THE HANFORD SITE

ZP-1 Operable Unit Case Study

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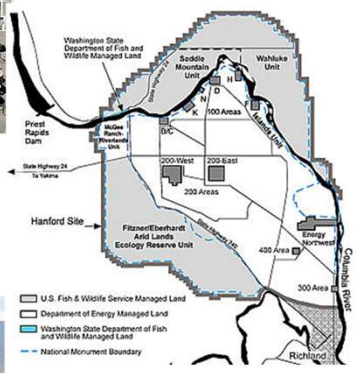
1

THE HANFORD SITE | Historical Hanford Processes

Chemical Separations

Irradiate Fuel Elements



Plutonium Finishing

Manufacture Fuel Elements

U.S. DEPARTMENT OF ENERGY

ONE HANFORD

2

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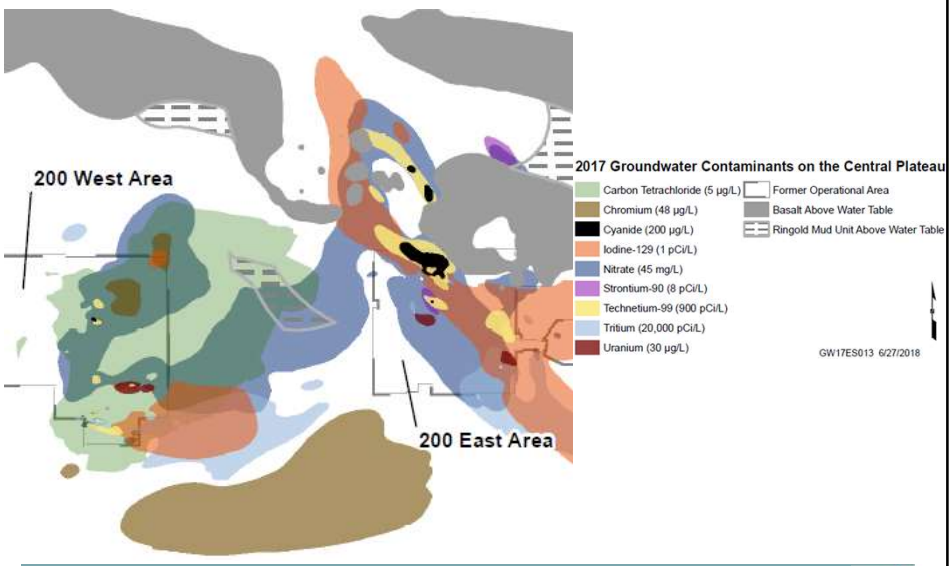

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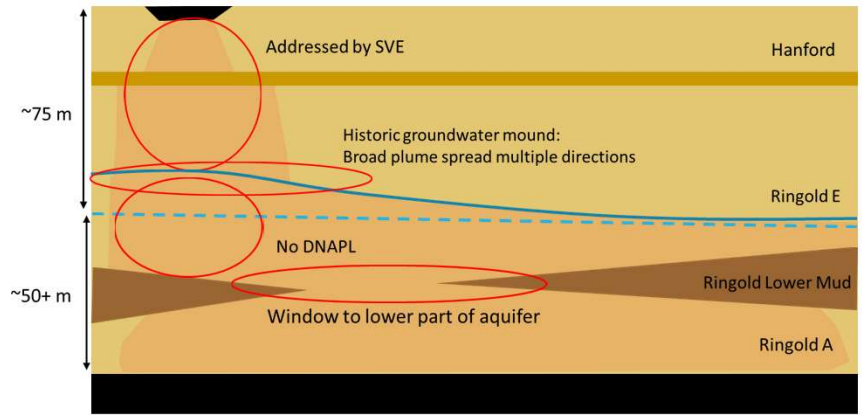
THE HANFORD SITE | ZP-1 OU Conceptual Site Model



