Federal Examples of Water Reuse

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Water Use Terms For Discussion

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- Recycle
  - the internal use of water by the original user before discharge
- Reuse
  - the use of untreated or slightly treated water in a different process or application
- Reclaim
  - water that is treated for use in a more pure environment

Federal Reuse Examples

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- Naval Air Station, Jacksonville, Florida
- Fort Carson, Colorado
- Fort Bragg, North Carolina
- Department of Energy, Kansas City Plant
- Commercial-Size Laundry Reuse Project

Naval Air Station Jacksonville Wastewater Treatment Plant

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- Serves 23,000 people at the NAS Jacksonville, Naval Aviation Depot, Naval Hospital, etc.
- Owned by Navy-PWC, operated by Johnson Controls-Hill
- Permitted as a 3.0 MGD conventional activated sludge treatment plant

Slides courtesy of Lee Merrill, Navy PWC from the 2002 FEMP Water Resource Management Workshop, Tampa, FL

- Normal dry weather flow thru plant ~ 1.0 MGD
- Discharges to St. Johns River

Naval Air Station Jacksonville Golf Course Reuse Project

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- 80 acre adjacent Timuquana Country Club (TCC) currently irrigating from 1000’ well from aquifer
- Basic project information
  - 12” gravity PVC pipeline (325’ long)
  - tapped into plant outfall pipe
  - discharges to 2.0 acre holding pond on golf course
  - float valve detects when pond level drops and diverts all WWTP effluent to refill pond
- Permitted annual average usage 250 KGAL/day
- TCC paid $250K for all project costs while the Navy agreed to provide reuse effluent at no cost

Naval Air Station Jacksonville Project Summary

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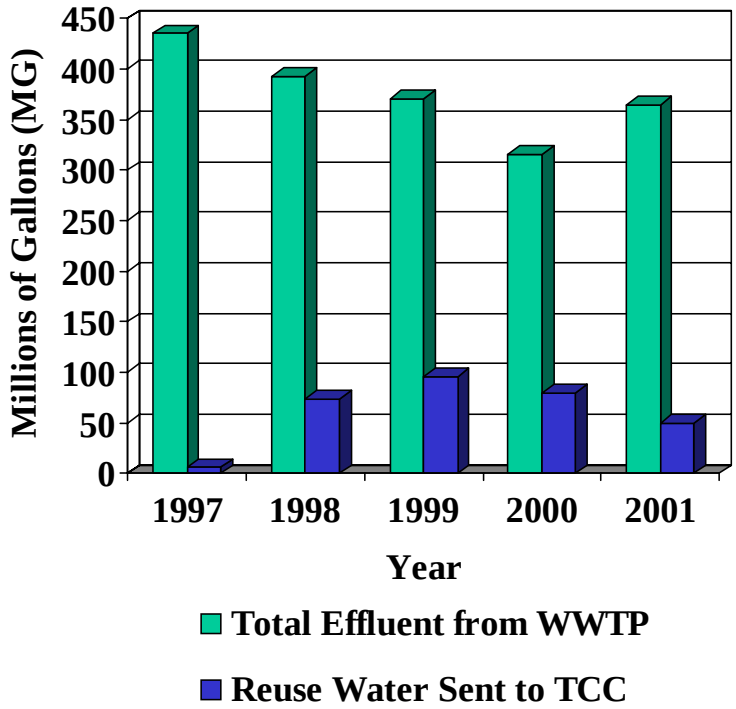

- Project currently using only 25% of WWTP outfall (by permit)
- Other potential sources for reuse water:
  - NAS JAX golf course
  - City of JAX Westside Regional Park
  - NAS JAX runway grounds
  - NAS JAX athletic fields, common areas
  - NADEP aircraft washing/rinsing facilities, cooling towers

Fort Carson, Colorado Water Program

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- Golf course irrigation
- Vehicle wash stations
- Landscape irrigation

Slides courtesy of Richard Pilatzke, Water Programs Manager, Fort Carson, Colorado from the 2003 FEMP Water Resource Management Workshop, Denver, Colorado.

Fort Carson Golf Course

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- 80-110 millions gallons used annually to irrigate golf course
- Effluent reuse dates to 1971
- Annual avoided cost of $150K - $200K
- New water treatment plant in 1998 - Excellent quality of effluent.

Central Vehicle Wash Station

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Wash Station History

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- Primary purpose -- remove sediment from tactical vehicles.
- Serves the Army, Department of Transportation (DOT), and CO National Guard/Reserve vehicles
- Constructed in 1987
- Original cost: $7 Million.

