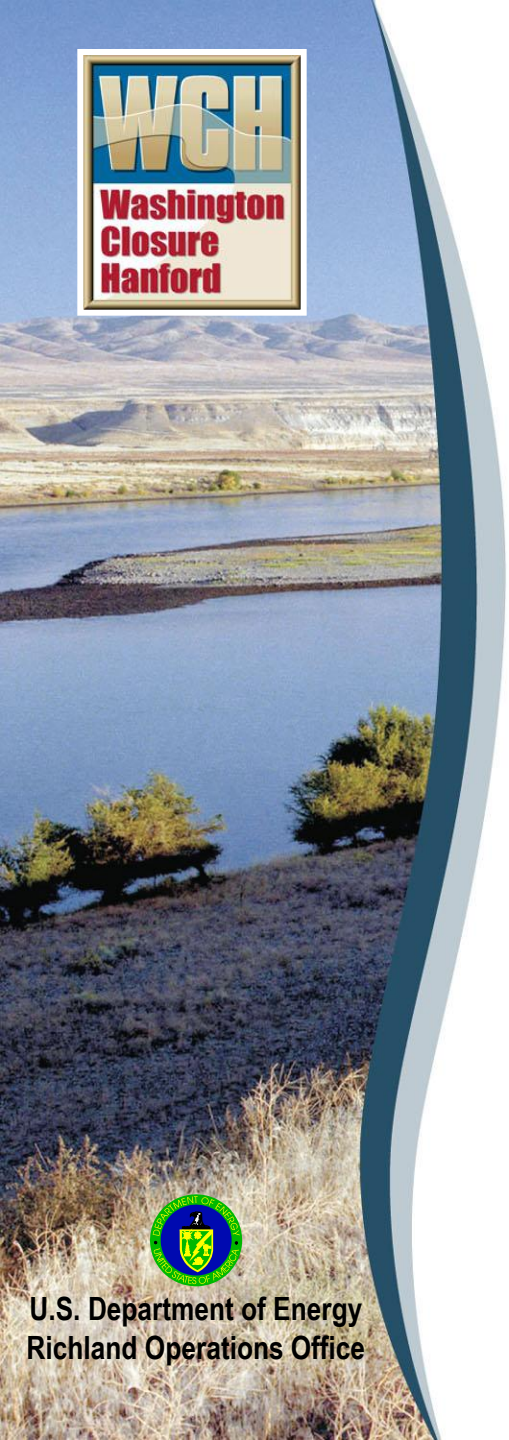

Work Plan Summary for the ERDF Performance Assessment (PA) Analysis

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November 2010

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ERDF PA - Summary Discussion

- Background Information
- Purpose
- Scope
- Analyses
- Schedule

ERDF PA - Background Information

- Basis for Updating the ERDF PA
  - DOE has directed WCH to update the preliminary ERDF PA analysis.
  - The Hanford Advisory Board has recommended completion of a PA analysis to support ongoing ERDF disposal activities (HAB advice # 219)
  - The ERDF ROD Amendment authorizing Super Cells 9 & 10 (August 2009) requires the preparation of a PA prior to expansion of ERDF beyond Cells 9 & 10.

