

# ILLINOIS SUSTAINABLE TECHNOLOGY CENTER

[WWW.ISTC.ILLINOIS.EDU](http://WWW.ISTC.ILLINOIS.EDU)



ILLINOIS  
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Freeport, Illinois  
May 28, 2009



**Deb Jacobson, Regional Operations Manager**

University of Illinois  
Sustainable Technology Center  
1010 Jorie Boulevard, Suite 12  
Oak Brook, Illinois 60523  
630/472-5019 Direct  
630/472-5016 General  
Djacobson@istc.illinois.edu



# Illinois Sustainable Technology Center (ISTC)

## University of Illinois

- Division of the Institute of Natural Resource Sustainability

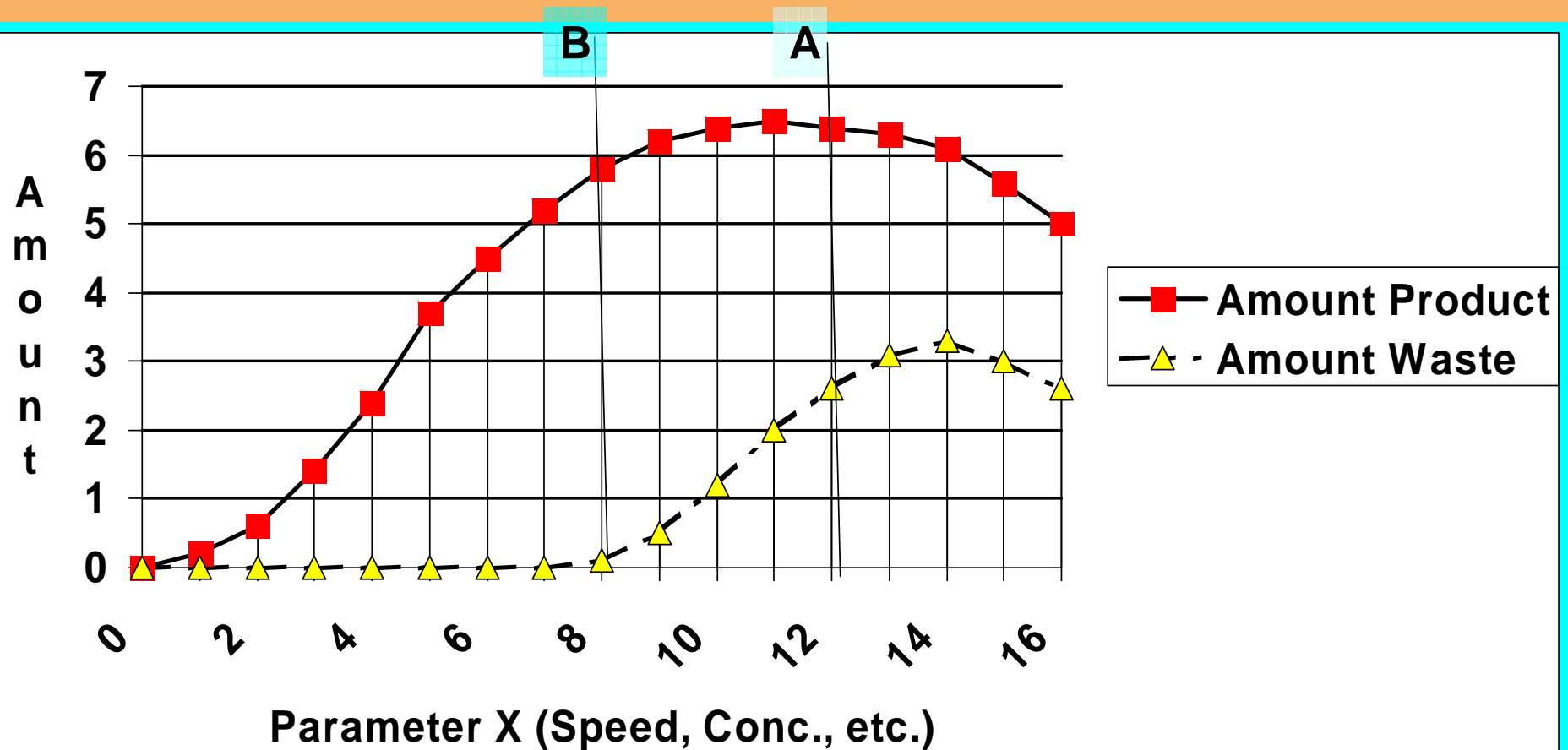
## Mission

- Assist Illinois industries, businesses, & citizens to reduce their consumption of resources and to eliminate or better manage waste.

