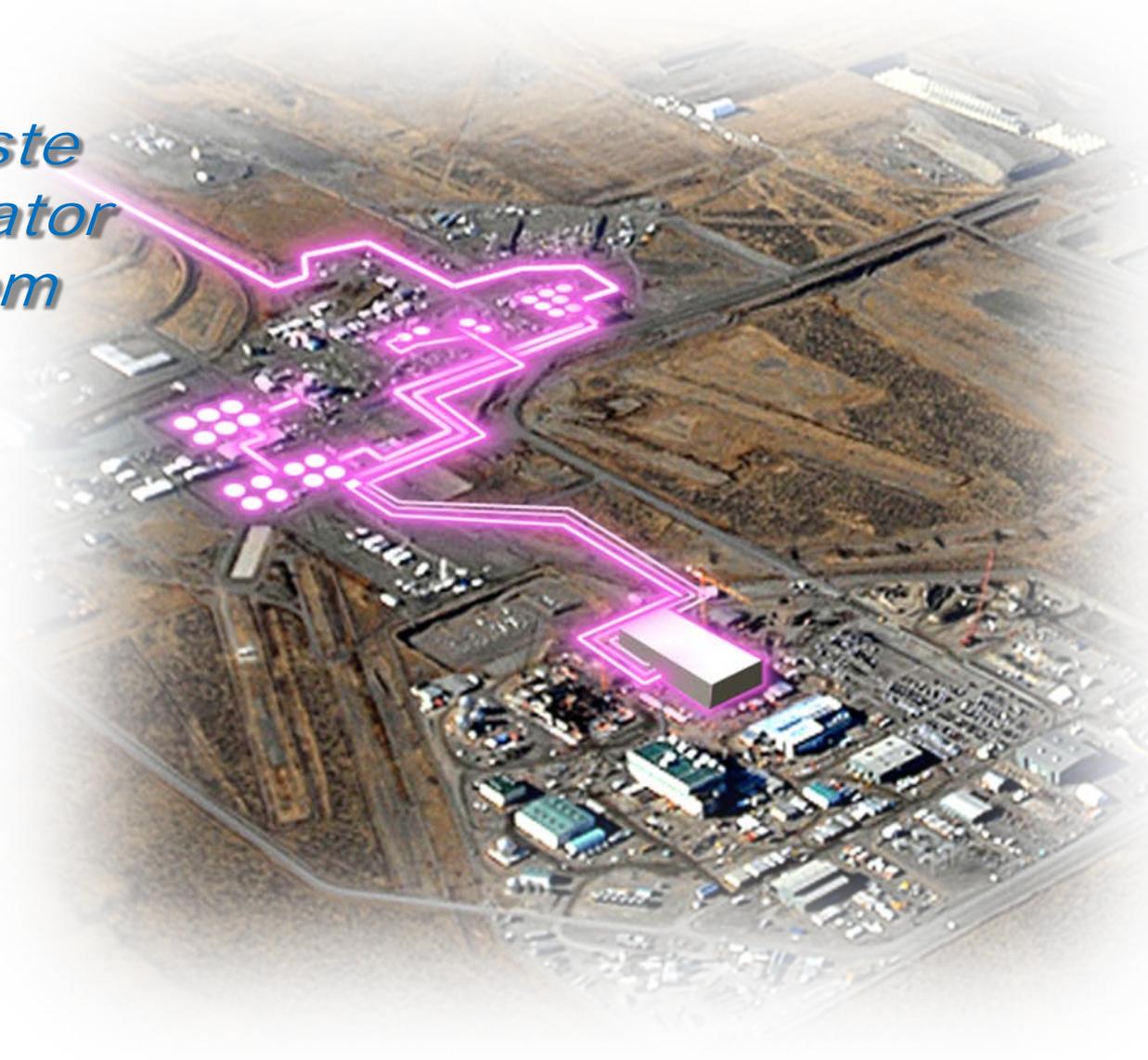




Hanford Tank Waste Operations Simulator (HTWOS): A System Planning Tool

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Tom Crawford
Tony Waldo
System Planning & Modeling

