SRS F&H Area Retention Basins DQO/SAFER Pilot:

Process and Lessons Learned

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OVERVIEW

I. DQO / SAFER Approach
II. Pilot Study Objectives
III. Participants
IV. Applying the DQO/SAFER Process
V. Statistician's Comments

I. SAFER

- Streamlined Approach for Environmental Restoration

  = DQO's + "Observational Method"
- An Iterative Refining of the DQO Process as Data Becomes Available
- Planning For Contingencies and What to Do When Deviations of Assumptions in the Planning Arise

WHAT ARE DQO's/SAFER ?

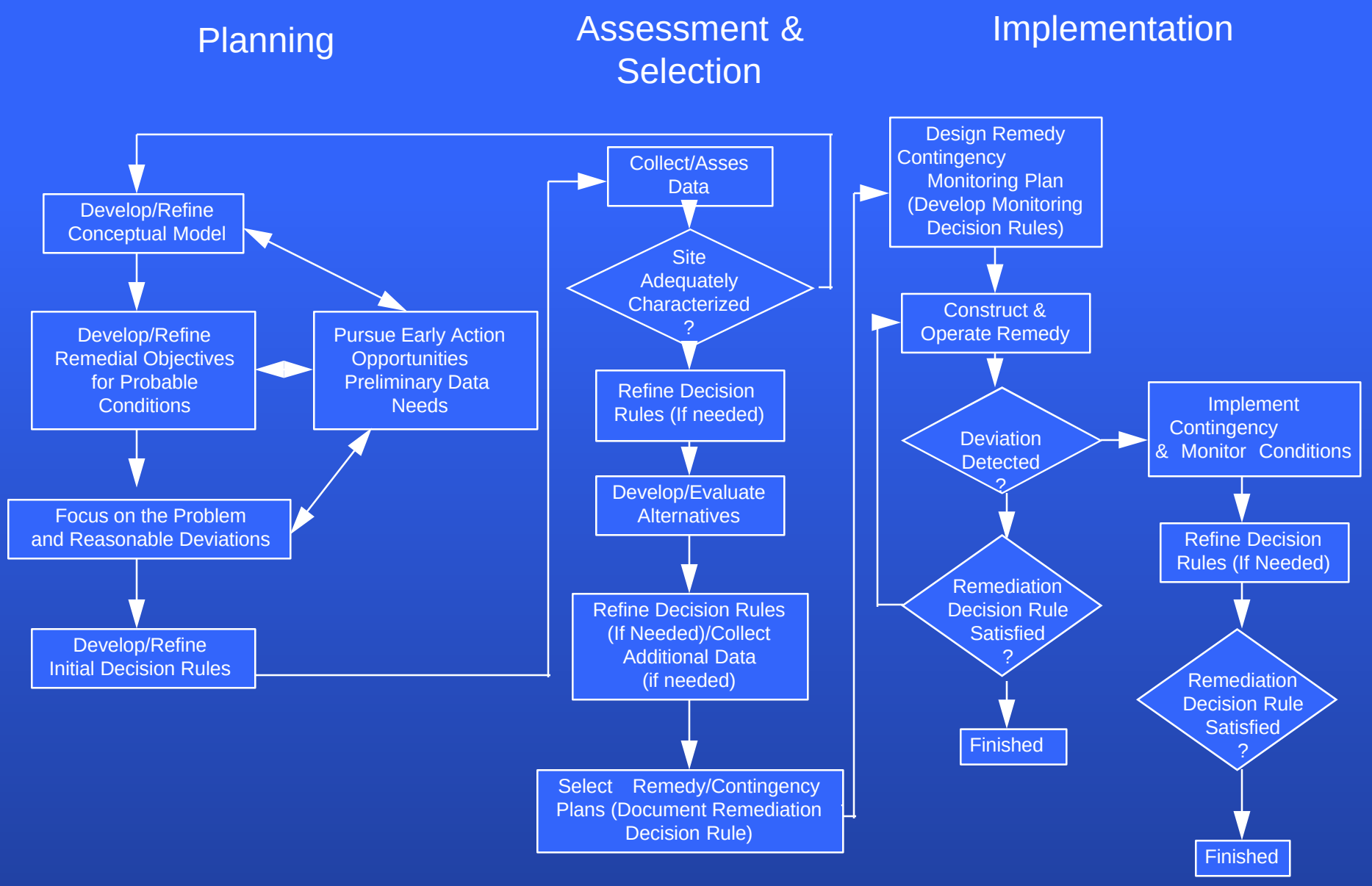
DQO process and Observational Approach help plan and conduct efficient and effective remediation

