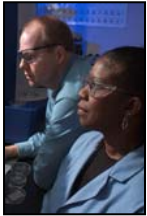


Pilot Plant Testing – Summary Remarks



We Put Science To Work

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December 4, 2007

Preface

- Testing discussed was performed extremely successfully
 - We concentrated on the areas for improvement
 - We didn't highlight the testing as the success story that it was
- Some concluding remarks and observations

Simulant Procurement Considerations

- Vendor Selection
 - Sole Source vs. Competitive
 - Past Experience
 - Proximity to Technical Experts and Pilot Facility
 - Understanding of SOW Simulant Preparation Instructions
 - Complexity of Simulant Preparation
- Considerations
 - Validated Recipe → SOW Simulant Preparation Instructions
 - Independent review of instructions for clarity before procurement
 - Vendor preparation of small test batches with actual bulk chemicals to be used for “production” batches
 - Specify and Review Cleanliness
 - Trace Contaminants / Unwanted Products
 - Equipment Reuse
 - Shipping and Transport
 - Technical Representative present during key production steps
 - Independent Lab Verification
 - Stage Delivery for Success

Simulant Procurement Considerations

Example: HLW Sludge Simulant for Overseas Advanced Melter Pilot Tests

- What went well
 - Vendor responsiveness & schedule recovery efforts
 - Proximity to Technical Experts - Technical Representative present during key production steps
 - Overseas shipments – prior vendor experience plus sub-contracted expertise
 - Vendor preparation of small test batches with actual bulk chemicals to be used for “production” batches
 - Equipment cleanliness
- What did not go well
 - Vendor mis-understanding of SOW Simulant Preparation instructions resulted in severely underestimating the time and equipment required for preparation
 - Minimal experience with SRS simulants
 - Vendor bias low on critical wt% solids analysis
- Recommendations
 - SOW Simulant Preparation Instructions
 - Independent review of instructions for clarity before procurement
 - Consider review with all potential vendors prior to placing order
 - Independent Lab Verification
 - Stage Delivery for Success

Simulant Procurement Considerations

Another Example:

Tank 48 simulant production for pilot tests – went well – experienced vendor and dedicated experienced technical staff for effort – staged pre-measured raw materials to make final feed simulant at test site prior to use – technical staff at vendor and test site

Pilot Plant Startup and Operations Considerations

Increasing Size, Hazards, Scope, Cost, Complexity, Critical Nature of Results →

Small Scope Research Activity

- Bench scale
- Limited unit operations & chemistry
- Limited resource needs
- Short operating run durations
- Low simulant and waste volumes
- Limited sampling
- Simple Process Controls
- Low Hazard
- Single POC operation



Large Scope Research Activity

- Approaching or at Production Scale
- Multiple Unit Operations
- Complex Chemistry
- Around the clock extended operation
- High Simulant and Waste Volumes
- Significant process hazards
- Complex / High I/O Control Systems
- High Data Collection Demands
- High number of operations & support staff
- Large Number of Analytical Samples

Recommended Good Practices

Conduct of R&D Practices → Conduct of Operations → Nuclear Startup & Testing

- | | |
|---|---------------------------------------|
| ▪ Minimum Shift Staffing Schedules | ▪ Readiness Reviews |
| ▪ Operations and Run Plan Status Boards | ▪ Joint Test Groups |
| ▪ Consider Con Ops during design | ▪ Test Deviations – “What-if” Reviews |
| ▪ Alarm/Abnormal Response Procedures | ▪ ... |
| ▪ Standard Valving Lineups ... | |

Waste Generation Considerations

- Easy to Overlook
 - Emphasis is on Successful Test Completion
- Waste Disposal Frequently
 - Costs More
 - Takes Longer
- Considerations
 - Get Environmental experts involved early
 - Review constituents of concern early
 - Other countries may be different than US
 - Pre-plan storage, staging areas, and transport
 - Consider secondary wastes
 - Unused simulant may become waste
 - Sometimes harder to dispose of than “Waste products”
 - Consider processing all simulant to avoid issue
 - Have vendors / treatment methods identified early
 - Consider backup plans & methods