September 11, 2013





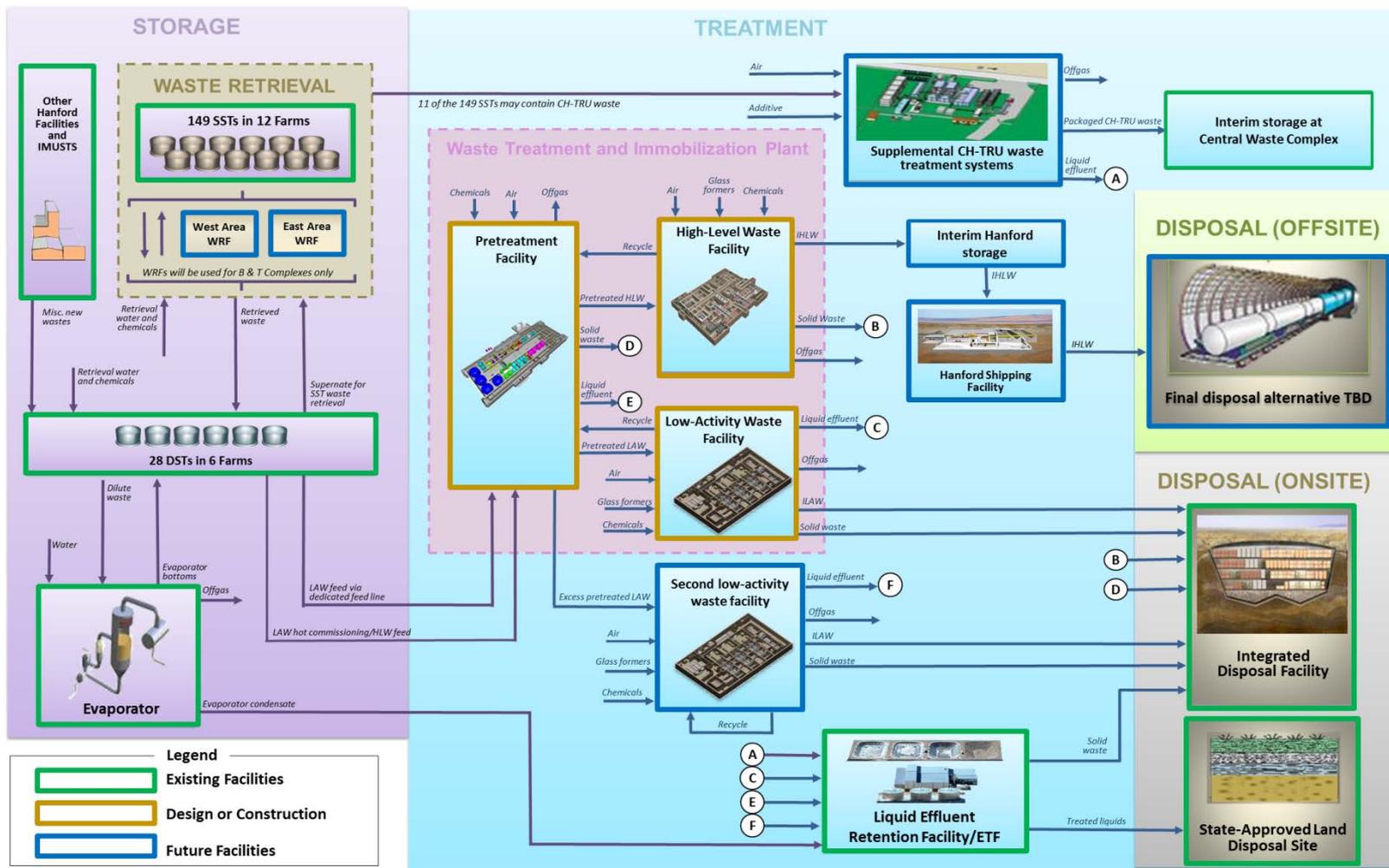
Agenda

- System Planning Process (12 min)
- Hanford Tank Waste Operations Simulator Model (15 min)
- Demonstration (30 minutes)
- Q&A (25 min)