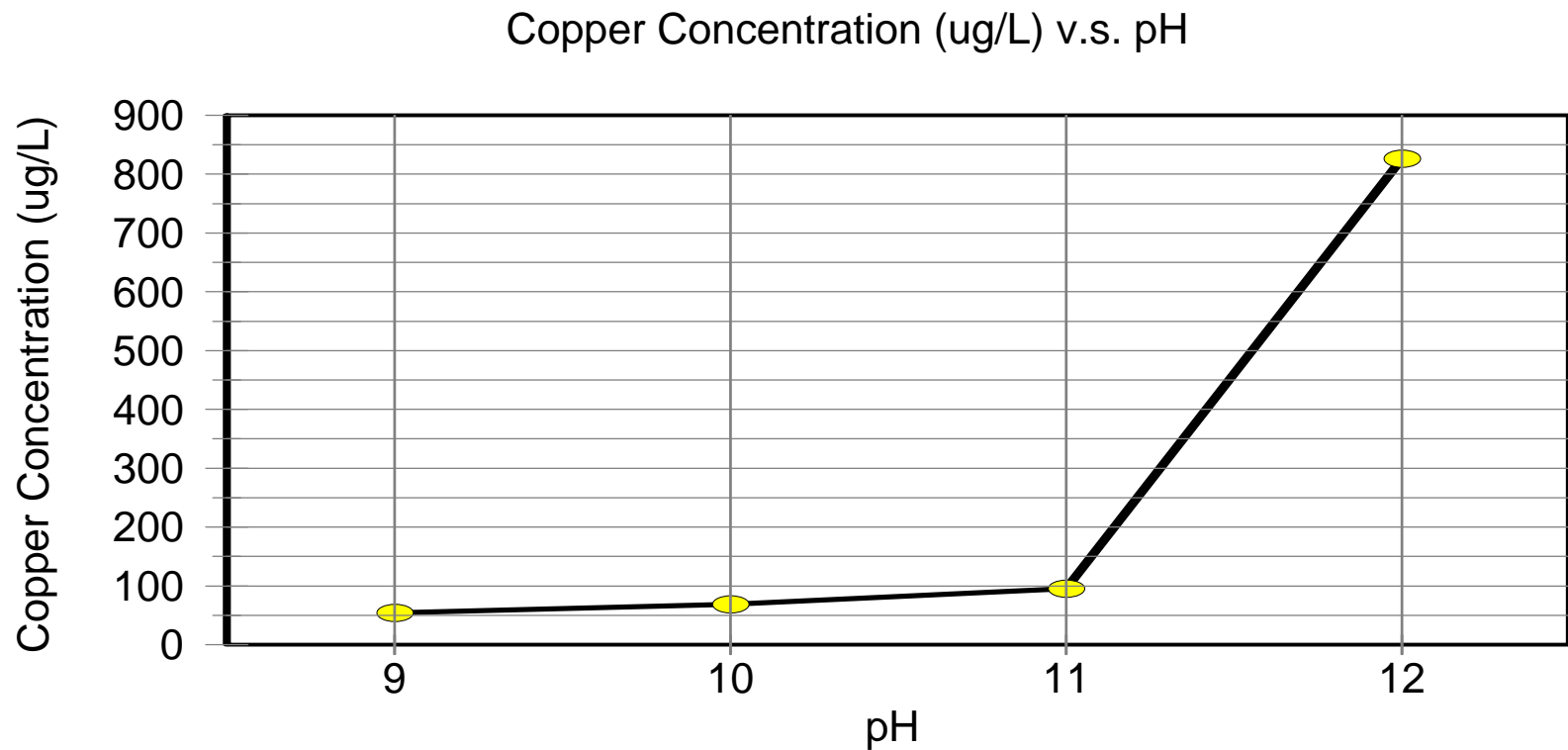
# Benefits of Waste Minimization and Energy Efficiency (P2/E2)

