

Soil Treatability Study

Energy Technology Engineering Center • U.S. Department of Energy

Results of Completed Soil Investigations

John Jones, DOE



U.S. DEPARTMENT OF
ENERGY



Soil Treatability Study

Energy Technology Engineering Center • U.S. Department of Energy

Data Review Processes for Soil Investigation Results

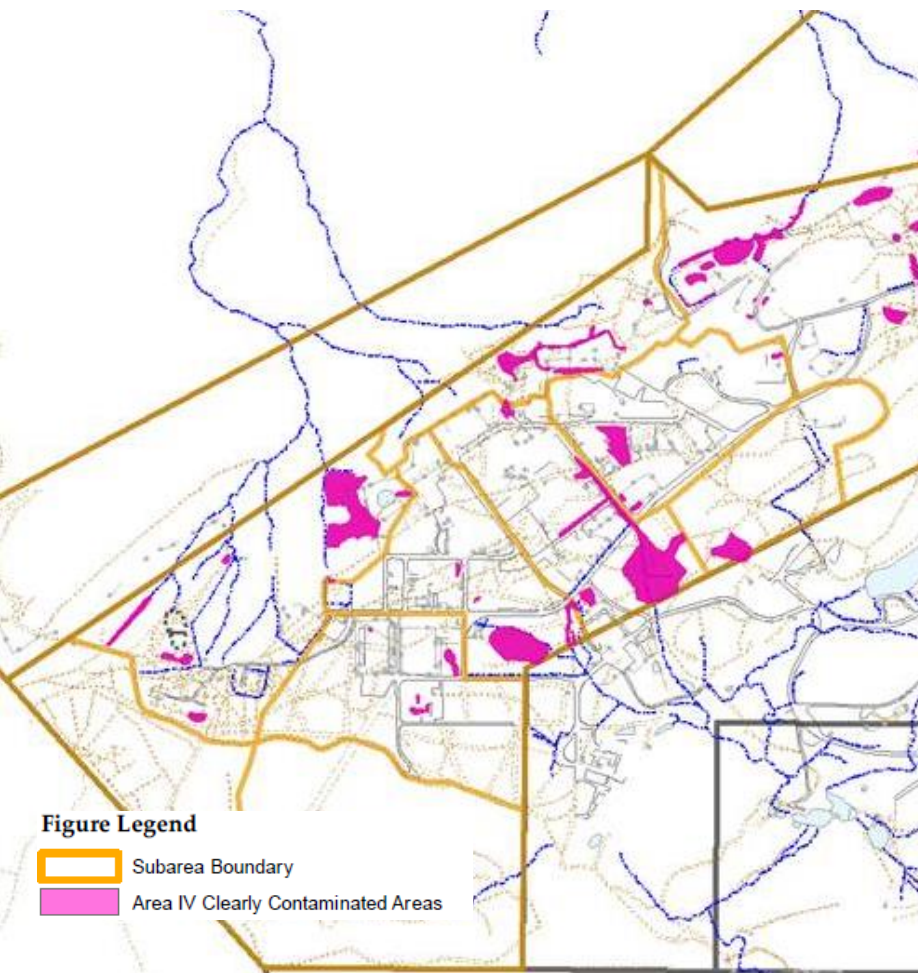
- All chemical data have been subject to a rigorous review process with DTSC and the public engaged at all steps
- EPA radiological data have been compared with Provisional Look-Up Table (LUT) values defined by DTSC in January 2013
- Chemical data have been compared with Look-Up Table values defined by DTSC in June 2013
- The soils database has been screened to identify where sample results exceed Look-Up Table values and a Geographical Information System (GIS) has been used to illustrate where these exceedances occur at surface or at depth