DQO PROCESS
establishes THE problem and action requiring attention, defines the type and quality of data needed for problem resolution

OBSERVATIONAL APPROACH
Operational framework for managing uncertainty and planning decision making

SAFER

SAFER FRAMEWORK



II. PILOT PROJECT GOALS

- Demonstrate Efficacy of DQO Approach
- Expose More People to DQO Process Logic
- Solve Actual Site Problem and Thereby Demonstrate Feasibility and Practicality of DQO Process

SUCCESS DEFINED BY

- **BETTER**
  - More Defensible, Practical, Efficient Site Decisions
  - Enhanced Communication between Management, Technical Staff & Regulators
- **FASTER**
  - Timely
  - Avoid Rework

    Wrong Work , "Another Rock" Syndrome
  - Earlier Determination and Acceptance of Work Plan

    Measures
- **CHEAPER**
  - Cost Savings compared with Past Practices
  - Cost / Benefit. Drives Level of Site Study.

III. Participants

- DOE (Dave Bottrell - EM-563)
- Westinghouse Savannah River Company (Operator for DOE)
- South Carolina Department of Health and Environmental Control (SCDHEC)
- EPA Region IV
- Pacific Northwest Laboratory
  - "Data Quality Objectives Training and Support (Support for SAFER Implementation)" to DOE
- Neptune and Co.
  - DQO Facilitator

IV. Applying DQO's

- F & H Area Retention Basins (1955 - Closed '73)
  - 200 X 120 Ft. Unlined Earthen Basins
  - Temporary Emergency Storage for Cooling Water from Separations Facility
  - Waters contained Rads & Trace Quantities of Chemicals
- Process Line for F-Area Retention Basin
  - Approx. 1200 ft. Reinforced Concrete Line
  - Ungrouted Joints
  - 5 Manholes
  - Some Parts of Line Inaccessible