- Save money \$\$\$\$ in energy, raw materials, treatment, labor, disposal, & head aches
- Improve quality & increase productivity
- Improve worker safety & morale
- Make regulatory compliance easier
- Enhance environmental quality

# Operating Conditions Affect Waste Generation



# Actual Operating Conditions That Affect Waste Generation



# ISTC Mission Accomplished

- Technical Assistance Services
- Technology Development & Evaluation
- Partner With Others
  - Manufacturing Extension Centers
    - IMEC
    - CMC
  - Local Government Agencies
    - City of Chicago
    - POTW's Throughout Illinois
      - Metropolitan Water Reclamation District
  - IEPA
  - U.S. EPA

# ISTC

## Technical Assistance Services

- Waste Minimization/Pollution Prevention
- By-products Synergy
- Energy Efficiency (E2)
- Green Business Practices
- Compliance Assistance
- Greenhouse Gas Foot-printing & Reduction
- Water Foot-printing & Reduction
- Environmental Cost Analysis
- Activity Based Cost Analysis
- Systems Engineering
- Laboratory Analysis & Support
- Environmental Management Systems (EMS)

# ISTC

## Technology Development & Evaluation

- Pilot Testing On-Site or in ISTC Laboratories
- Fluid Purification (metal working fluids, degreasers, solvents, rinse waters, etc.)
- Energy Efficient Technologies
- Alternative Energy
- Alternative Fuels
- Green Chemistry

# **IL Conservation of Resources & Energy Program (ICORE)**

## **Partnership with local government agencies**

A Program Funded by U.S. EPA

Areas addressed:

- Industrial water use & waste water reduction
- Greywater use
- Cooling tower water and energy management
- POTW influent and effluent reduction

# **Minimizing the Environmental Footprint of Metal Working Fluids Program**

## **Partnership with Illinois EPA**

A Partnership Funded by IEPA

Scope:

Work with Illinois manufacturers using metal working fluids to directly assist them with reducing metal working fluid use & associated wastes.

# How Does ISTC Help?

1. Establish baseline
  - Identify current conditions
2. Identify improvement options
  - Provide different options
  - Provide materials estimate
3. Identify savings potential
4. Identify simple payback

# Need to “Test Drive” Innovative Technologies

- “Awareness” information is not enough
- “Demonstrations” can increase interest
- Pilot Trials Reduce Uncertainty
  - Resolve compatibility issues
  - Reduce perceived complexity
  - Give “Champions” the information they need

# Equipment ISTC Has Available for Pilot Testing

- Aqueous Parts Washers\*
- Fluid Purifier System\*
- Conductivity Control
- Ultra Filtration

