix F: ALs
  - Specifies the hazardous constituent ALs for the facility

Conclusions

- HSWA enforcement strategy
  - Ensure site investigations are thorough and complete
  - Do not get bogged down in the minutia
  - Implement IMs if needed
  - Consider potential corrective measures early in the process
  - Ensure public participation during all phases

Agenda:
Public/Community Involvement and Participation

- Overview
- RCRA Regulatory Requirements
- Identifying the Audience
- Identifying the stakeholders
- Methods for collecting information
- Best practices for communicating with the public
  - Lessons learned from EPA outreach efforts
  - Lessons learned from Army and Air Force outreach efforts

Guidelines for a Successful Public Participation Program

- Create a dialogue that provides opportunities for feedback
- Establish trust and credibility in the community through honesty and openness
- Foster an informed and active community that understands the RCRA process, provides input to other concerned stakeholders, and openly discusses RCRA-related issues

What is Public Participation?

Public participation is any stakeholder activity conducted to increase public input or understanding of the RCRA permitting process.

Source: RCRA Public Participation Manual, Chapter 2

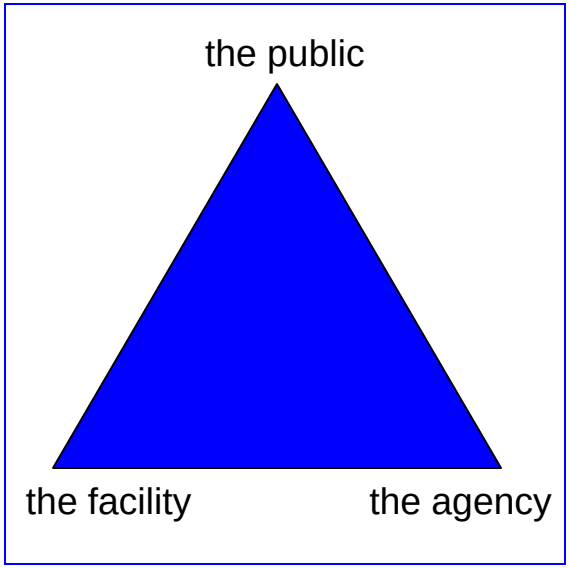
Guidelines for a Successful Public Participation Program (cont.)

- Ensure that public officials meet their obligations to the public
- Involve the public early in the RCRA process, receive feedback, and address public concerns before making decisions
- Assess the community to find out from citizens what types of activities would best allow them to participate

Guidelines for a Successful Public Participation Program (cont.)

- Plan public participation activities ahead of time, allowing flexibility for changing interest levels in the community
- Understand and respect the values and limitations of other stakeholders
- Take steps, such as issuing multilingual fact sheets or encouraging the formation of citizen advisory groups, to ensure that all segments of the interested community have an equal opportunity to receive information and participate in the process

Public Participation Triangle



This graphic illustrates how information should flow back and forth among parties involved in the RCRA process.

Guidelines for a Successful Public Participation Program (cont.)

- Support efforts to solve environmental problems in the context of the community in which they occur
- Periodically evaluate the program's effectiveness in the community and make adjustments as community attitudes and interest levels evolve

Public Involvement Requirements for Selecting a Final Cleanup Remedy

- General guidelines for public participation during the remedy selection phase of the corrective action process require (or recommend) that the agency:
  - For agency-initiated permit modifications: follow 40 CFR 124 procedures, which include publishing a public notice, holding a public comment period, and holding a hearing (if requested)
  - For corrective action under an order: publish a notice and a statement of basis, take public comments, hold a public hearing/meeting (if requested by the public or determined necessary by the overseeing agency), prepare and publish responses to comments, and publish the final remedy decision (making supporting information available)
  - Hold a workshop or informal meeting on the proposed remedy (recommended)
  - Send out a notice of decision once the final remedy has been selected
  - Issue a response to public comments
  - Hold workshops or informal meetings on the final remedy (recommended)

Source: RCRA Public Participation Manual, Chapter 4
http://www.epa.gov/epaoswer/hazwaste/permit/pubpart/chp_4.pdf

Identifying the Stakeholders

- Stakeholder Assessments
  - What are stakeholders concerned about or interested in?
  - Where do stakeholders get their information?
  - How and when do they want to get the information?
  - How do they want to be involved in the process?