SYSTEM PLANNING PROCESS

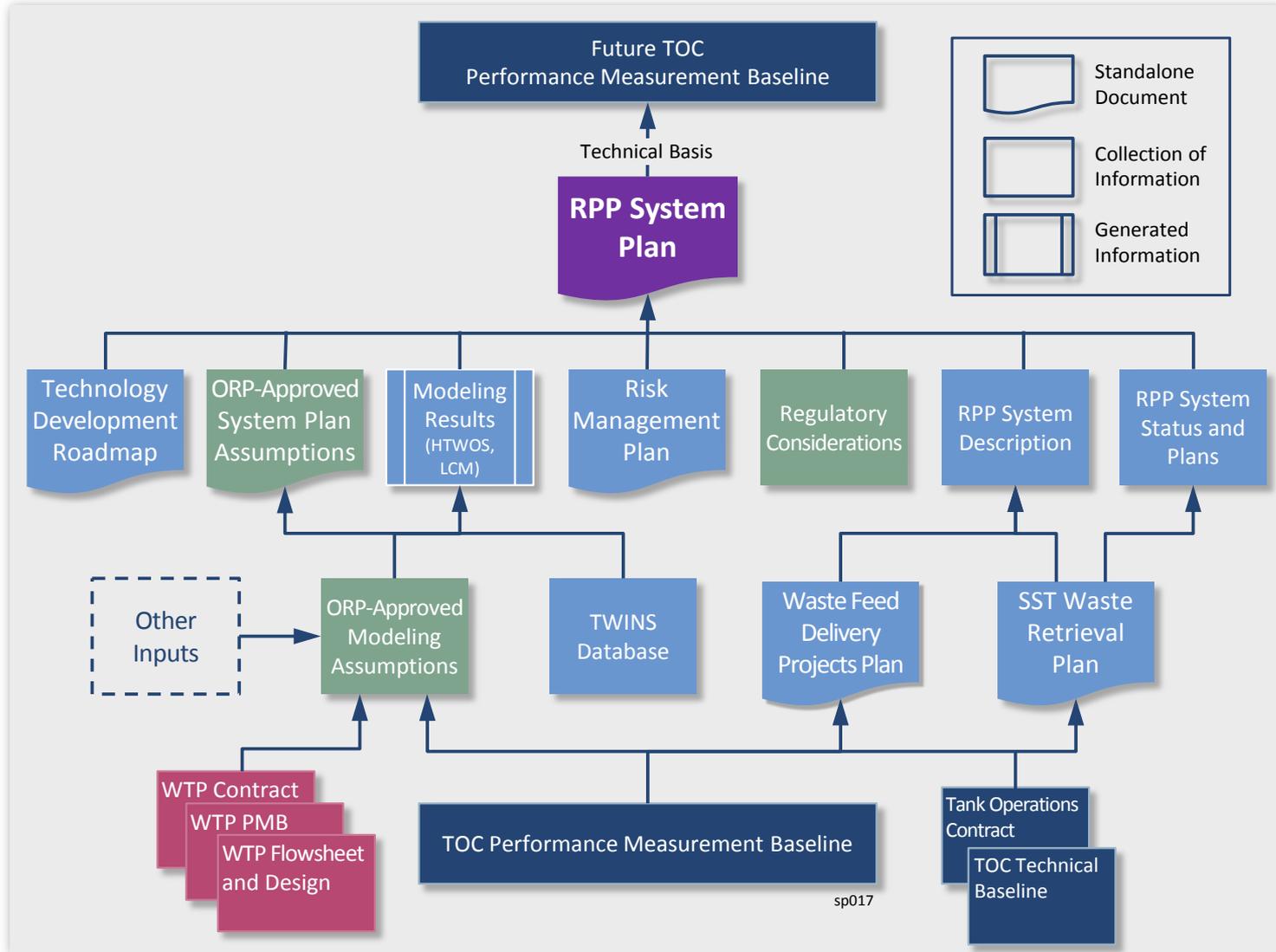
Mission Flowsheet – Simplified Process Flow Diagram



