Water Systems Analysis for Management

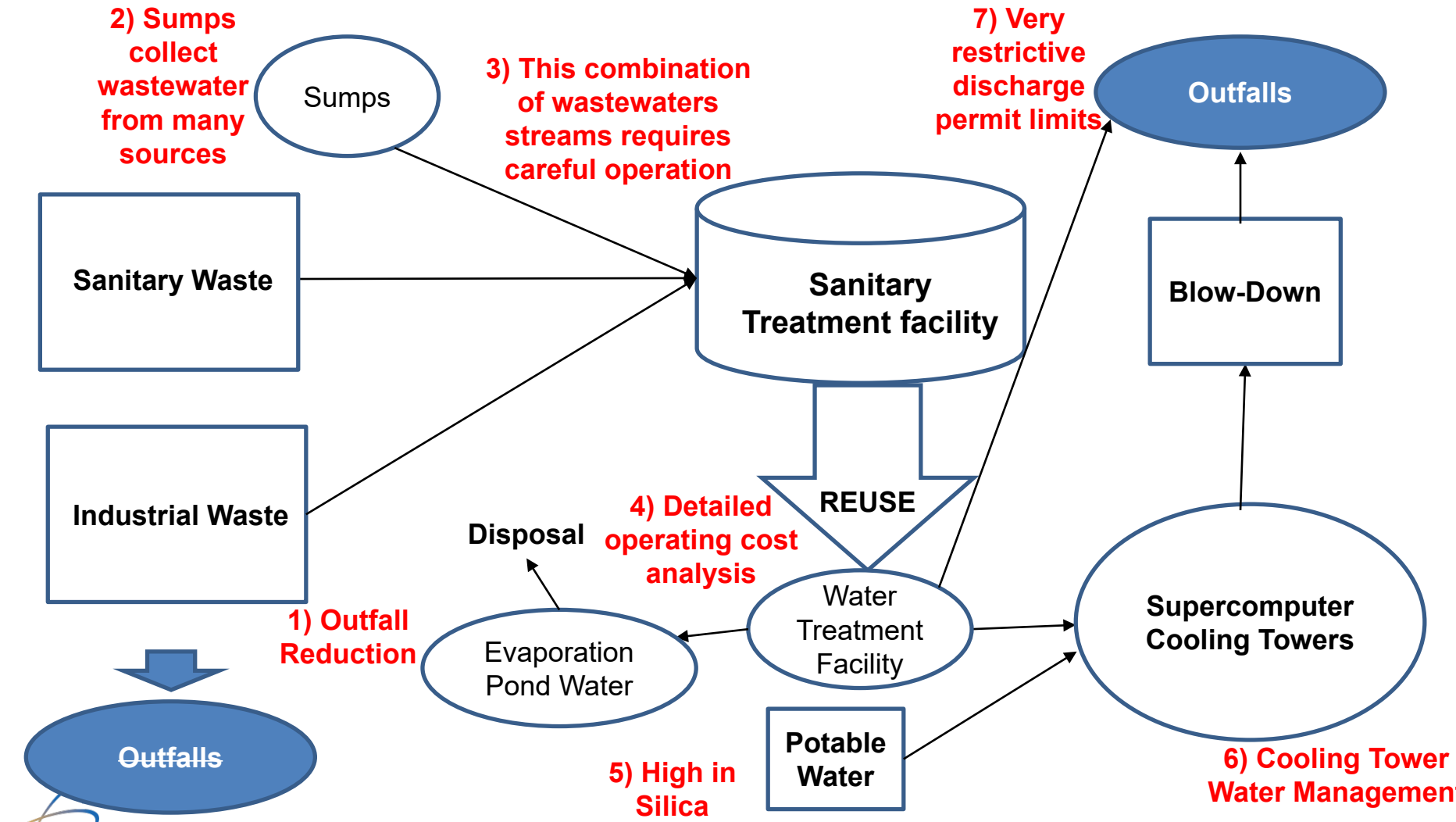
(LA-UR-19-30038)

Understand water system to optimize economic and water resources at Los Alamos National Laboratory and be cross-cutting

Water System Analysis

- How the water system worked at the Laboratory? this wide project lens made it difficult; knowledge isolated in “silos;”
- Whole Systems Analysis;
- Cross-cutting; Operations, economics, compliance, available data, management, and investment in R&D;

Big Picture


2) Sumps collect wastewater from many sources
Sumps
3) This combination of wastewaters streams requires careful operation
7) Very restrictive discharge permit limits
Outfalls
Sanitary Waste
Sanitary Treatment facility
Blow-Down
Industrial Waste
REUSE
4) Detailed operating cost analysis
Disposal
1) Outfall Reduction
Water Treatment Facility
Supercomputer Cooling Towers
Evaporation Pond Water
Outfalls
Potable Water
5) High in Silica
6) Cooling Tower Water Management