\* ISTC Developed

# Grease Gator System

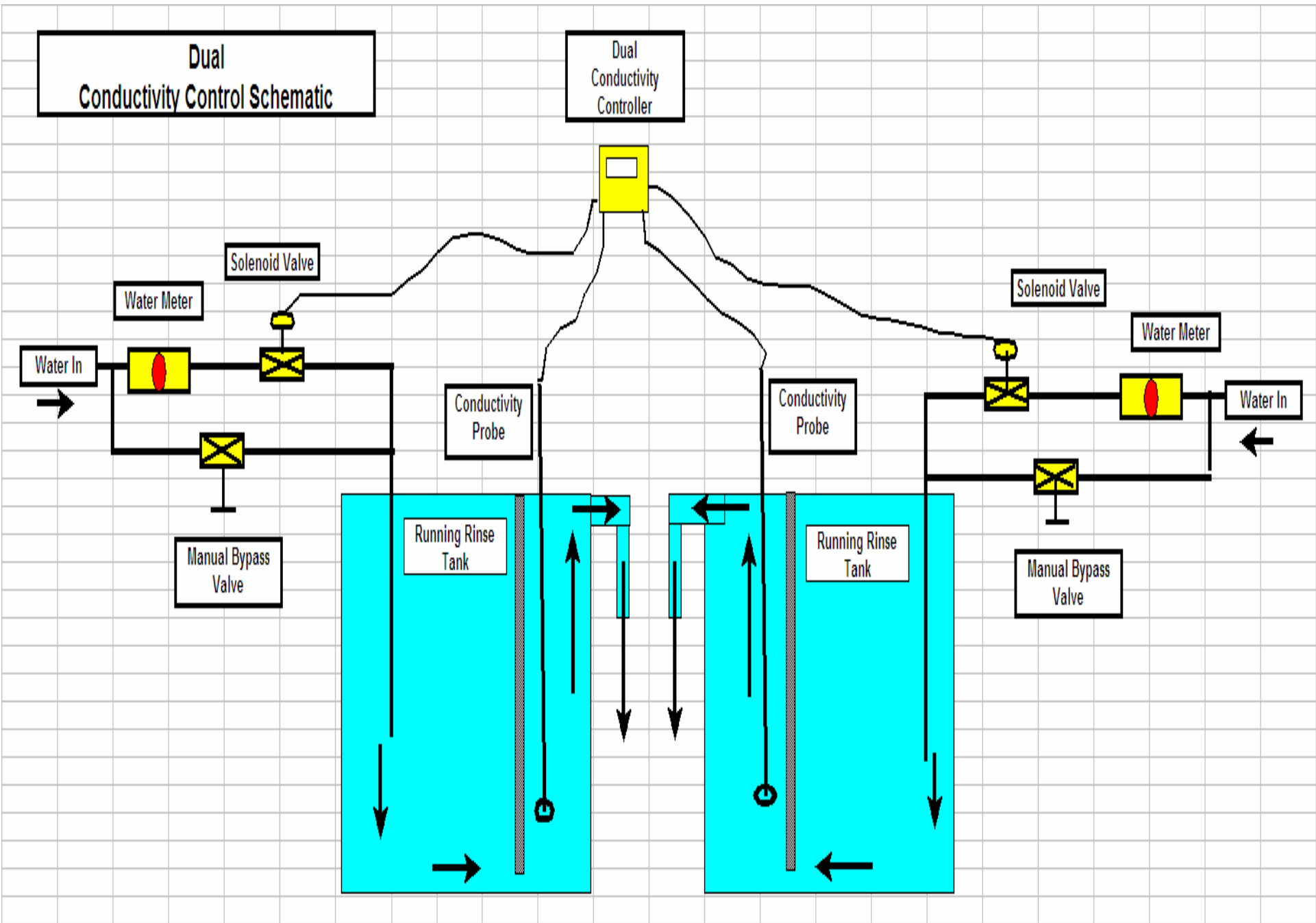


- Aqueous system cleans better than mineral spirits
- Safe, environmentally friendly chemistry
- Continuously purifies solution as it is used
- Recovers oil/grease for recycling
- Easy to maintain
- Pilot units available for testing