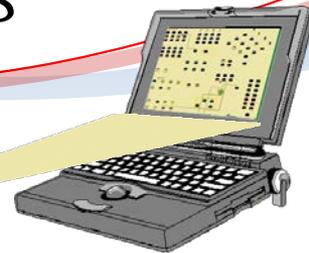


System Planning Inputs

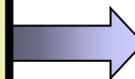
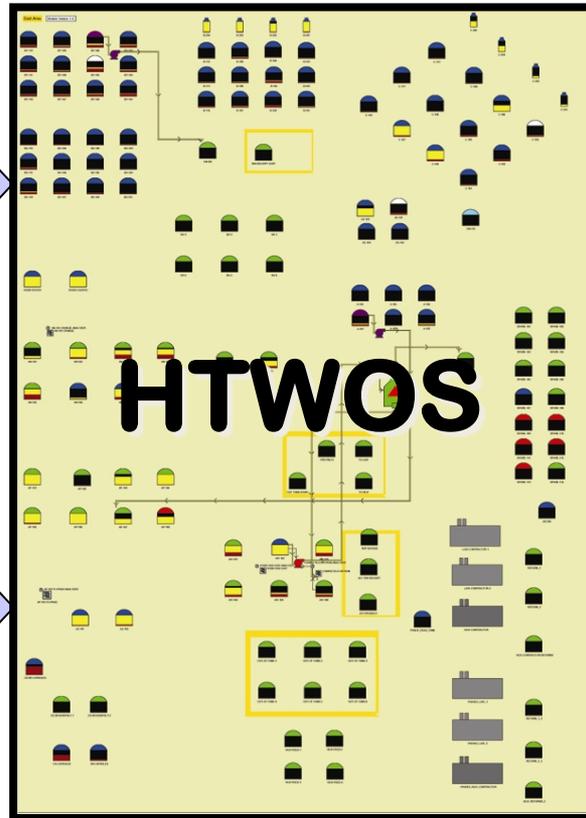
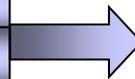
How do system models guide System Planning



Hanford Tank Waste Operations Simulator Model



Best Basis Inventory
Historic Waste Transfers and Retrievals
Radioactive Decay Data
Integrated Solubility Model
Total Operating Efficiency
Flowsheets (Tank Specific & Process)
Other Partitioning Assumptions
HLW and LAW Glass Models



Results (some require post-processing)

Overall Mission Mass Balance
WTP Feed Vector (Comp., Quantity, & Dates)
Production vs. Time
DST Space Usage and Volume vs. Time
Projected Waste Transfers
SST Retrieval Sequence and Timing
Feed Envelope Assessments & Screening
HLW Glass Drivers
End Dates (SST Retrieval, Waste Treatment)
Equipment Need Dates
Input For Funding Profiles
Projected 242-A Evaporator Use

Case-Specific Input

Customer's Key Planning Assumptions
Equipment & System Constraints
DST Tank Usage Allocations
Available Treatment Processes and Interconnection
Capacities, Rates, & Schedules
Near-term Waste Transfer Plans
SST Retrieval Strategy, Logic and Constraints



Simulates Waste Treatment Mission

- Partition Streams (Evaporator, IX, S/L Separation, Wash & Leach factors, Splits or DFs)
- Rule Based
- Dynamic (time-varying flows and compositions, discrete events)
- Mix Streams

Subject to Constraints

- Tank Space
- Production Rates
- Transfer Rates
- Equipment Availability
- Simultaneous Transfers
- Other Relevant Constraints

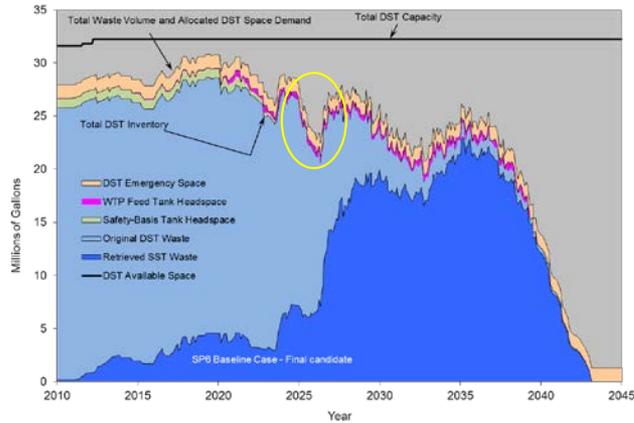
Not Directly Addressed

- Reaction Kinetics (except boemite leaching)
- Speciation
- Heat Transfer
- Certain Flowsheet Details
- Reliability (Point in time and start-ups)