Water Systems Analysis

- **Sanitary Waste Water Treatment Facility;**
  - **-> Outfall Reduction Strategy;**
  - **-> High input variability;**
  - **-> Facility designed for sanitary waste only;**
  - **-> Available data;**

- **How did the P2 Program add value?**
  - **-> sludge requires rigorous testing if land applied;**
  - **-> Aqueous Film Forming Foam for Fire Suppression;**

Water Systems Analysis

- **Effluent Water Treatment Facility;**
  - **-> economics – $1.6 million treatment chemical cost;**
  - **-> waste disposal - High Evaporation pond water + sludge;**
  - **-> cost of water between 10 cents to 17 cents per gallon**

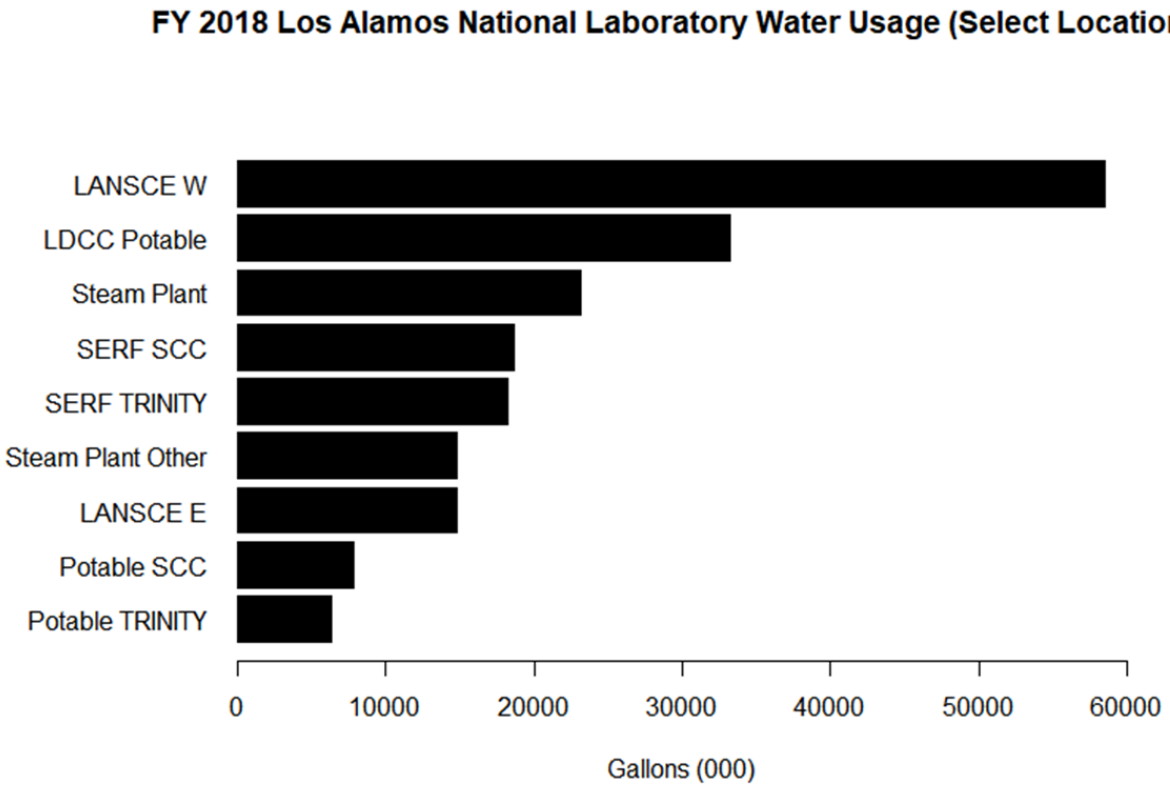
- **How did the P2 Program add value?**
  - **-> motivated management to reduce chemical inputs;**
  - **-> Investment in water treatment improvements;**

Water Systems Analysis

- Cooling Towers;
  -> operations;
  -> water is an unlimited resource;
  -> water is used for dilution;

- How can the P2 Program add value?
  -> change culture;
  -> shift operational parameters to reduce water usage at cooling towers;

Water Systems Analysis



Water Systems Analysis

- **Compliance;**
  -> data;
  -> Sump inputs;
  -> put whole water system together to tackle compliance issues at outfall;

- **How did the P2 Program add value?**
  -> Funded PCB source reduction initiative;

Water Systems Analysis

Take home message

Water management is not just compliance at an outfall but requires a whole systems analysis that is cross-cutting;