

# Water Re-Use System for Industrial Discharger

**Timothy J. St. Germain, P.E.**  
**Senior Vice President**



# Outline

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- I. Site Background**
- II. Process Flow Diagram**
- III. The Problem**
- IV. The Solution**
- V. The Process**
- VI. Results**
- VII. Transformative Decision**
- VIII. Questions/Discussion**

# Site Background

**Major Aerospace Manufacturer (Commercial and Military aircraft components)**

**Initial Site Development = 1950s**

**Manufacturing Space = 2.2M SF**

**Land Area = 300 Acres**

**Employees = 4,000**

**Industrial Wastewater**

**Discharges = 30,000 to  
40,000 GPD (typical)**

Manufacturing Facility

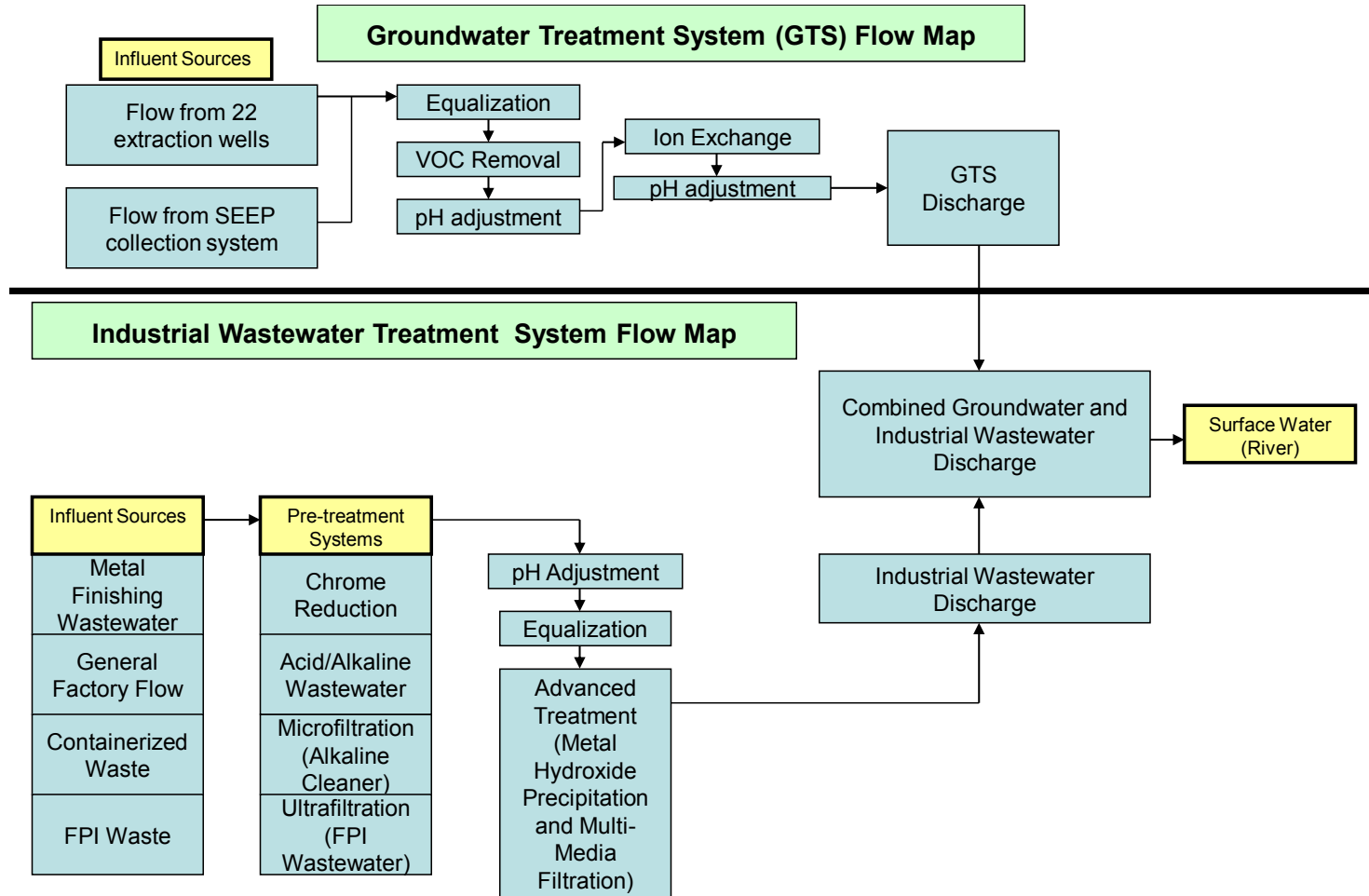


# Site Background

## Wastewater Treatment Facility



# Process Flow Diagram



# The Problem

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**Facility goals are to reduce or eliminate environmental risks**

- **EHS staff conclude that NPDES permit/surface water discharges represent significant environmental compliance risk**
  - **Cost of maintaining compliance**
  - **Risk of permit violation/impact to environment**
- **Determine that relocating discharge to local POTW may provide some risk reduction but not adequate**

# The Solution

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## Eliminate industrial discharges from the site

- **Implement water conservation measures**
  - **Process controls**
    - **Flow metering**
    - **Flow restriction**
    - **Conductivity-driven rinsewater use**
    - **Counterflow rinses**
    - **In-process treatment (I/X, filtration)**
  - **Operator training**
- **Upgrades to existing treatment processes**
- **Wastewater recycling and reuse**

# Treatment System Upgrades

- Chromium Pretreatment
- Equalization
- Groundwater Remediation
- Multi-Media Filtration