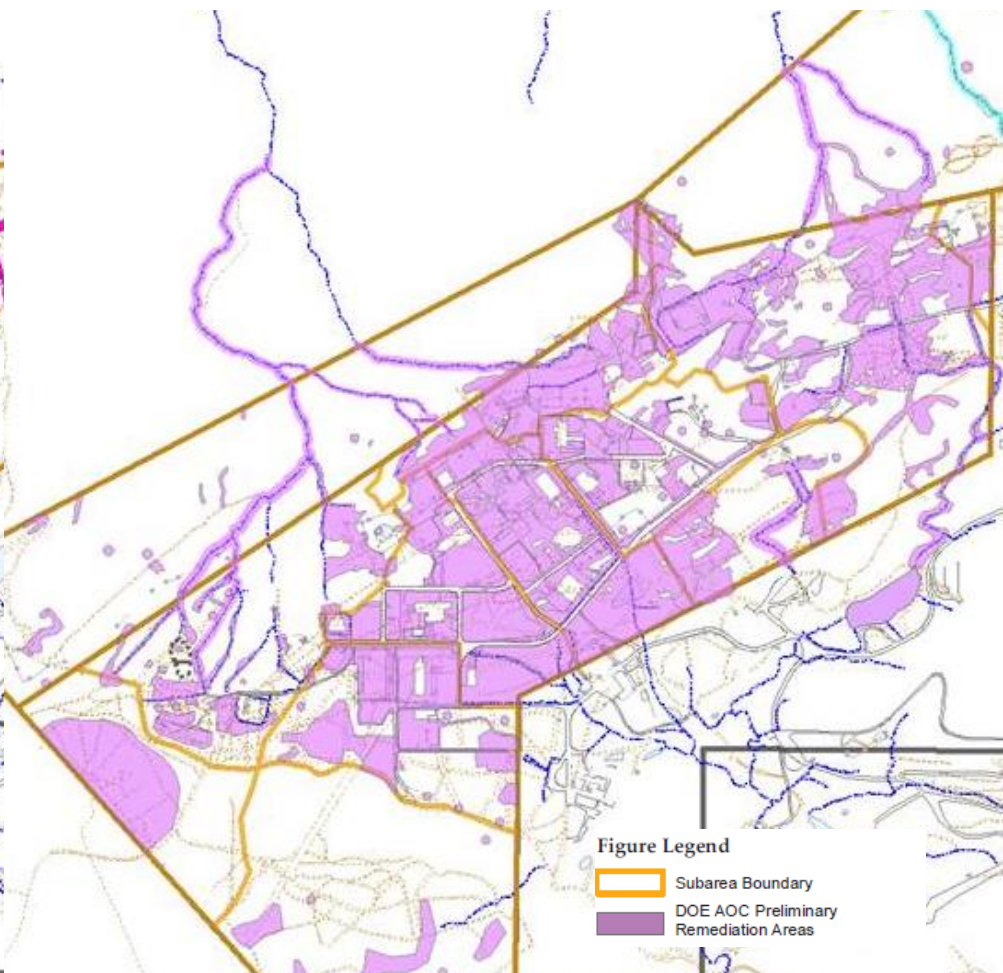
Soil Treatability Study

Energy Technology Engineering Center • U.S. Department of Energy

Chemical Clearly Contaminated Areas



Chemical Preliminary Remediation Areas

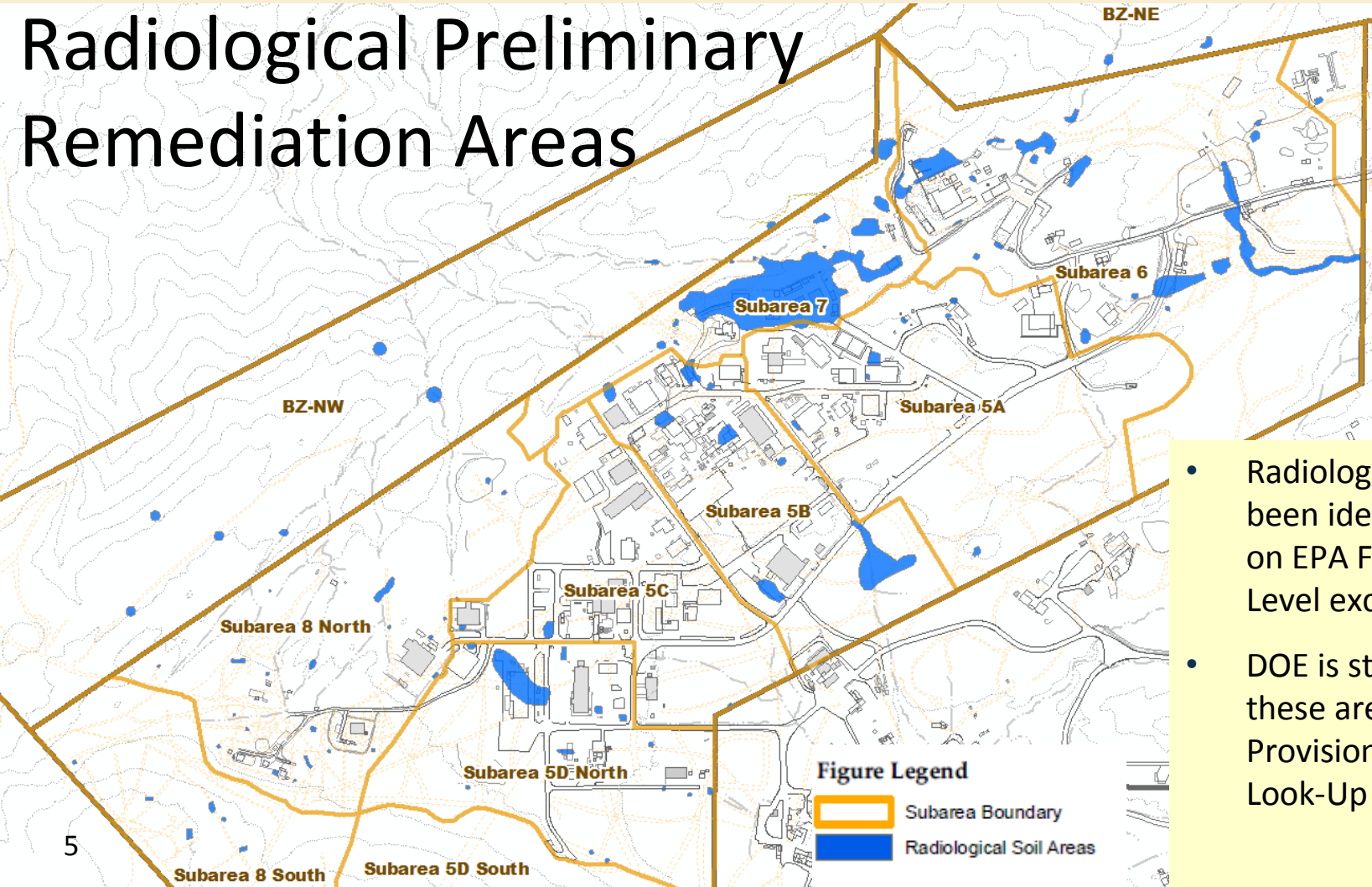




Soil Treatability Study

Energy Technology Engineering Center • U.S. Department of Energy

Radiological Preliminary Remediation Areas



- Radiological PRAs have been identified based on EPA Field Action Level exceedances
- DOE is still evaluating these areas against the Provisional Radiological Look-Up Table values