Wash Station Operation

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- Closed-loop system
- Averages 10,000 vehicle washes per year
- Can wash up to 500 vehicles per day
- Operators are water treatment plant trained
- Can operate with no water addition for extended periods
- Most use during highest water rate period
- Total water savings since inception: 3 billion gallons

Non-potable Groundwater for Landscape Irrigation

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- 180 irrigated acres.
- Main operation (demand) is highest rate period.
- Storage required to meet peak demand.
- Up to 110 mg per year
- Total savings more than 2 billion gallons since inception
- Cost: $0.60 vs. $1.25 per Kgal

Fort Bragg, North Carolina

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- During recent drought, Fort Bragg reduced water consumption 35% through voluntary restrictions and has maintained that reduction over time.
- Mitigation Actions
  - Turf irrigation restrictions
  - Closed once-through car washes, only use post's main vehicle wash facility
  - Rain barrel landscape irrigation (120)
  - Waste water effluent for golf course (planned)
  - Sustainable Fort Bragg promotes Xeriscaping for LEED credits

http://www.rainwatersolutions.com/

DOE Kansas City Plant

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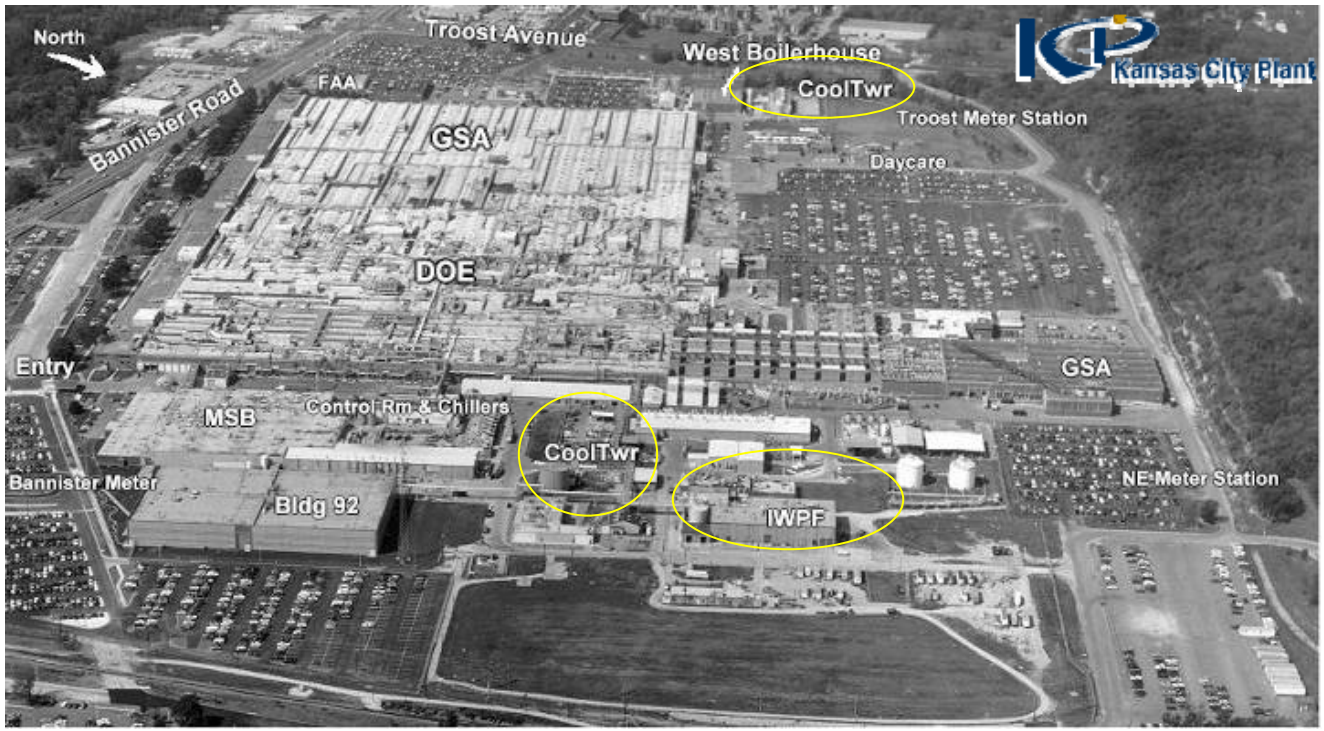
- Large industrial complex employing 2,800 staff with over 3 million square feet
- Industrial wastewater treated at industrial waste pretreatment facility (IWPF) before released in sanitary sewer



Kansas City Plant
Reverse Osmosis Treatment

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- Reverse osmosis provides de-ionized water and reuse water from industrial wastewater
- 40,000 gallons per day treated
- Economics-driven process: RO treatment cost is $3.10/Kgal, while IWPF cost is $15/Kgal
- RO process is 66% efficient at reclaiming water (better quality than city potable water), which is sent to the east cooling tower

Slides courtesy of DOE Kansas City Plant, "Department of Energy Kansas City Plant: Water Resource Management Plan," 2003.