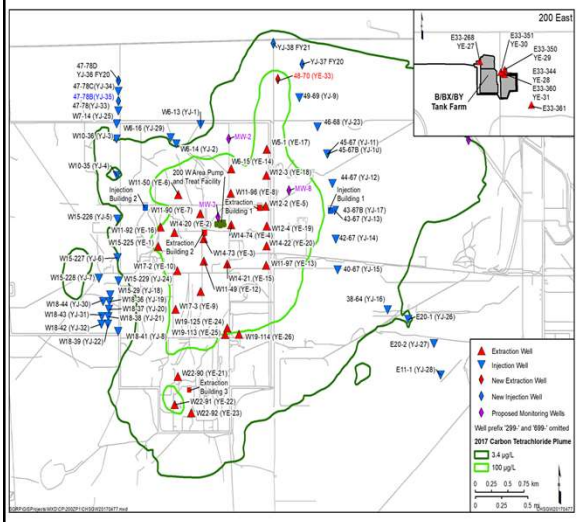
4

ZP-1 Remedy Selection

- Remedy applies P&T with transition to MNA
- Anticipated 25 years of P&T and 100 years of MNA to meet RAO based on Feasibility Study CSM
- CCl4 distribution – uncertainty in mass (collect data during remedy)
- Attenuation rate – uncertainty est. 41-290 yr half-life (implement study)

5

200 West Well Network



- Began operations in 2012
- 33 Extraction Wells located within carbon tetrachloride plume
- 35 Injection Wells on the outer edges of the highest concentration area

6

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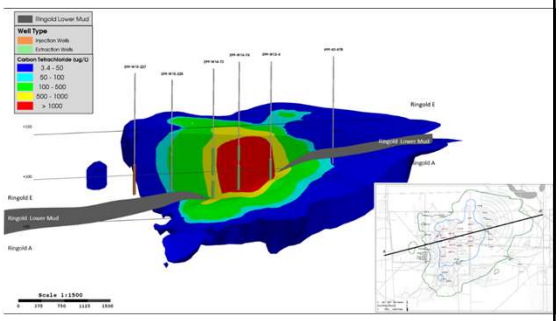
Challenges Identified

- More CCl4, including more below the Lower Mud Unit (Ringold A) than understood during the Feasibility Study
- Total within FS uncertainty but higher than baseline estimate
- Ringold A 25% versus 12% of total
- Characterization is planned to define the extent of COCs in Ringold A and its hydraulic properties



7

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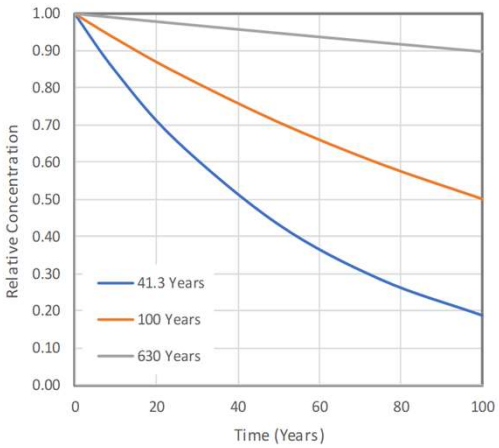
Challenges Identified

- Abiotic degradation of CCl4 (hydrolysis) is slower than FS assumption
- 630 vs. 41-290 year half-life
- Previous information extrapolated from high temperature
- Data at site-specific temperature shows lower rate (6-year study)
- Currently studying other degradation mechanisms at the site



8

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Nitrate Considerations

- Sufficient nitrate may have been removed from Ringold E to stop active biological treatment and start transition to MNA as identified in the ROD
- Blending during P&T
- Natural attenuation after P&T
- Suspending biological treatment would:
- Enable more efficient approach for increasing carbon tetrachloride treatment capacity
- Eliminate operational difficulties associated with biofouling in wells

9

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Optimization Study Rational

- Evaluated 6 years of 200 West P&T operation data
- Current remedy as designed is projected to be insufficient for meeting remedial action objectives due to
- Larger mass of carbon tetrachloride in the aquifer
- Slower degradation rate
- Important to consider remedy optimization for carbon tetrachloride because it is the most significant risk driver
- Unlike other contaminants, its concentration is up to 1000X greater than the RAO

10

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Optimization Study Plan

- Suspend biological treatment for specified amount of time and gather data on contaminant behavior in the aquifer
- Treatment capacity for CCl4 will be increased with an additional air stripper and expanded well network
- Intended to be an iterative process of data evaluation and decision-making
- Once sufficient data is collected and evaluated, the site and regulators will work together to determine if the remedy needs to be changed
- Will consider if RAOs and timeframes listed in ROD can be achieved
- No intent to change cleanup levels