Soil Treatability Study

Energy Technology Engineering Center • U.S. Department of Energy

Estimating Soil Volumes for Remediation

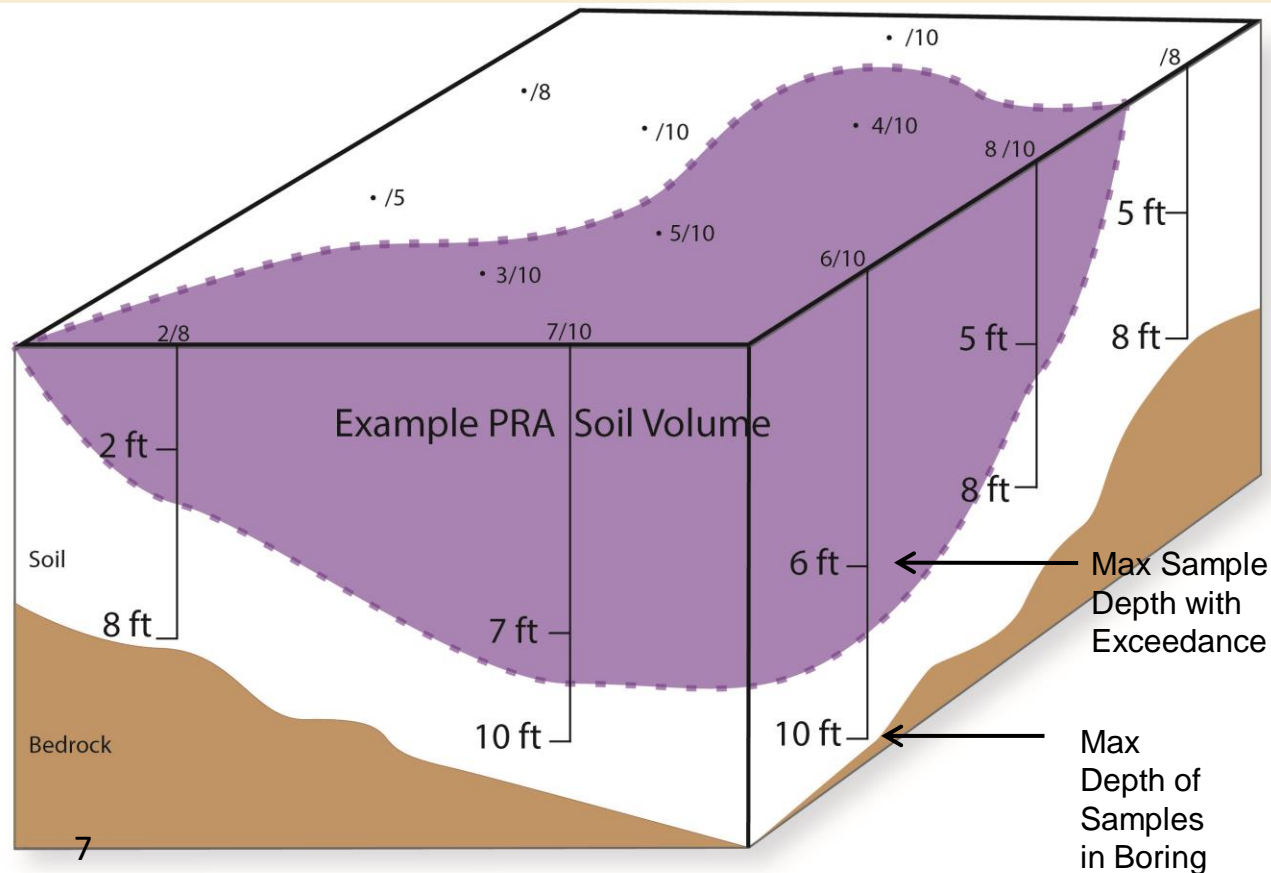
- The Chemical and Radiological PRA maps show the estimated lateral extent of exceedances
- To develop soil volumes for remedial planning, the depth of exceedance needs to be estimated
- The depth of contamination is not uniform.