# The Process

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## Feasibility Study

- Evaluate options
- Access needs and potential costs

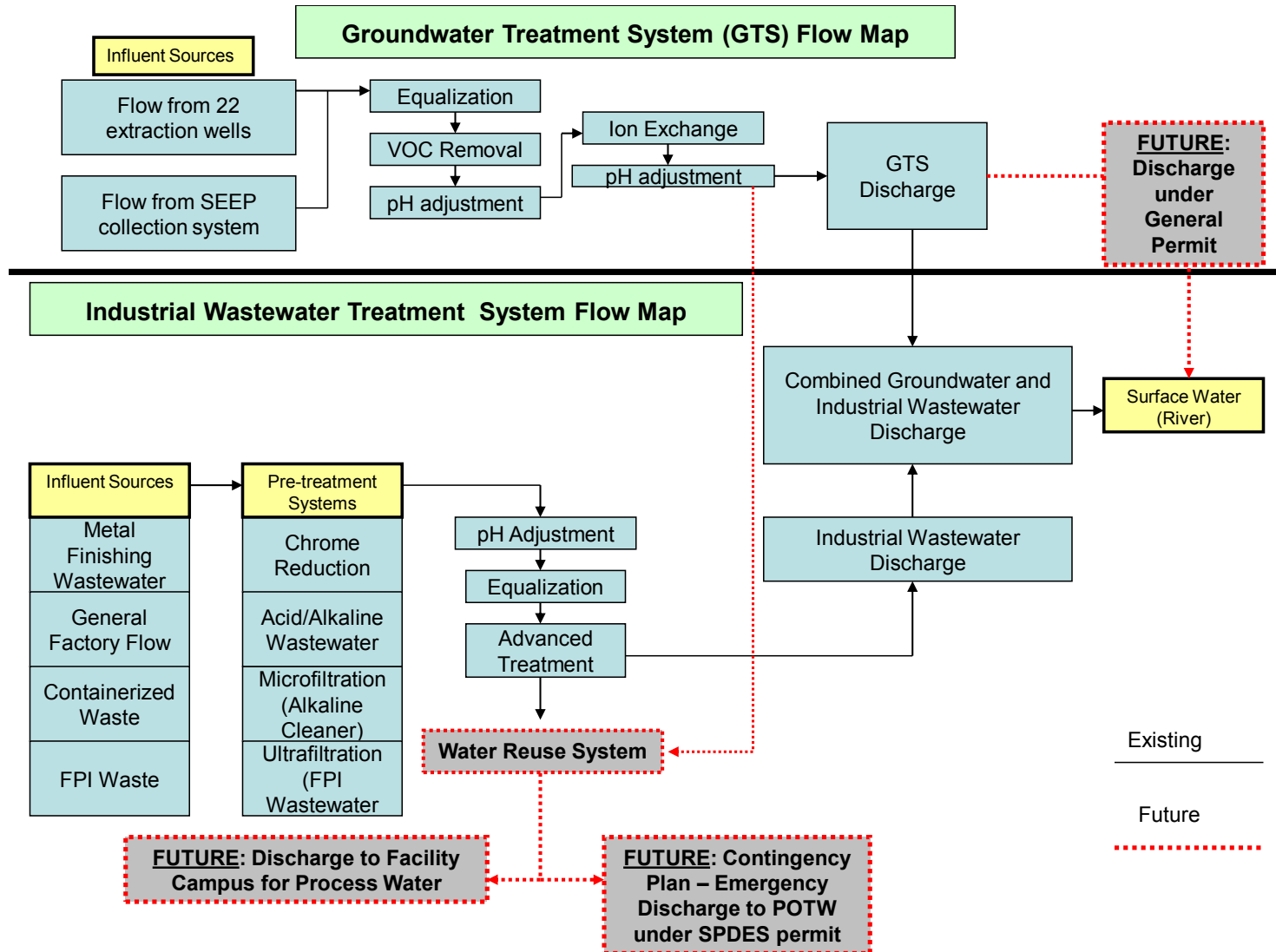
## Pilot Study

- On-site, side stream operation
- Gather design criteria (flow rates, treatment efficiency)
- Access maintenance requirements