F - Basin

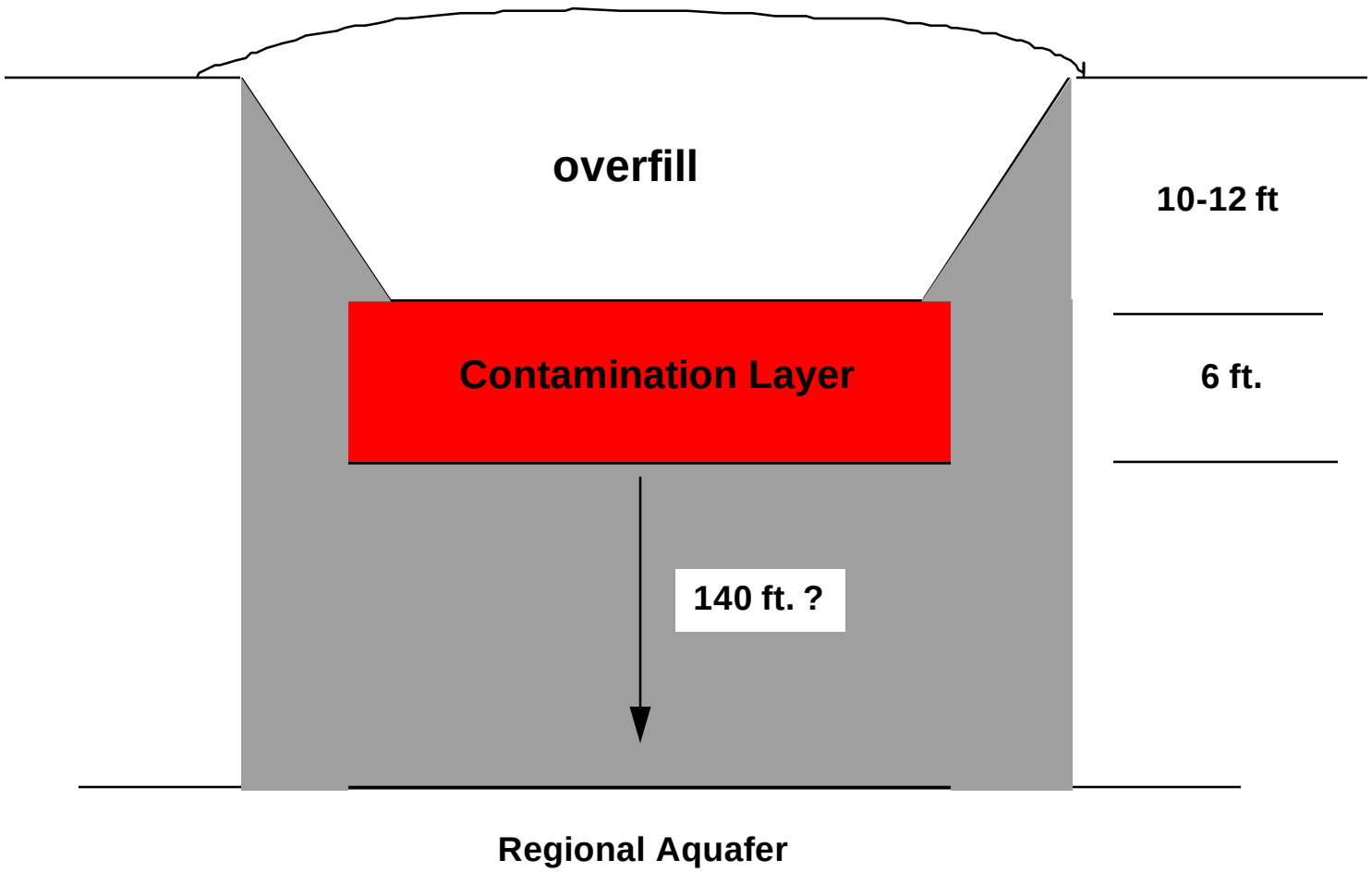
1. Statement of the Problem

- Contamination in the F-Basin affecting Groundwater ?
- Formation of a conceptual model
- Historical information available
  - 60 cm of soil removed from basin floor
  - Overfilled

2. Key Decisions to be Made

- What are the COC's ?
  - 90Sr & 137Cs known to exist
- Does basin exceed some unacceptable level of contamination affecting groundwater ?
- What is the extent of contamination above some unacceptable level ?
- Which Remediation Technologies will be effective ?

Conceptual Site Model
F-Area Retention Basin



3. Required Inputs to the Decision

- What are the COC's (Phase I Sampling) ?
- COC Concentration measurements (Phase II sampling)
- Threshold COC concentrations for entire basin assuming no action
  - Choices: MultiMed, MEPAS, RESRAD
  - GW Guidelines: 4 mrem/yr
- Data requirements for remedial alternatives and verifying RESRAD

4. Boundaries

- Current conceptual model assumes spatial boundaries at edge of basin
  - 120' x 200'
  - 10'-12' under current surface
  - contamination layer approx. 6' deep
- Verification in Phase II Sampling

5. Decision Rules

- If all samples taken outside basin have COC concentrations < C then maximum extent of contamination is within the perimeter of the basin
- If average basin conc. < C then no remediation
- If average basin conc. > C then recommend capping