ERDF PA - Background Information

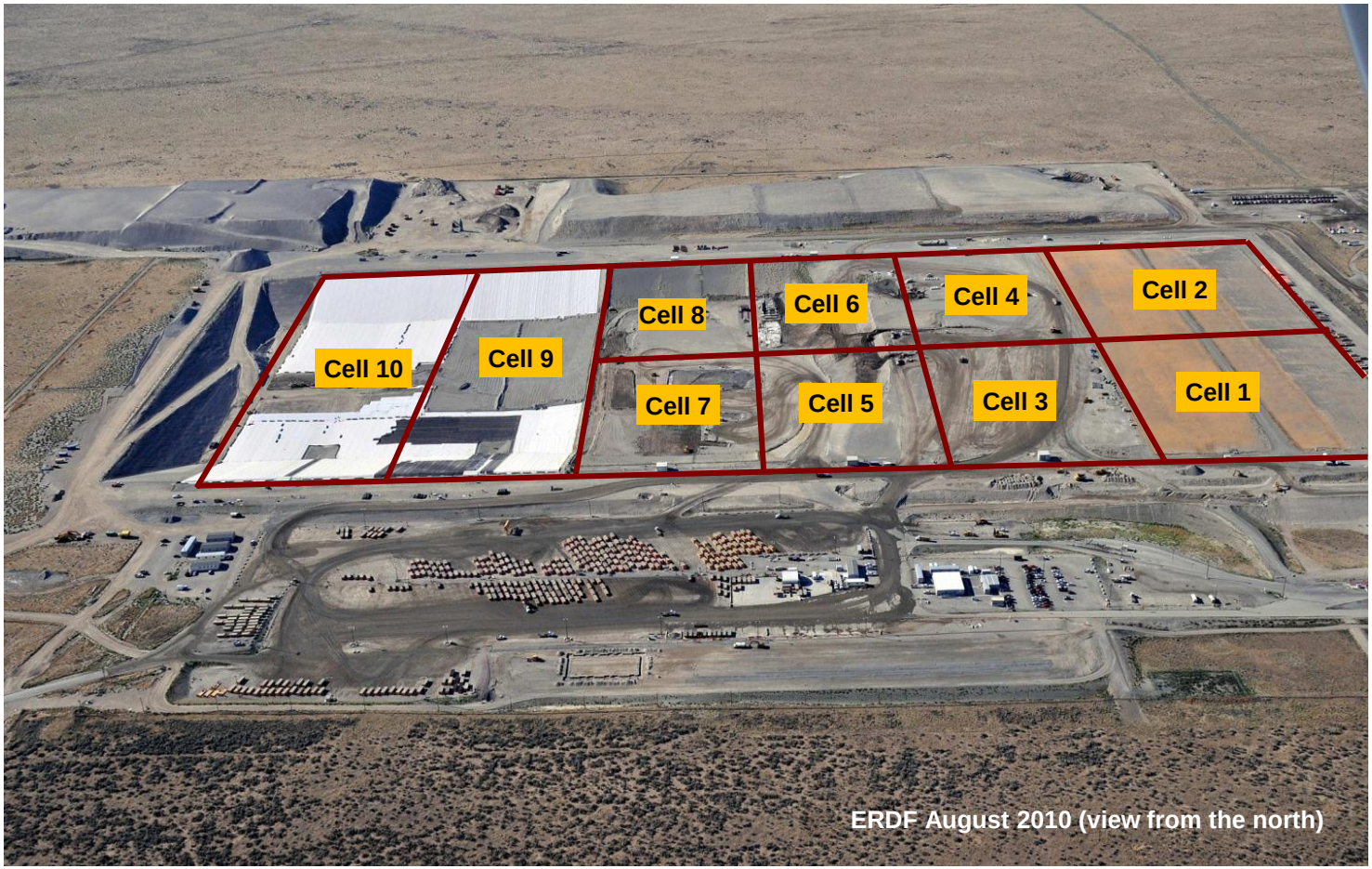
- Previous Related Efforts
  - Completion of a preliminary PA analysis in 1995 (BHI-00169)
  - Completion of a cross walk comparison between DOE Order 5820.2A requirements and the RI/FS in 1996
  - Completion of a cross walk comparison between DOE Order 435.1 requirements and the RI/FS in 2000

ERDF PA - Background Information

- PROJECT TEAM
  - **Washington Closure Hanford (WCH)**
    - Project Management
    - Implement and Maintain the Approved PA
  - **CH2M Hill Plateau Remediation Company (CHPRC)**
    - Preparation of the PA
  - **URS Safety Management Solutions**
    - Technical Oversight

ERDF PA - Background Information

- Current ERDF Configuration



ERDF PA - Purpose

- Demonstrate that DOE low-level waste disposal facilities comply with long-term performance objectives provided in DOE Order 435.1, Radioactive Waste Management
  - 25 mrem/yr all pathways dose limit
    - MCLs will be used for groundwater under 435.1
  - 10 mrem/yr air pathway dose limit, excluding radon and its progeny
  - 20 pCi/m^2/s radon flux limit at facility surface
- Establish disposal limits to ensure that performance objectives will be met
- Address CERCLA requirements that are incorporated in the DOE Order 435.1 requirements analysis (e.g., MCLs)