Soil Treatability Study

Energy Technology Engineering Center • U.S. Department of Energy

Development of Soil Volumes for PRAs

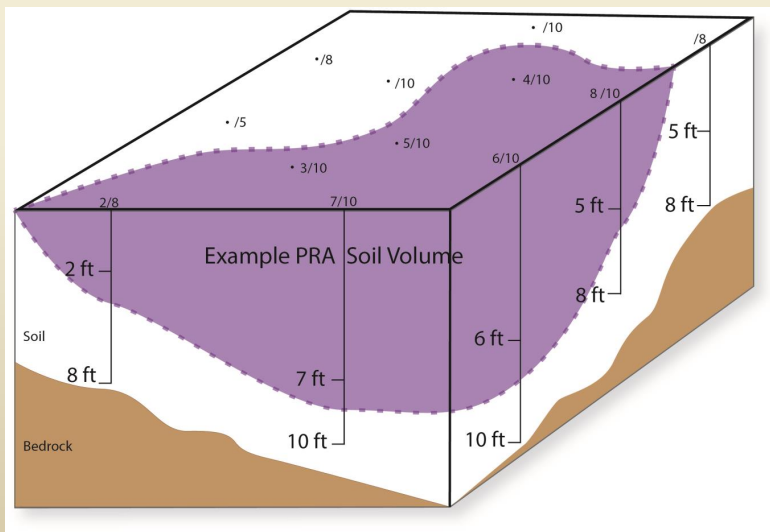


- Here is a conceptual diagram to illustrate how soil volumes are developed
- Imagine the soil area is cut open to show how deep the exceedances are
- The vertical lines are soil borings with samples at surface and at depths shown
- The mapped extent of exceedance is based on the soil sample results. Sample results in white do not exceed; those in purple do exceed the Look-Up Table



Example Soil Volume Calculation

1. Measure Surface Extent (Area) of Exceedance = 20,000 ft²
2. Estimate Average Depth of Exceedance = 5 ft
3. Calculate Exceedance Volume = 20,000 ft² x 5 ft = 100,000 ft³



4. Convert volume to cubic yards in the ground (in situ) =
 $100,000 \text{ ft}^3 \div 27 \text{ ft}^3/\text{cy} = 3,700 \text{ cy}$
5. Estimate volume after excavation (ex situ) using a 30% swell factor =
 $3,700 \text{ cy} \times 1.3 = 4,800 \text{ cy}$



Soil Treatability Study

Energy Technology Engineering Center • U.S. Department of Energy

Soil Investigation Results Evaluation – Preliminary Soil Volumes for Remediation

- For both chemicals and radionuclides, the estimated lateral extent and soil sample depth data were used to calculate soil volumes for remediation
- Soil volume calculations were reviewed and checked by DOE estimation staff
- Soil volume calculations were also provided to DTSC and independently validated



Soil Treatability Study

Energy Technology Engineering Center • U.S. Department of Energy

Preliminary Soil Volume Remediation Estimates

- DOE estimates that there is at least 1,100,000 cubic yards (1.1 million cy), and up to 1,700,000 cubic yards (1.7 million cy) of soil that require remediation
- This volume range includes an estimated 82,000 cubic yards of soil that require remediation for radionuclides



Soil Treatability Study

Energy Technology Engineering Center • U.S. Department of Energy

Additional Considerations

Preliminary Soil Remediation Volumes:

- Include soil potentially treatable onsite using the types of alternative technologies being evaluated by the Universities
- Have not been adjusted for environmentally sensitive areas for habitat protection and cultural resources

>>> Both these factors are important and will be considered in remedial planning to account for precautions when working in these areas





Soil Treatability Study

Energy Technology Engineering Center • U.S. Department of Energy

Results of Soil Characterization Summary

- Current estimates show a large volume of soil will require remediation – between 1.1 and 1.7 million cubic yards
- DTSC conducted independent analysis to confirm DOE's estimate of the total volume requiring remediation
- AOC allows for possible exceptions for protected species or habitat and cultural resources
- DOE is hopeful that the Soil Treatability Studies will identify remedial technologies that are able to sufficiently reduce soil concentration levels onsite



Soil Treatability Study

Energy Technology Engineering Center • U.S. Department of Energy

Results of Soil Characterization Summary

- The EIS is being prepared to evaluate alternatives for how to accomplish the cleanup
- The estimated volume information presented tonight is just the beginning of the discussion for remedial planning
- DOE is committed to keeping the public informed of our progress as we complete characterization, prepare the Data Summary Reports, conduct the EIS, and develop the Soils Remedial Action Implementation Plan (SRAIP)