under capping C = 20,000 pCi/g for 90Sr using RESRAD

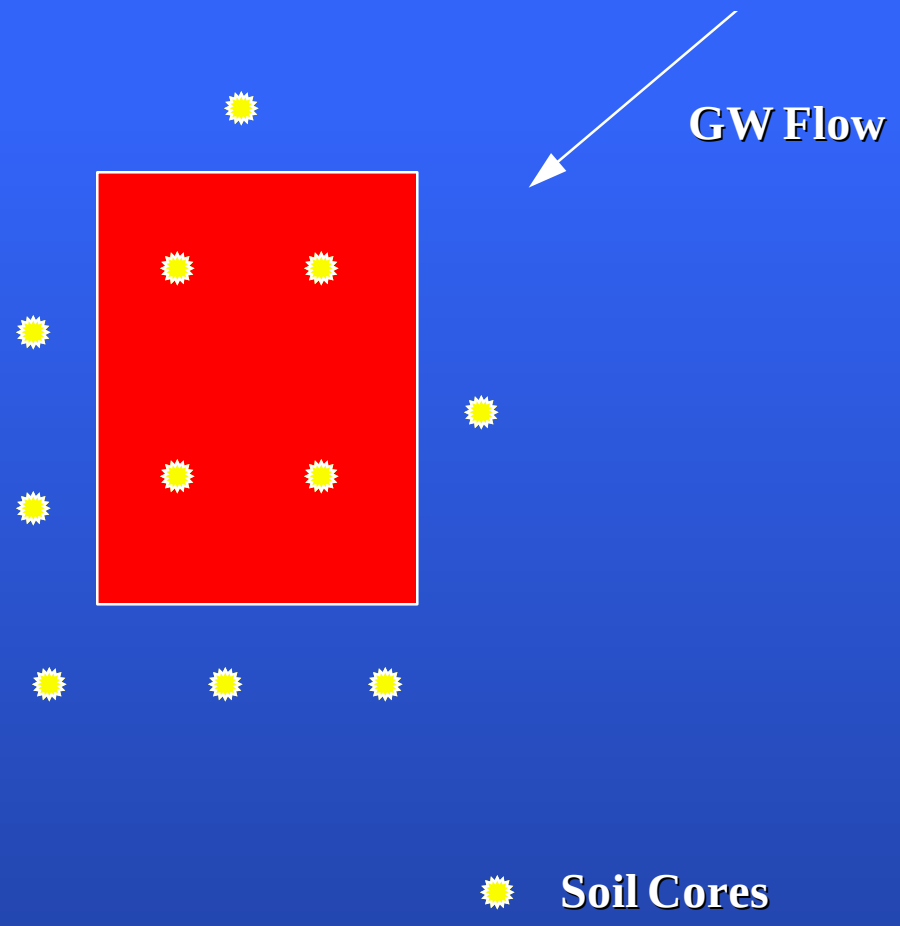
6. Decision Error Tolerances

- Power of accepting mean < C (when under the null hypothesis mean > C) is very high under capping option
- Historical high value before clean-up
  - 90Sr - 1,500 pCi/g
  - 137Cs - 17,000 pCi/g
- With Capping RESRAD calculated thresholds are:
  - » 20,000 pCi/g for Sr
  - » LARGE pCi/g for Cs

7. Sampling Scheme

- Two Consecutive Clean Rule applies to determining depth
- Samples taken to 18' in depth to determine extent
- Average of all cores is adequate to characterize the basin to determine remedial option
- Only pathway to human receptors is through groundwater

Phase II Sampling Locations
F-Area Retention Basin



F-Area Process Line

- Empties into F-Area Retention Basin
- Approximately 1,200 of ungrouted, reinforced concrete pipe (30" in diameter)
- 5 Manholes
- Pipe segments joints)

Statement of the Problem:

- Have leaks occurred in the process line that may have contaminated soils, and hence ultimately affect GW ?
- Formation of a Conceptual Model

Key Decisions:

- Where are the process line locations with the greatest potential for leaks ?
- What is the soil volume associated with the process line that is above some unacceptable level of contaminant concentration?
- What are the COC's ?
- If required what are the remediation technologies that will reduce contaminant risk to GW to acceptable levels and be most practical and cost effective?

H-Area Retention Basin

- H-Basin is "hot"
  - 50 mrem/hr at basin edge
  - vegetation "hot"
  - 5 general subareas
    - » basin proper, soil pile, berm, stream flood area, basin overflow area
- How best to remediate in order to reduce risk ?
- Formation of a conceptual Model

Key Decisions to be Made:

- What are the COC's ?
- What is the horizontal extent of contamination at the H-basin area?
- What remediation approach is both technically feasible and effective?

LESSONS LEARNED at SRS

- **DQO/SAFER Process Works !**
  - **EPA Region IV Representative: "We have made more progress in this one meeting than we have in all our other efforts in the last year."**
- **Lack of Land Use Policy Caused Focus on Residential Risk (Default) Instead of Logical Non-Residential Use (e.g. Wildlife Preserve)**
- **Better Definition of Stakeholder Roles / Responsibilities**

LESSONS LEARNED at SRS (continued)

- Lack of Established Risk & Transport Models Slowed Progress on Developing Decision Thresholds
- Need Better Understanding of Cleanup Standards !
  - Uncertainty in model based calculations
  - What does the number mean statistically?
- Policy versus Technical Consideration
  - Defensibility of plan when reviewed by public

SOME LARGER ISSUES NEEDING RESOLUTION

- **Develop Model Validation Methods to Assess Appropriateness of Models for Site Characterization and Data Needed to Demonstrate Validity of Models**
- **Pilot and Develop Statistical DQA Tools to Increase the Usability of Historical Data and Allow Flexibility in the DQO / SAFER Process.**