

# GROUNDWATER MONITORING PROGRAM EVALUATIONS



# What is a groundwater evaluation?

- ▶ A groundwater evaluation is a thorough review of the entire groundwater monitoring program and the groundwater monitoring system in conjunction with a review of the groundwater sampling and analysis plan and all applicable regulations and guidelines.



# Title 11, Part 4, Chapter 1, Rule 1.4

## Design Criteria

- ▶ Mississippi Regulations require groundwater monitoring at the relevant point of compliance that considers:
  - ▶ Hydrogeology
  - ▶ Leachate characteristics
  - ▶ Groundwater flow
  - ▶ Groundwater uses
  - ▶ Alternate sources
  - ▶ Cumulative impacts
  - ▶ Public welfare
  - ▶ Owner capabilities
  - ▶ Other relevant factors



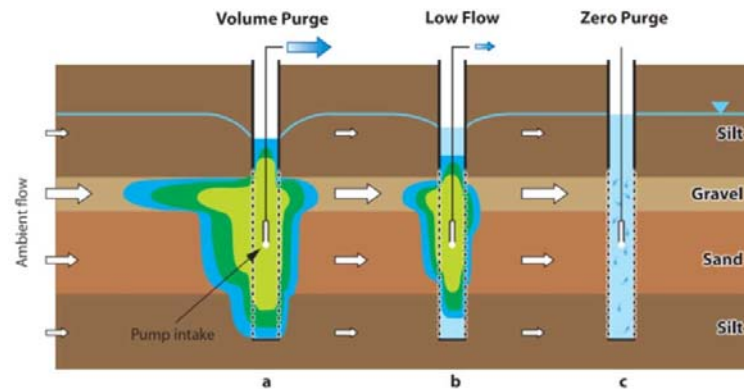
## Must also determine the schedule of compliance based on:

- ▶ Proximity of receptors
- ▶ Design of the landfill
- ▶ Age of the landfill
- ▶ Size of the landfill
- ▶ Types and quantities of the waste
- ▶ Value of the underlying aquifer
  - ▶ Current and future uses
  - ▶ Proximity and withdrawal rate of users
  - ▶ Groundwater quality and quantity



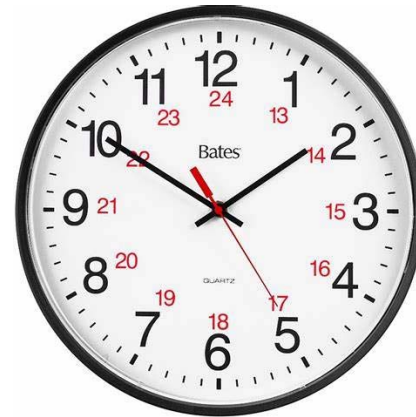
# Why perform an evaluation?

- ▶ Can be performed for a variety of reasons
  - ▶ To determine compliance
  - ▶ To evaluate performance and adequacy of:
    - ▶ Well siting: location, depth, number
    - ▶ Sampling protocol
      - ▶ Equipment
      - ▶ Procedures
    - ▶ Statistical tools
    - ▶ Recordkeeping and reporting procedures
    - ▶ Laboratory
      - ▶ QA/QC
  - ▶ To determine if procedures/program can be altered and/or streamlined
    - ▶ Could mean extra expenditures in the short term
    - ▶ Could lead to long term cost savings



# When should an evaluation be performed?

- ▶ A groundwater evaluation can be performed at any time or to address specific issues
  - ▶ Before an Agency inspection
  - ▶ As part of a permit modification
  - ▶ As part of a permit renewal
  - ▶ To help evaluate an SSI



# Who should perform the evaluation?

- ▶ An evaluation can be performed internally or by an outside party
  - ▶ Evaluator should have :
    - ▶ A thorough working knowledge of the regulations
      - ▶ Means you know them well enough to navigate them with relative ease
    - ▶ Knowledge of the history of the regulations
      - ▶ Statutes
      - ▶ Subtitle D
    - ▶ Knowledge of other related Division regulations
      - ▶ Reporting requirements
    - ▶ Knowledge of other related Agency regulations
      - ▶ Health and Hospitals
      - ▶ Oil & Gas
      - ▶ SW846
    - ▶ Knowledge of relevant Guidelines
      - ▶ Statistics
      - ▶ Well Construction
- ▶ Should not be performed by anyone involved in the program in any way