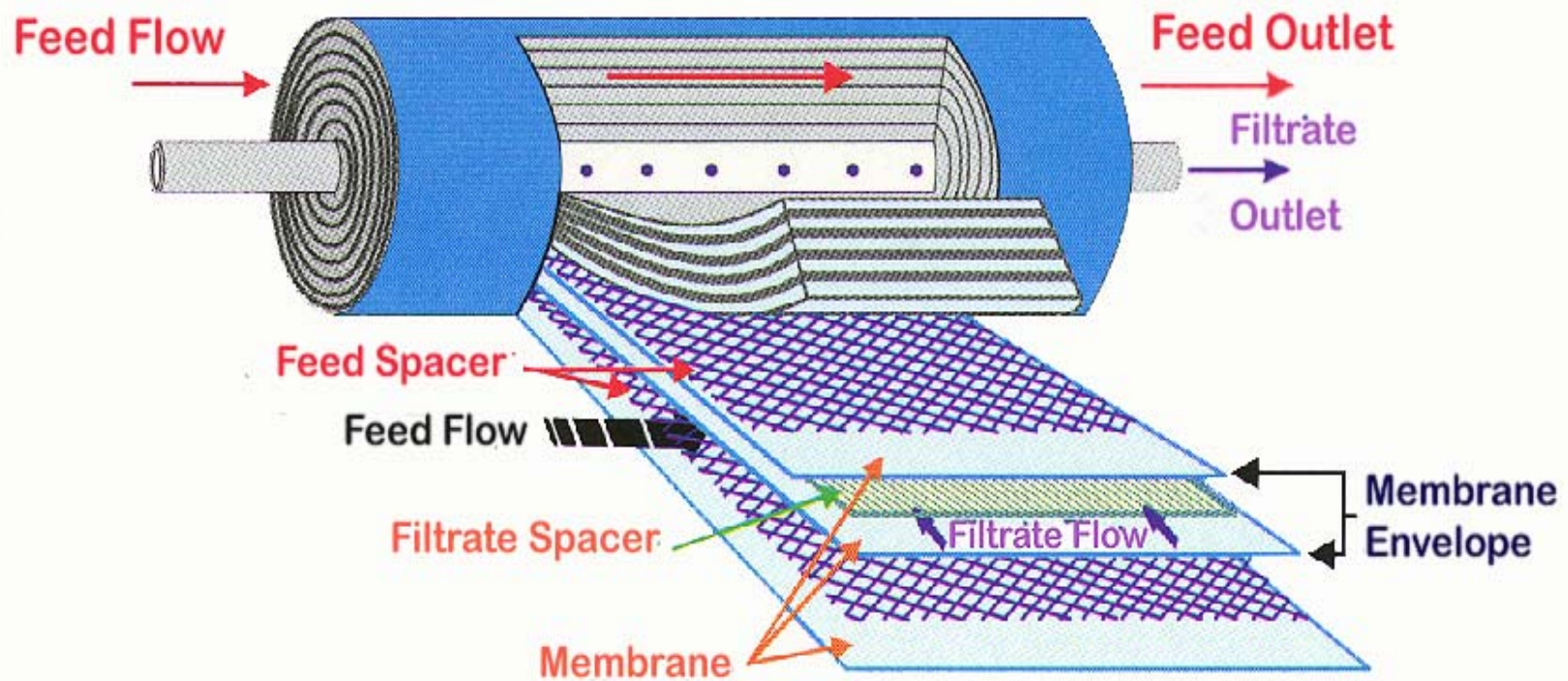
# Fluid Purifier System



- Cleans soluble oils and semi-synthetic metal working fluids (MWF)
- Continuously purifies solution of tramp oils
- Removes nutrients for bacterial growth
- Recovers oil/grease for recycling
- Easy to maintain
- Pilot units available for testing



# Spiral Wound UF Membrane





**Pollution Prevention  
Case Study:  
Metal Working Fluids**

**Ref. ISTC/IEPA Partnership**



# Fluid Purification System

- ***Need:*** Remove tramp oil from machine tool sumps & parts washers
- ***Design Parameters:***
  - Inexpensive
  - Keeps entire sump surface free of oil
  - Small footprint
  - Minimal maintenance
  - Works with multiple fluids