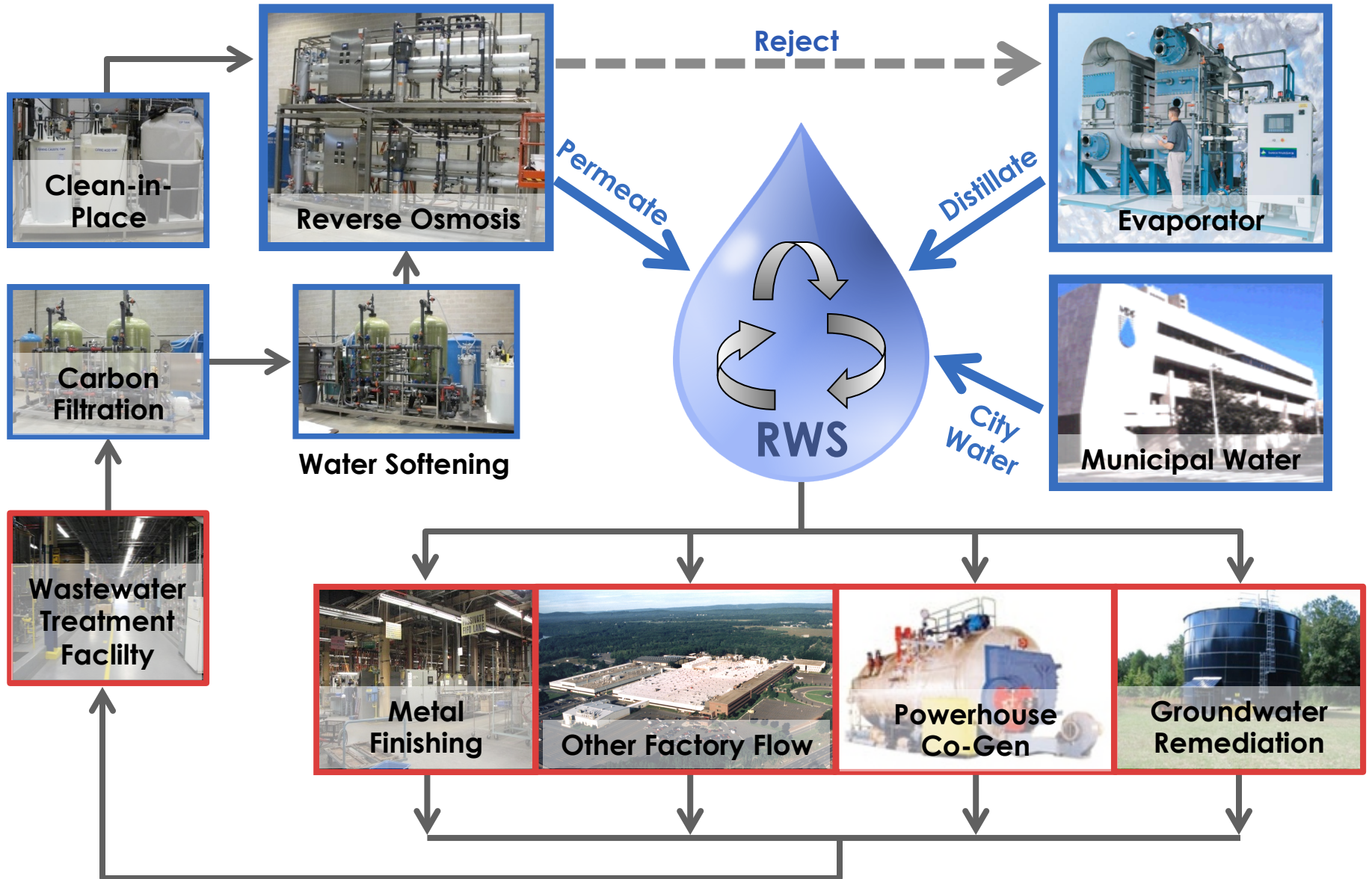
## Design

- Primary recycling equipment
- Supporting utilities (steam, electricity, cooling water)
- Other infrastructure (building, distribution system)

# Process Flow Diagram



# Recycled Water System



# Water Reuse System

## 5 Major Treatment Skid-Mounted Components

(Carbon Polishing, Water Softening, Reverse Osmosis, Vacuum Distillation and Clean-In-Place)



# Carbon Polishing

Purpose – Remove organics to protect RO membranes

Feature - Redundancy



# Water Softening

Purpose – To protect RO membranes

Feature - Redundancy



# Reverse Osmosis

**Purpose – Primary recycling (85-90% permeate)**

**Features – 100% Redundancy (dual trains); 75 GPM**



# Vacuum Distillation

Purpose – Enhanced recycling (98%+ recycle)

Features – Vacuum distillation and dual effect (900 GPH)





# The Infrastructure

- New building
- New utilities (steam, compressed air, electricity, cooling water)