Identifying the Stakeholders (cont.)

- Stakeholder Assessments
  - What are the best forums for discussing the issues and what are the best times to schedule meetings or activities?
  - What else is going on in the community that the facility and regulator needs to be aware of and sensitive to?
  - Who does the community consider to be credible sources of information? The answer to the question varies greatly between stakeholder groups, so it is crucial to identify who/what organizations each group respects.

Identifying the Stakeholders (cont.)

- Stakeholder Group Identification
  - Who has previously expressed interest in, or been involved with the issue?
  - Which groups are likely to be affected by the operation?
  - Which groups are likely to be upset if they are not consulted or alerted to the issue by the facility before they see media coverage on it?
  - Which groups should be consulted because they have information that could be useful to the project?

Identifying the Stakeholders (cont.)

- Stakeholder Group Identification
  - Which groups would provide a balance of opinions?
  - Which groups may not want to provide input, but need to be aware of the investigation and remediation activities?
  - Are facility employees well informed about the issue?
  - Are local, regional, and/or national activist groups involved with the program?

Commonly Affected Stakeholders

- Federal and state regulators
- Elected officials
- Employees and Unions
- Religious/civil organizations
- Ethnic and national origin/heritage associations
- Residential/business neighbors
- Public interest/activists groups
- Emergency response organizations
- Civic organizations
- Recreational/youth groups
- News media
- Professional or trade associations

Methods for Collecting Information

- Community Interviews
  - Elected officials
  - Civic association members
  - Neighborhood association members
  - Environmental advocacy groups
  - Municipal officials
- Telephone Surveys
- Focus Groups

Telephone Surveys

Pros	Cons
• Quantitative, statistically valid data	• Costly
• Opinions obtained from a cross-section of the community	• Does not provide opportunity to form relationships with stakeholders
• Data allows generalization about wider community values	• Limits the number of questions that can be asked
• Quick completion of the interview process	• Provides no opportunity for feedback or discussion
• Baseline results can be used for future comparisons	• Requires experts to design the questionnaires and interpret the data
	• People generally avoid telemarketers

Best Practices for Communicating with the Public
Lessons Learned from Army and Air Force Outreach Efforts

- Public involvement initiatives should be strategic and follow a distinct timeline
- Information campaigns and other outreach efforts should follow a well thought-out plan that clearly identifies the target audience
- Outreach materials should use a journalistic writing style, be geared to an appropriate level for the audience, and avoid technical jargon

The Army used direct mail pieces, among other outreach strategies, to communicate the closure of a chemical weapons disposal facility on Johnston Island to the public.

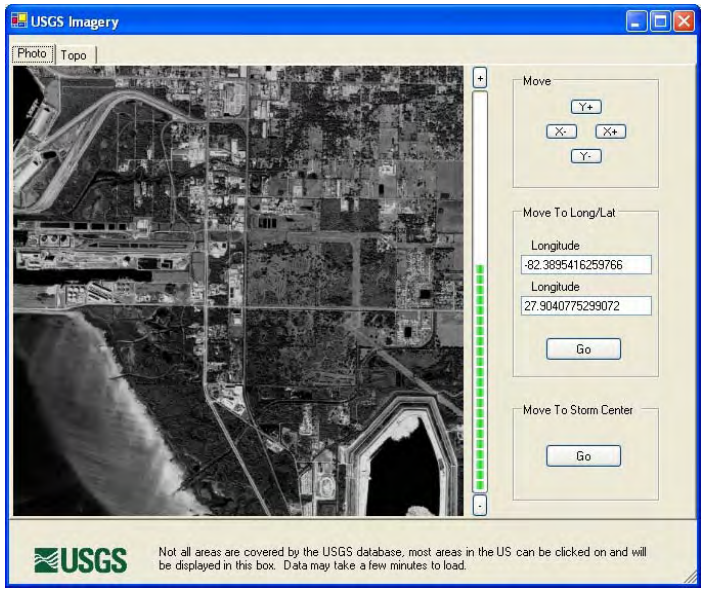
Best Practices for Communicating with the Public
Lessons Learned from Army and Air Force Outreach Efforts (cont.)