## Large Milling Machine with Passive Filtration



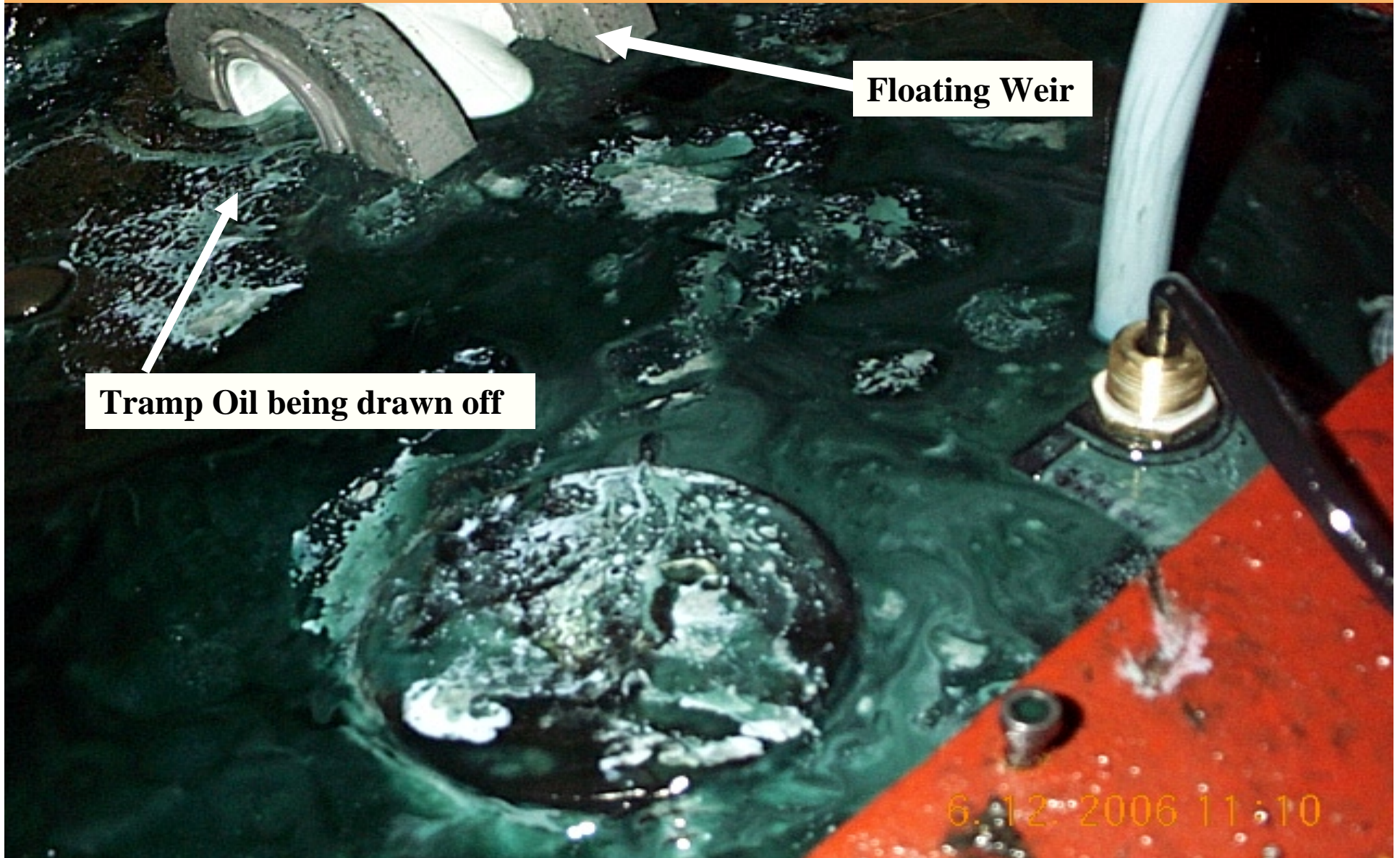
# Large Milling Machine Sump with Passive Filtration System



## Large Milling Machine Sump with Floating Skimmer to Passive Filtration System



**Passive Filter on a small milling machine (sump size about 10 gallons). BEFORE SKIMMING.**



**Floating Weir**

**Tramp Oil being drawn off**

## Small Sump and Floating Skimmer



## Small Sump and Floating Skimmer, system running



**Small Sump & Floating Skimmer, system running for 15 seconds.**



**Small Sump, system running after about 2 minutes.**



## **Illinois Governor's Sustainability Award**

Since 1987, ISTC has presented these awards to organizations in Illinois that have demonstrated a commitment to environmental excellence through outstanding and innovative sustainability practices. Award winning projects have saved millions of dollars in material and disposal costs, prevented hundreds of tons of waste materials from being released into the environment and saved millions of gallons of wastewater from being taken from the environment, soiled and sent to treatment facilities.

**Applications due May 29, 2009.**

## Accessing ISTC's Services

Information on the Governor's Pollution Prevention Awards program and technical assistance and energy efficiency are available from:

Illinois Sustainable Technology Center (ISTC)  
One Hazelwood Drive, Champaign, IL 61820  
Phone: 217/333-8940.

Website:

[www.istc.illinois.edu/info/govs\\_awards.cfm](http://www.istc.illinois.edu/info/govs_awards.cfm)