ERDF PA - Scope

- DOE O 435.1 specifies specific analyses to be completed and additional analysis constraints
- Performance objectives analyses
  - All Pathways
  - Atmospheric flux of radon and volatile radionuclides
- Disposal limits analyses
  - Inadvertent intruder
  - Groundwater resources protection
- Other Analyses
- Sensitivity/uncertainty
- As Low as Reasonably Achievable (ALARA)

ERDF PA - Scope

- Additional analysis constraints include
  - Radiological but not chemical impacts
  - Postclosure conditions only
  - Barrier degradation processes that are reasonably foreseeable natural processes
  - Compliance with performance objectives for 1000 years post closure
  - Compliance at the highest point of dose impacts beyond a 100 meter buffer zone
  - Human health effects only using dose metric
  - Use of DOE approved dose conversion factors

ERDF PA - Scope

- Approach to Human Health Affects Analyses (DOE G 435.1-1)
  - Performance assessment analyses should be based on reasonable activities of the portion of the exposed population likely to receive the highest dose (i.e., the critical group). However, the performance assessment analyses should not be based on "worst-case" assumptions. Rather, the analyses should be based on scenarios that represent reasonable actions of a typical group of individuals performing activities that are consistent with regional social customs, work, and housing practices, and expected regional environmental conditions at the time of the exposure scenario, and who are members of the critical group expected to receive the highest doses.

ERDF PA - Scope

- Requirements and Guidance Documents
  - DOE, 1999, DOE O 435.1, Radioactive Waste Management, U.S. Department of Energy, Washington, D.C.
  - DOE, 1999, DOE M 435.1-1, Radioactive Waste Management Manual, U.S. Department of Energy, Washington, D.C.
  - DOE, 1999, DOE G 435.1-1, Implementation Guide for DOE M 435.1-1, U.S. Department of Energy, Washington, D.C.
  - DOE, 1999, Format and Content Guide for U.S. Department of Energy Low-Level Waste Disposal Facility Performance Assessments and Composite Analyses, U.S. Department of Energy, Washington, D.C.

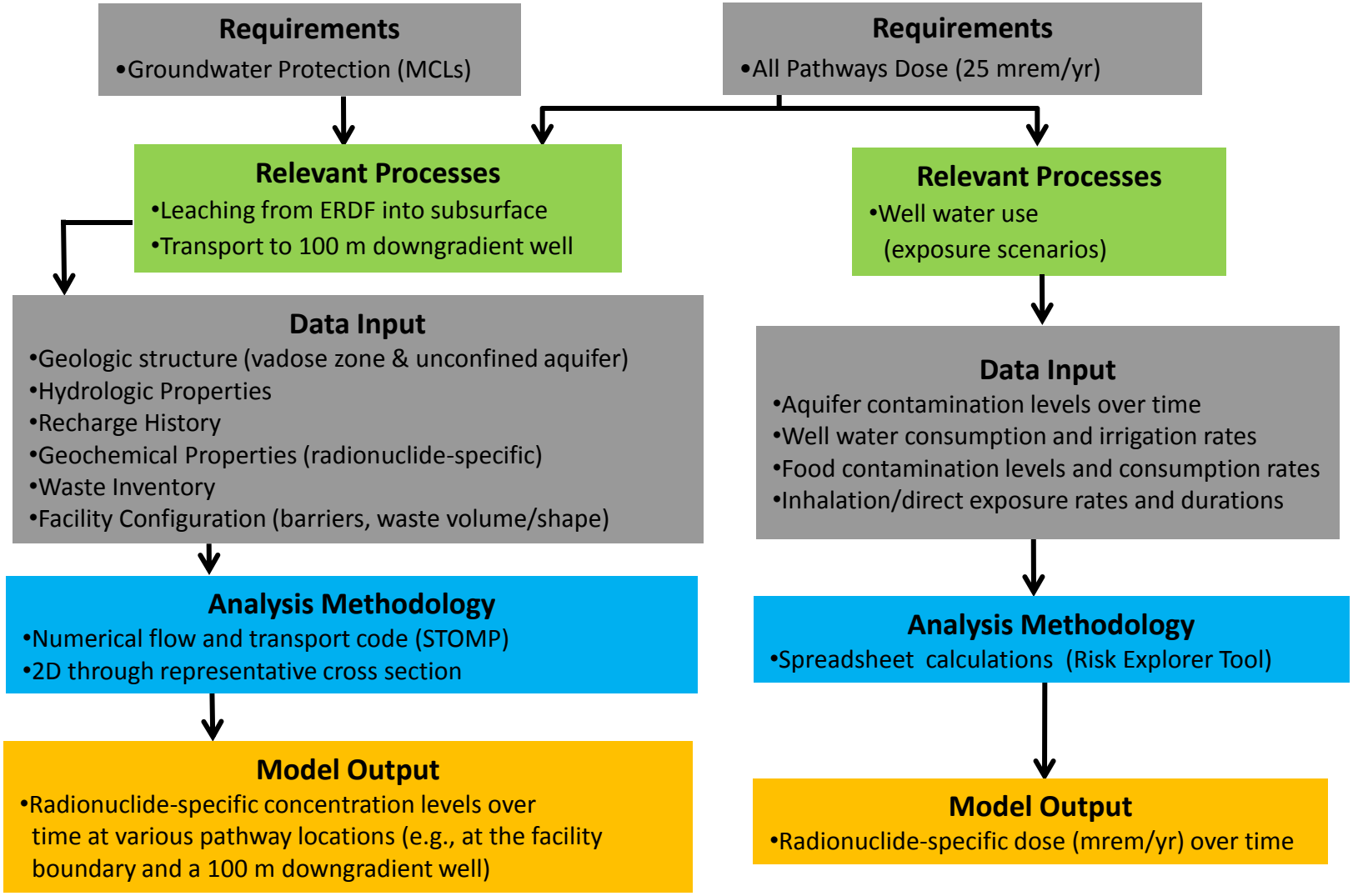
ERDF PA – Analyses *Consistency with Other Hanford PAs*