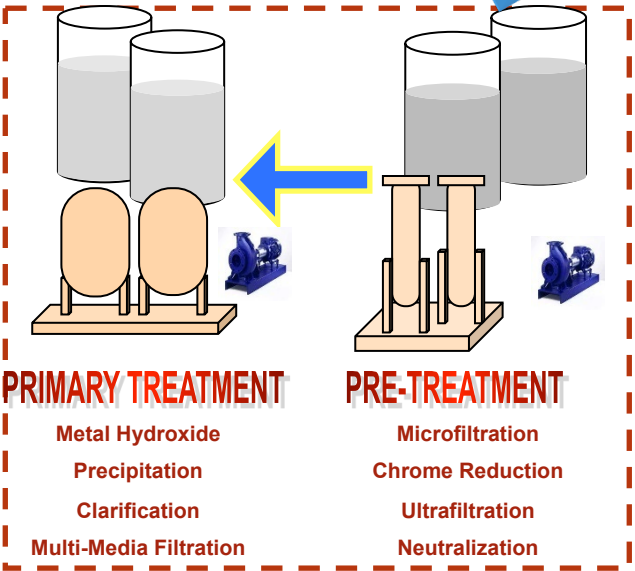
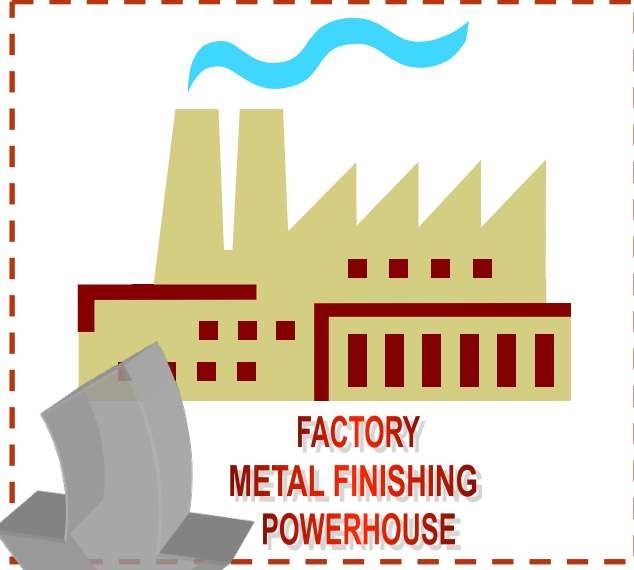
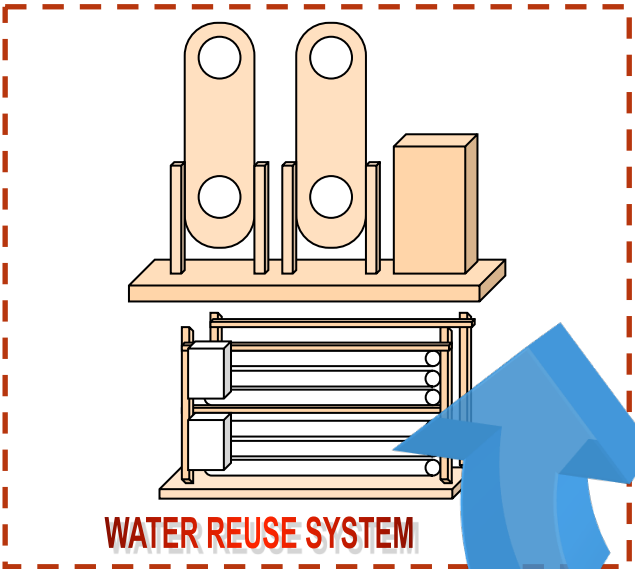


# Water Reuse - Distribution

- 10,000 Gallon Storage Tank (Recycled Water)
- Distribution Network
- 2 – 30,000 gallon Storage Tanks



# Facility Water Balance



# Results

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## Completion in 2011

- Close-loop industrial wastewater
- Excellent and consistent water quality
- 30,000 to 40,000 GPD (average) reduction in discharges (approximately 13 to 14 MGY)

## Revocation of NPDES Permit to the river

## Pretreatment Permit for discharge to local POTW

- Regulatory coverage
- Emergency
- No discharge has occurred since system start-up (approximately 4 years)

# Transformative Decision

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The company is evaluating zero discharge throughout its entire organization

- **150 manufacturing facilities world-wide**

The outcome has been viewed as an overwhelming success

- **Reduce corporate-wide environmental risk**
- **Achieves corporate goals for sustainability**
- **Improves business continuity**

# Acknowledgement

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## Primary Equipment Manufacturer:

**Kontek Ecology Systems Inc.  
Burlington, Ontario, Canada**

# Questions/Discussion

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# WATER REUSE SYSTEM

## WASTESAVER EVAPORATIVE RECOVERY SYSTEM

## TRADITIONAL WASTEWATER EVAPORATOR