Examples of Results



DST Space Utilization



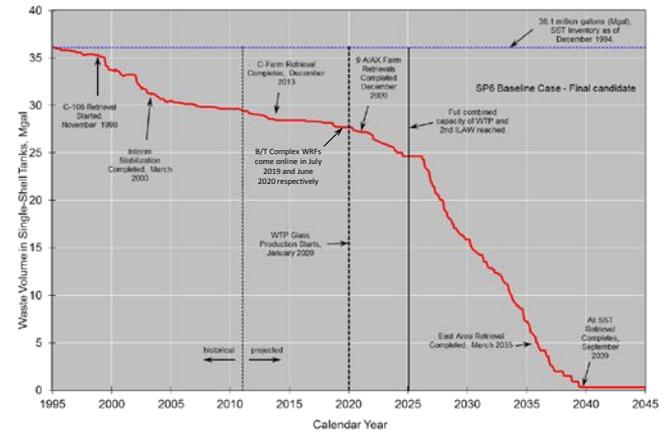
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SST Retrieval Progress



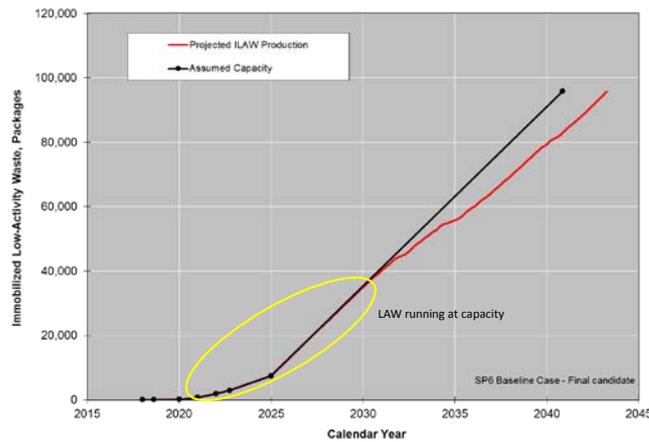
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Combined LAW Production



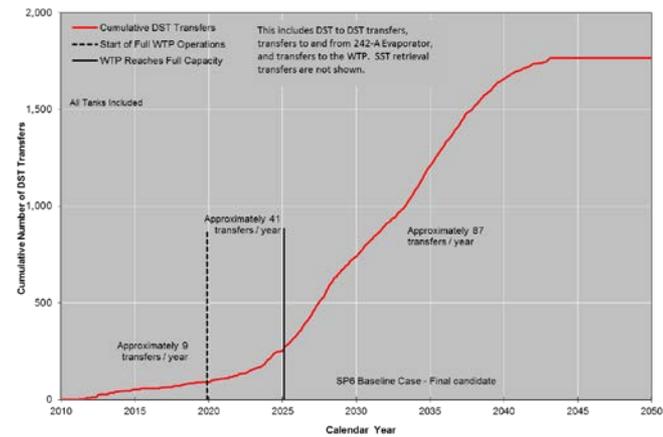
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Cumulative DST Transfers



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Hanford Tank Waste Operations Simulator

HTWOS MODEL



HTWOS Model Purpose

- Tank Operations Contract specifies use of the HTWOS model:
 - *The Contractor shall maintain the Hanford Tank Waste Operation Simulator (HTWOS) model and use the model to evaluate alternative cases to optimize RPP system performance and provide a technical basis for the approved Performance Measurement Baseline described in Section C.3.1.2, Project Scope, Schedule, and Cost Baseline.*

Near-Term	Long-Term
Near-term transfers	System Planning
Evaporator operations	Baseline Change Requests
Process flowsheets	Project Planning and Integration
DST space management	Issue Identification and Risk Management
Support operational planning	Operational research model input



HTWOS Model Software

- HTWOS model uses the Gensym (G2) software platform
 - Dynamic discrete event simulation modeling tool
 - Used to simulate the full duration of the RPP Mission
 - Movement of waste through Tank Farms
 - Feed delivery and WTP operations
 - TRU waste processing
 - Supplemental treatment systems

- HTWOS is compliant with WRPS software quality requirements, plans, and procedures



Hanford Tank Waste Operations Simulator

HTWOS DEMONSTRATION

QUESTIONS?