- Developing Consistency Between the ERDF PA Analysis and Similar Analyses
  - Other Hanford "PA-like" analyses are being completed to:
    - Authorize other disposal facility operations (active burial grounds and IDF), and
    - Support CERCLA remediation and tank waste management area closure decisions
  - Similar, although not identical, aspects among analyses include Hanford subsurface environment, contaminant migration pathways, human exposure pathways, and environmental protection requirements (primarily MCLs)

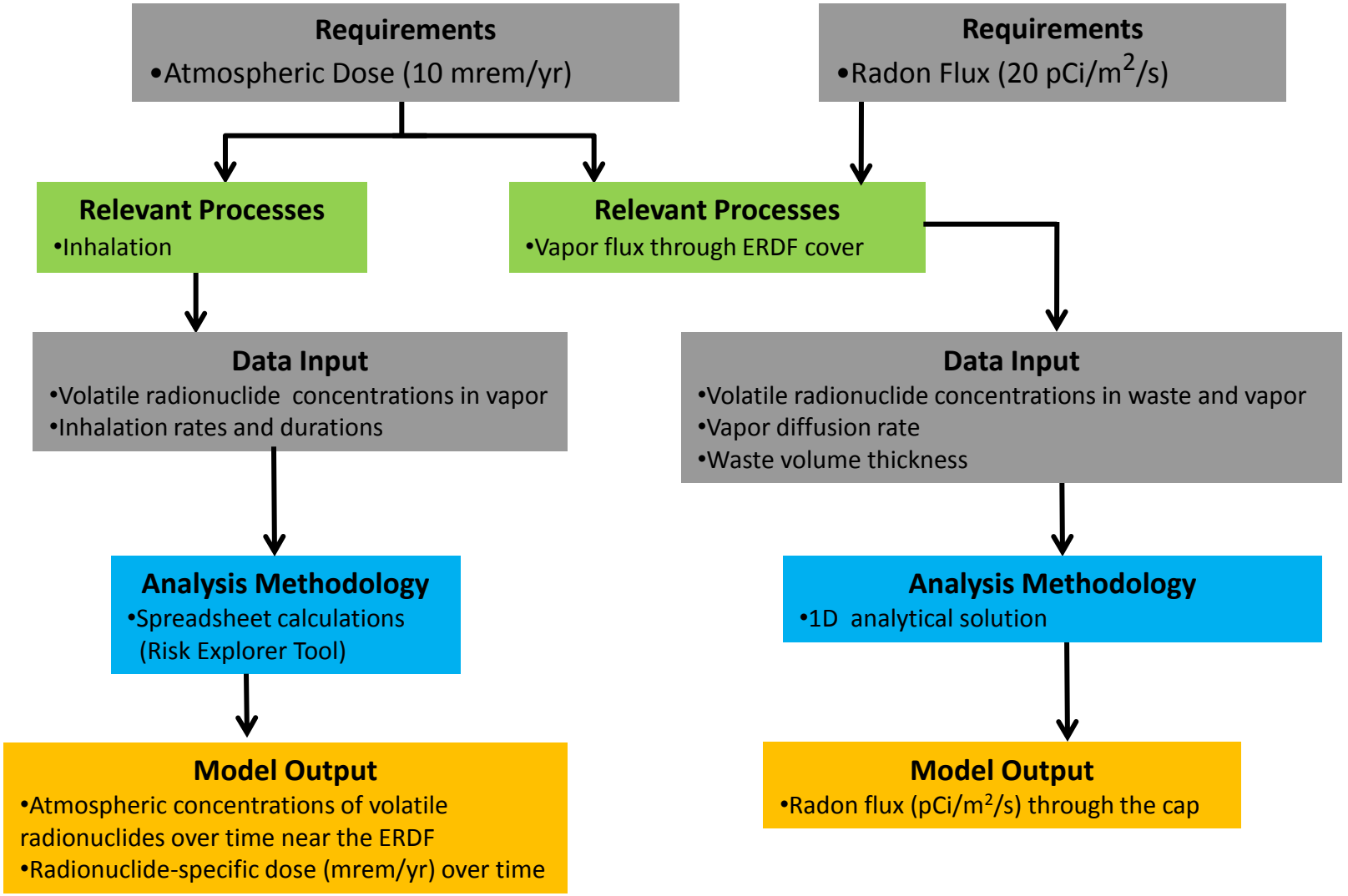
ERDF PA – Analyses *Consistency with Other Hanford PAs*