- Reject water sent to IWPF is more concentrated, which is better for that process

Commercial-Size Laundry Reuse Project

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- Commercial-size laundry operations (e.g. hotel/lodging) and larger
- Escalation of sewage treatment cost, prime driver for water recovery systems
- Additional savings on water, energy and chemicals

Commercial-Size Laundry Reuse Project

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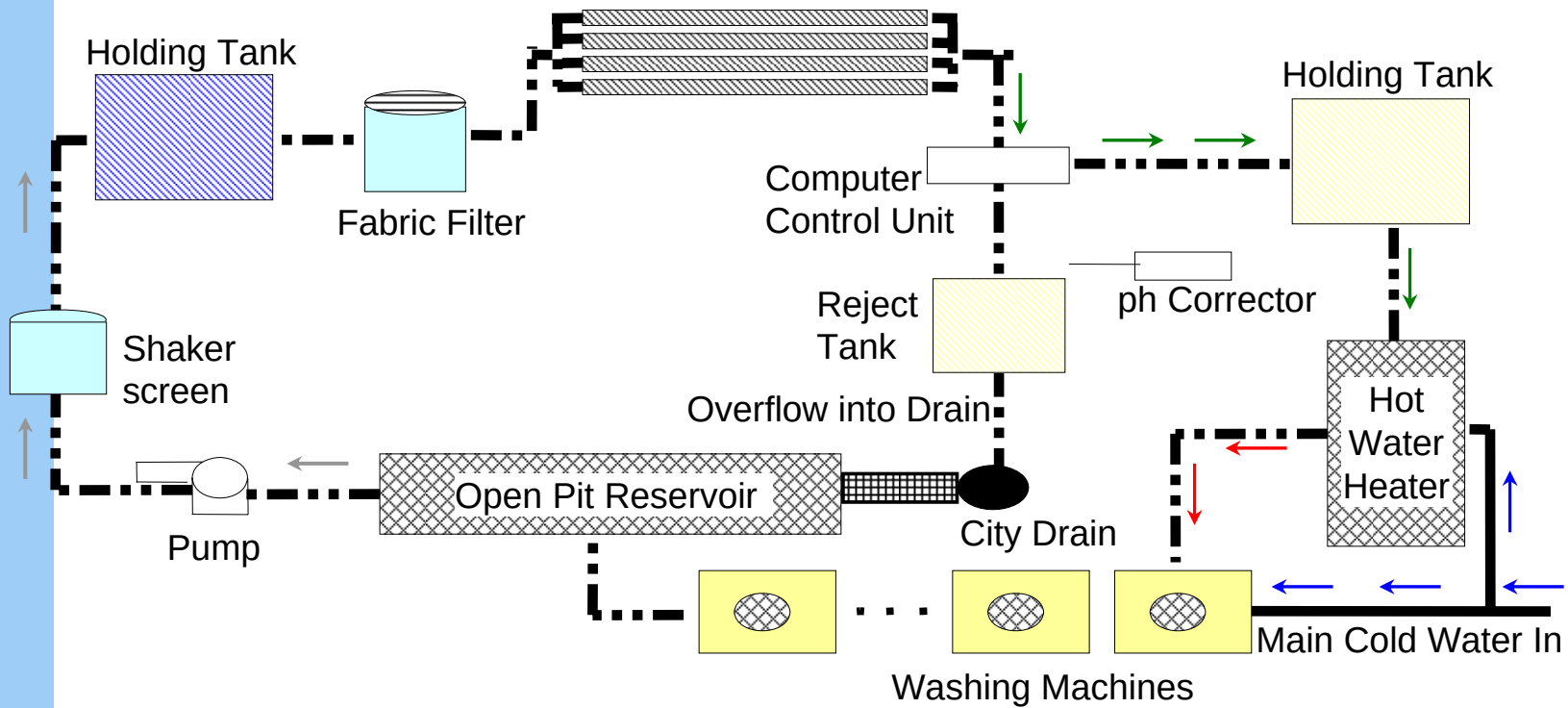
Water Reclamation System for Commercial Laundries



Commercial-Size Laundry Reuse Project

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- Average input to the H_20 heater = 52°F
- Average 55,000 gals/day
- 2.46 gals/pound
- 1,300 kBTU/h for wash

- Average input to the H_20 heater = 97°F
- Average 32,000 gals/day
- 1.6 gals/pound
- 700 kBTU/h for wash