# What is necessary to conduct an evaluation?

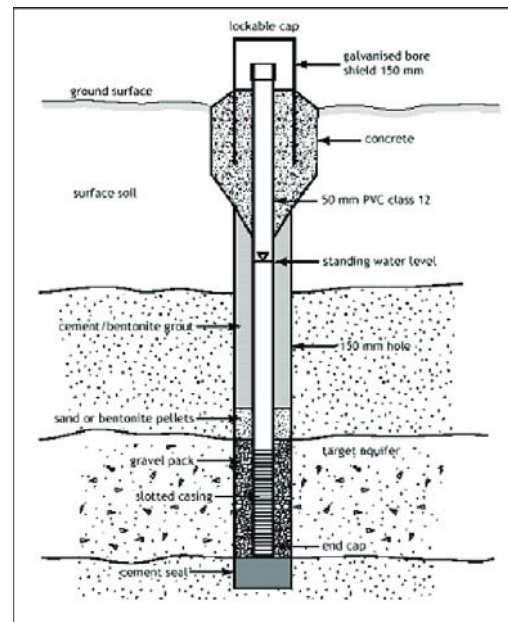
- ▶ Must have access to all relevant documents:
  - ▶ Permits
  - ▶ Previous sampling reports
  - ▶ Sampling and Analysis Plan
  - ▶ Field logbooks and records
  - ▶ Boring logs
  - ▶ Geologic evaluations
  - ▶ Monitoring data
  - ▶ Geotechnical assessments
  - ▶ Well construction logs
- ▶ May need to review regional geologic, well registration, and spill reports
- ▶ Soil data
- ▶ Geochemistry





# Knowledge of relevant regulations and guideline

- ▶ Monitoring Well System Requirements
  - ▶ Well Siting
  - ▶ Well Spacing
  - ▶ Well Construction
  - ▶ Well Depth
  - ▶ Monitored Zone(s)



# Knowledge of relevant regulations, guidelines and SAP

- ▶ Sampling Requirements
  - ▶ SAP
  - ▶ Detection Monitoring
  - ▶ Assessment Monitoring
- ▶ Field Procedures
  - ▶ Purging Equipment & Procedures
  - ▶ Sampling Equipment & Procedures
  - ▶ Sample Collection & Handling Procedures



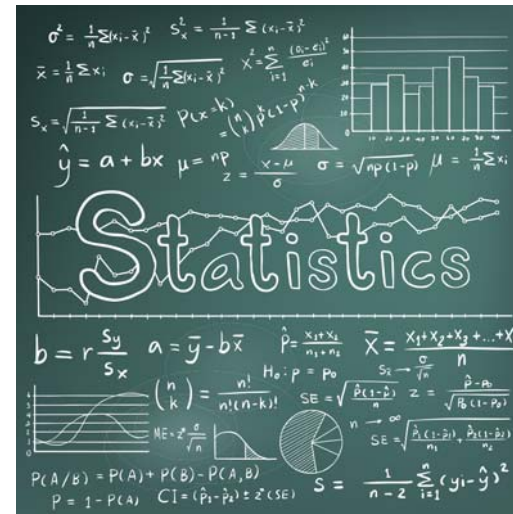
# Knowledge of relevant regulations, guidelines, and SAP

- ▶ Record Keeping
  - ▶ Field Notes
    - ▶ Logbooks
    - ▶ COC
    - ▶ Field Forms
- ▶ Analytical/Laboratory
  - ▶ Methods
  - ▶ Preservatives
  - ▶ QA/QC
    - ▶ Appropriate Samples
    - ▶ Results Within Limits



# Knowledge of relevant regulations, guidelines, and SAP

- ▶ Statistical Methods - US EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance
  - ▶ Established Background
  - ▶ Appropriate Method(s)
    - ▶ Compatibility with sample number and type
    - ▶ Appropriate for Distribution, Variability



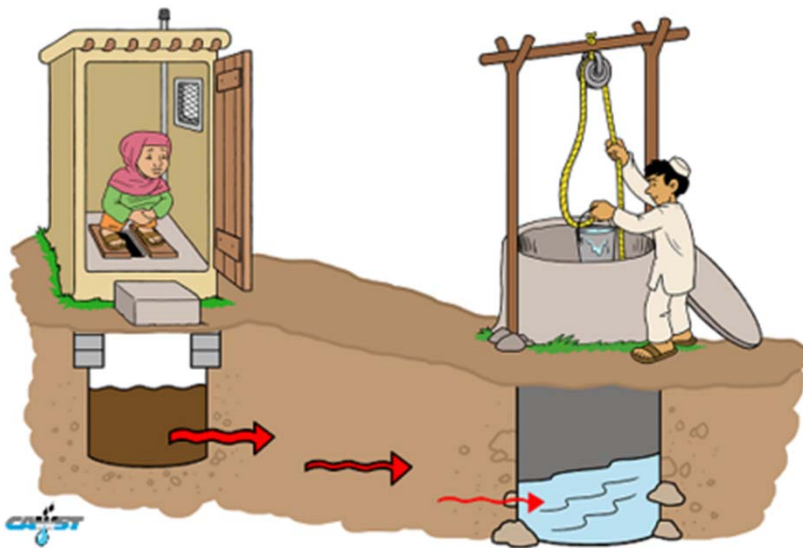
# Knowledge of relevant regulations

- ▶ Reporting
  - ▶ Appropriate documentation of field procedures
  - ▶ Appropriate maps
    - ▶ Measured or estimated distances
  - ▶ Evaluation of data
  - ▶ Discussion of results
  - ▶ Recommendations for future actions
    - ▶ Appropriate time frame
  - ▶ Appropriate number of copies
    - ▶ Distributed to appropriate Agencies and individuals
    - ▶ Site copy



# CONCLUSIONS

No one enjoys an “audit” but checking your groundwater system periodically could help you avoid costly problems in the future.



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