- Steps being taken to maximize consistency
  - Routine communication with other analysis coordinators and analysts
  - Use of data being standardized in the Hanford Environmental Information System (HEIS): geohydrologic properties; geophysical logs
  - Use of site documents generally recognized as standards: geochemical, recharge, source term data
  - Select exposure scenarios consistent with those being developed for the Central Plateau CERCLA decision documents and Tank Farm closure activities
  - Use of commonly used numerical pathway codes: STOMP for near field, MODFLOW for far field (as necessary)

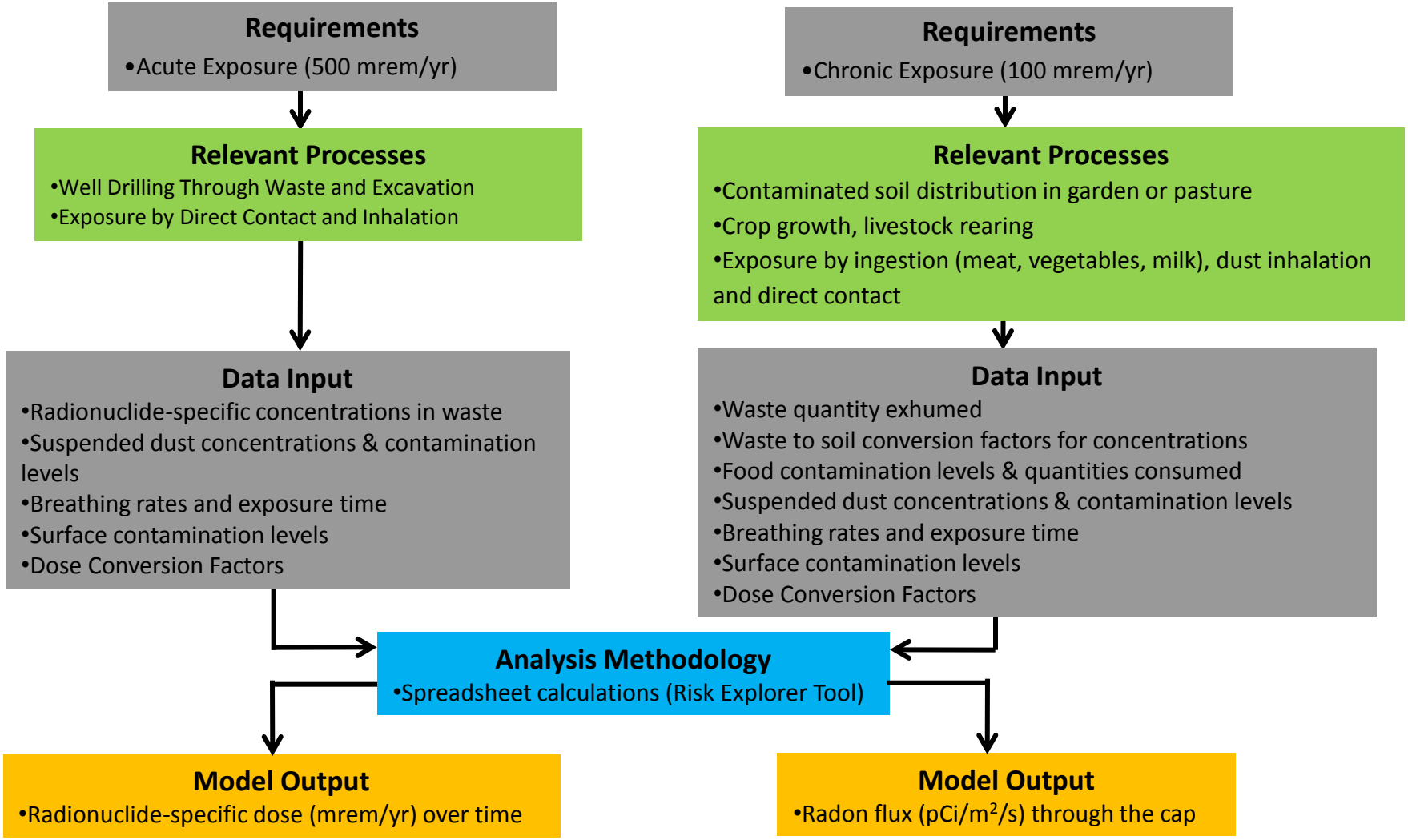
ERDF PA – Analyses *Groundwater Pathway*



ERDF PA – Analyses *Atmospheric Pathway*



ERDF PA – Analyses *Inadvertent Intruder*



ERDF PA – Analyses *Sensitivity/Uncertainty*

Requirements
- All Pathways Dose (25 mrem/yr)
- Groundwater Protection (MCLs)

Relevant Processes
- Leaching from ERDF into subsurface
- Transport to 100 m downgradient well

Data Input
- Expected ranges and probability distribution functions of parameter input values used in the groundwater pathway analysis:
  - Geohydrologic properties
  - Radionuclide-specific geochemical properties
  - Recharge rate projections
  - Radionuclide-specific inventory

Analysis Methodology
- Numerical Code Flow and Transport (STOMP)
- Abstraction Approach (e.g., GOLDSIM)

Model Output
- Sensitivity of estimated groundwater contamination levels to changes in model parameter input values
- Range and likelihood of dose values around the reference case caused by uncertainty in input parameter values

Requirements
- Chronic Exposure to the Inadvertent Intruder (100 mrem/yr)

