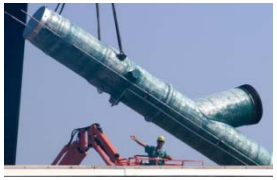
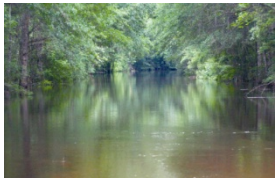
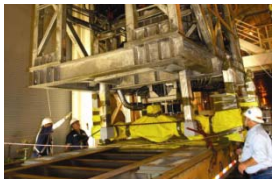
Tank 48 Business Decision Criteria

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Technology Development

May 21, 2009

Tank 48 Business Decision Criteria

- Technology development for the treatment of Tank 48 was invested in two alternatives
  - Fluidized Bed Steam Reforming (FBSR)
  - Wet Air Oxidation (WAO)
- Systems engineering processes were used to identify, define and weigh a set of criteria to perform selection of alternatives
  - Designed with flexibility so that the criteria can be applied to the Tank 48 technology selection at any time
- The business decision will result in the design, deployment and operation of the selected alternative for the treatment of Tank 48

Agenda

- Tank 48 Background and Importance
- Development of Criteria
- Comparison to Past Evaluations
- Status

Tank 48 Contents

- Physical
  - 242,000 gallons
  - Specific Gravity – 1.165
  - Insoluble solids – 3 wt%

- Chemical
  - 0.15 wt% MST
  - 21,800 kgs KTPB
  - > 1M OH
  - 1,350 curies alpha
  - 800,000 Curies (400,000 curies Cs-137)
  - 3.8M Na

Drivers

Why Tank 48?

Best ratio of tank space recovered per Ci of Cs-137

- Optimal location
  - Near ARP, MCU and transfer lines to SWPF and DWPF
- Fully compliant Type IIIA tank
  - 1,300,000 gallon capacity
- Low Curie content
  - ~400,000 Ci of Cs-137

Challenges

Why is it so difficult?

- Tetraphenylborate (TPB) decomposition produces benzene, a hazardous and flammable gas
- Transfers to other tanks or facilities are prohibited by the Documented Safety Analysis (DSA)
- Downstream impacts must be well understood and strictly controlled
- Required disposition >99%
- Need to support salt feed preparation for SWPF

Goals for the T48 Treatment Process

- Be easy to operate
- Minimize production of secondary wastes
- Be commercially available and technically mature
- Minimize the curies disposed of within South Carolina
- Return T48 to service quickly

Business Decision Criteria

- Technical Maturity
- Complexity
- Schedule
- Cost

Used analytical hierarchy techniques of Pair-wise comparison to apply weightings to criteria

Criteria Weighting

Main Criteria	Weight
TECHNOLOGY MATURATION	0.514
SCHEDULE	0.226
COMPLEXITY	0.185
COST	0.0750

Technology Maturation Elements

Main Criteria	Sub-criteria	Sub-criteria Description	Weighting
TECHNOLOGY MATURATION 51%	Proof of Technology Viability	Technology Readiness Level (TRL)*	0.33
	Difficulty of Continued Advancement	Any remaining potential for “fatal flaws” or “technology off-ramps”	0.667

Complexity Elements

Main Criteria	Sub-criteria	Sub-criteria Description	Weighting
COMPLEXITY 19%	Safety Basis Controls	Number of Safety Class (SC) / Safety Significant (SS) Controls to protect the Documented Safety Analysis	0.49
	System Robustness (Safety)	Level of process operating margin to Safety Limit	0.226
	System Robustness (Operations / Maintenance)	• Ability to run continuously • Availability and utility while producing product within spec.	0.087
	Quality Assurance	How difficult is technology to build / deploy from a QA viewpoint	0.056
	Downstream Impacts	• Physical and chemical impacts (constituents/volumes) • Permit mods due to new quantity/constituent release	0.141

Schedule Elements

Main Criteria	Sub-criteria	Sub-criteria Description	Weighting
SCHEDULE 23%	Project Schedule	Duration to: • Design • Test • Build • Turnover	0.75
	Operating Schedule	Duration to operate the process to achieve the tank 48 processing end-point	0.25

Cost Elements

Main Criteria	Sub-criteria	Sub-criteria Description	Weighting
COST 7%	Project (Design/Build)	Total project cost: •TEC •OPC	0.75
	Operations	Total operating cost (OPEX): •Cost of materials •Cost of operators •Cost of testing	0.25

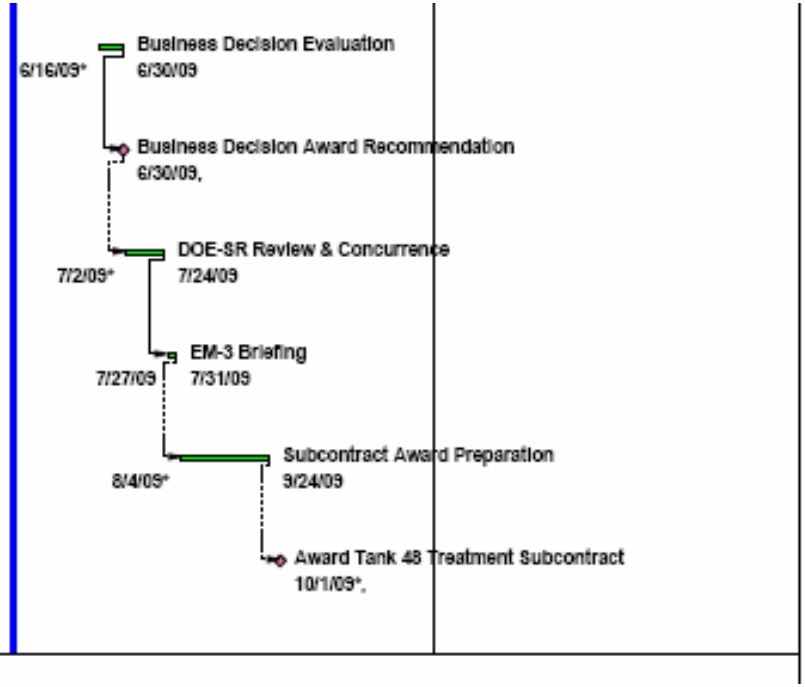
Systems Engineering Evaluation Criteria Comparison

Weighted Evaluation Criteria	FY2002	FY2003	FY2005	FY2006	FY2007	FY2009
40-60%	Technical Maturity		Technical Maturity		Technical Maturity	Technical Maturity
30-39%		Schedule	System Impacts	Schedule	Complexity	Schedule
20-29%		Cost		Cost Technical Maturity	Schedule	
10-19%	Safety	Technical Maturity Regulatory Safety Basis System Impacts	Cost Schedule	Complexity System Impacts		Complexity
<10%	Regulatory Risk Complexity Schedule	Operations	Regulatory			Cost

Tank 48 Treatment Decision Process

Recommendation to DOE for the Business Decision is on schedule for 6/30/09

WH483128	Business Decision Evaluation	PT	6/16/09*	6/30/09
WH483130	Business Decision Award Recommendation	PT		6/30/09
WH483132	DOE-SR Review & Concurrence	DO	7/2/09*	7/24/09
WH483134	EM-3 Briefing	DO	7/27/09	7/31/09
WH483136	Subcontract Award Preparation	PT	8/4/09*	9/24/09
WH483138	Award Tank 48 Treatment Subcontract	PT		10/1/09*



Summary

- The Tank 48 Business Decision Criteria were designed with flexibility
  - Ability to apply criteria at any time