- Effective communication channels include:
  - Face-to-face meetings with opinion leaders
  - Personalized letters sent to select audiences
  - Informational open houses, public availability sessions, and poster sessions
  - Speaker's Bureau events and base/site tours for key community groups
  - Product templates developed/branded by headquarters, which regional offices can cater to specific audiences
  - News updates via the installation's Web site

The Air Force conducted site tours to educate community groups about the installation of permeable reactive barriers to treat contamination at the former Kelly AFB.

Best Practices for Communicating with the Public
Lessons Learned from EPA Outreach Efforts

- Effective communication channels include:
  - Informational open houses with poster presentations
  - Time line mailers/fact sheets
  - Site tours
  - Information booths at remediation sites
  - Informational Web sites
  - Cross-cultural/bilingual signage/meetings
  - Site update mailers
  - Videos
  - Maps/GIS



Time Line Example

Timeline of Vernay's corrective action activities

Following are dates for key activities Vernay agreed to conduct as part of the legal agreement with EPA. Completed activities are noted with a ✔.

November 2002
- Submit a current conditions report, which describes the property and any known contamination. ✔

Winter 2002 - 2003

Phase one of the RCRA* facility investigation to study site ground water, soil and sediment

- Begin a quarterly ground-water monitoring program to collect and test samples of water from area monitoring wells. ✔
- Review data collected about the ground water — called a capture zone analysis — and decide where to install another pumping well to slow movement of contaminated ground water. ✔
- Begin researching the option of treating contaminated soil in place without having to dig it up and move it off site. ✔

February 2003
- Install a second ground water pumping well on the property. ✔

April 2003
- Submit first quarterly report about the types and amounts of chemicals found in ground-water samples. ✔ *Vernay will submit quarterly reports about the ground water during the entire corrective action process.*

June 2003
- Begin treating contaminated soils in place (if Vernay and EPA decide this is the best option for cleaning the soil). ✔

September 2003
- Install more wells on and off the property to study the ground water and the water in the sewer that collects runoff water from storms. ✔

December 2003
- Submit a report — called a ground-water monitoring technical memorandum — that sums up results from the quarterly ground-water testing program. ✔

June 2004
- Submit the phase one facility investigation report, which describes all the results from testing the ground water and storm sewer water. The report will help EPA and Vernay decide if more wells are needed to study ground water farther away from the site. ✔

Phase two of the RCRA facility investigation

- Begin a study of contamination in ground water deeper under the site, if necessary. This would be done as part of a phase two RCRA facility investigation. ✔
- Submit the environmental indicator report for human health to show Vernay has removed health risks to people. ✔

December 2004
- Submit the phase two facility investigation report, providing details about the extent of all site contamination. ✔

Winter 2004 - 2005
- Submit the environmental indicator report for ground water, which shows contaminated ground water has stopped moving away from the site.

Summer 2005
- Propose an option for cleaning up any remaining contamination on the property and in the ground water. This is called the final corrective measures proposal.

EPA holds a comment period and public meeting for the public to comment on cleanup options.

Vernay begins cleanup.

** Resource Conservation and Recovery Act*

Public Participation Programs are Moving

- FROM:
  - Including everybody
  - Large public meetings/events
  - Involving the public at the end
  - “Being heard”

- TO:
  - Targeting most interested
  - Small activities and more innovative communications
  - Involving the public at the beginning and throughout process
  - Actively influencing decisions

References/Resources

- U.S. Environmental Protection Agency. Public Involvement Policy. (EPA 233-B-03-002). http://www.epa.gov/policy2003

- U.S. Environmental Protection Agency. RCRA Public Participation Manual. 1996. http://www.epa.gov/epaoswer/hazwaste/permit/pubpart/manual.htm

- U.S. Army. Final Leader's Public Involvement Guide. Army Involvement Toolbox. February 2005. https://www.asaie.army.mil/Public/IE/Toolbox/tool_guides.html