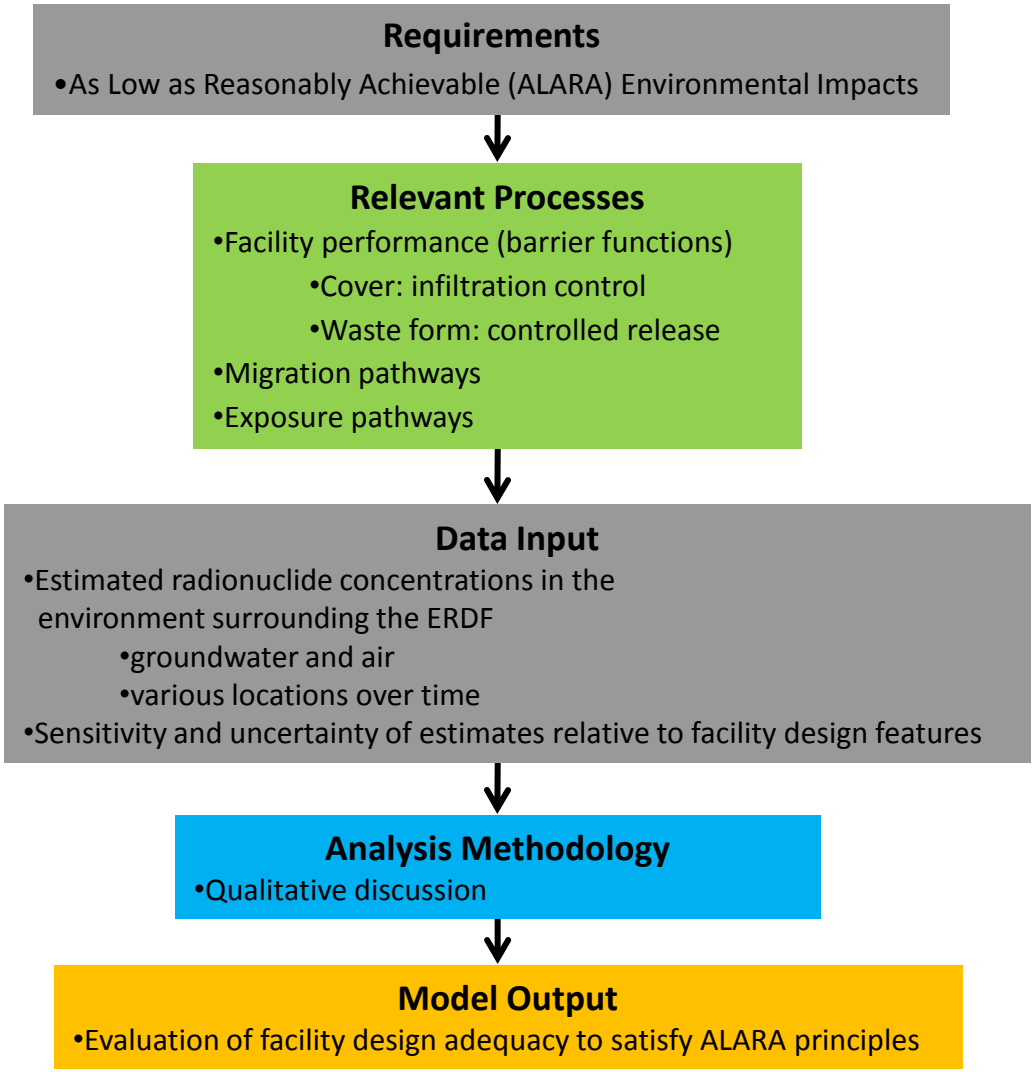
Relevant Processes
- Distribution of contaminated soil in garden or pasture
- Crop growth, livestock rearing
- Exposure by ingestion (meat, vegetables, milk), dust inhalation and direct contact

Data Input
- Expected ranges of parameter input values used in the inadvertent intruder analysis:
  - Radionuclide concentrations in soil, crops, milk, meat, suspended dust
  - Exposure times
  - Rates of ingestion and inhalation

Analysis Methodology
- Spreadsheet calculations (Risk Explorer Tool)

Model Output
- Sensitivity of intruder dose estimates to changes in model parameter input values
- Range of dose values around the reference case caused by uncertainty in input parameter values

ERDF PA – Analyses *ALARA*



ERDF PA – Schedule *Estimated at ~33 months*

- Prepare Work Plan ~ 7 months (July 2010 – January 2011)
  - Brief regulators and stakeholders (11/10-12/10)
- Prepare draft PA document ~18 months (July 2010 – March 2012)
  - Collect data ~11 months (07/10 – 5/11)
  - Define modeling approach ~ 6 months (1/11 – 6/11)
  - Brief regulators and stakeholders (3/11 – 5/11)
  - Modeling analyses ~6 months (6/11 – 12/11)
  - Document background, analysis input and results ~9 months (4/11 – 3/12)
  - Draft PA (3/12)
- Draft PA Review process ~ 13 months (March 2012 – April 2013)
  - WCH review/comment incorporation ~2 months (3/12 – 5/12)
  - DOE-RL & EPA review/comment incorporation ~ 2 months (5/12 – 6/12)
  - DOE-LFRG review ~ 6 months (6/12 – 12/12)
  - Brief regulators and stakeholders (6/12 – 8/12)
- Final document completed ~4 months (December 2012 – April 2013)
  - Incorporate comments and issue the final document, assuming a recommendation of technical adequacy from the DOE-LFRG