



811.363

Chapter 6: **Examples**



**Universität für Bodenkultur Wien
University of Natural Resources
and Applied Life Sciences, Vienna**

Department für Wasser-Atmosphäre-
Umwelt
Department of Water, Atmosphere
and Environment

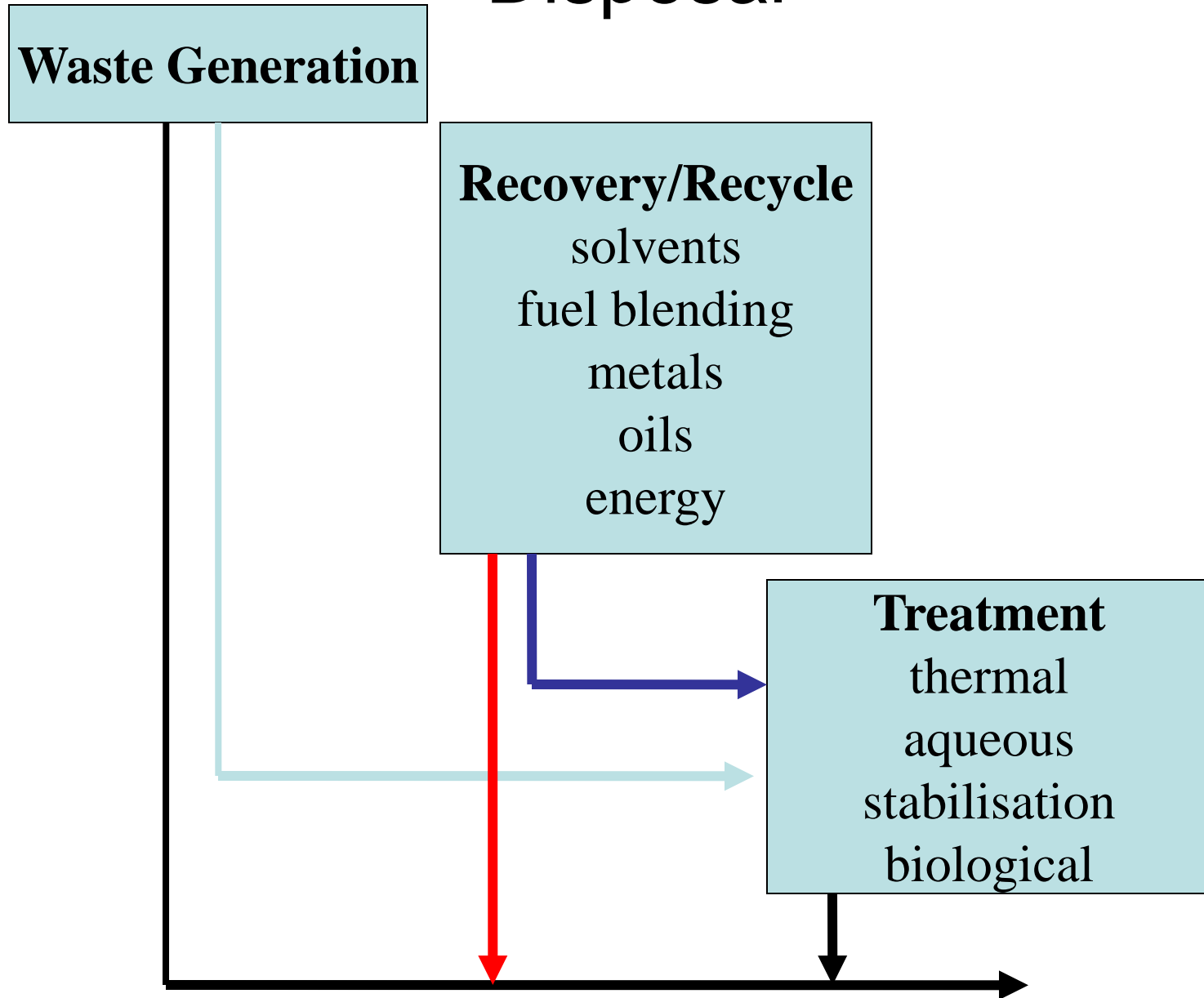
Wastes Leaving Plant

- Under IPPC
 - BPEO
 - BATNEEC
- Wastewater to sewer (river!) under consent
- Discharge to air within emission standards
- Solids
 - ash
 - sludge (biological and/or chemical)
 - drums
- Recovered products (ie oil)

Reception Arrangements

- Pre-acceptance
 - identify process stream
 - quantity
 - physical, chemical, biological details
 - Special Waste Regulations Consignment Procedure
- Acceptance on arrival
 - analysis in laboratory
 - reject if not identical to manifest
 - sign consignment note
 - decide on treatment procedures

Waste Recovery, Treatment and Disposal



Specific Wastes

- Detergents and Paint Waste
 - acid and iron salts to crack emulsion
 - sedimentation or flotation
 - thicken sludge
 - liquid to biological treatment
- Acids
 - neutralise with lime
- Alkalis
 - neutralise with acid (metal containing sludge)
- Sulphides
 - precipitate with Mn salt

BACIACAVALLO PLANT

located in PRATO (near Florence - Italy)

is
administered by :

GIDA

(Gestione Impianti Depurazione Acque SpA)

51%



Municipality
of PRATO

49 %



Industrial Consortium
gathering around 300
textile industries

PRATO WASTE WATER PLANT

- 70% from industrial source
- 30% from municipal waste water
- Total inhabitant equivalent : 1.000.000 persons
- Total input flow : 5.000 m³/h

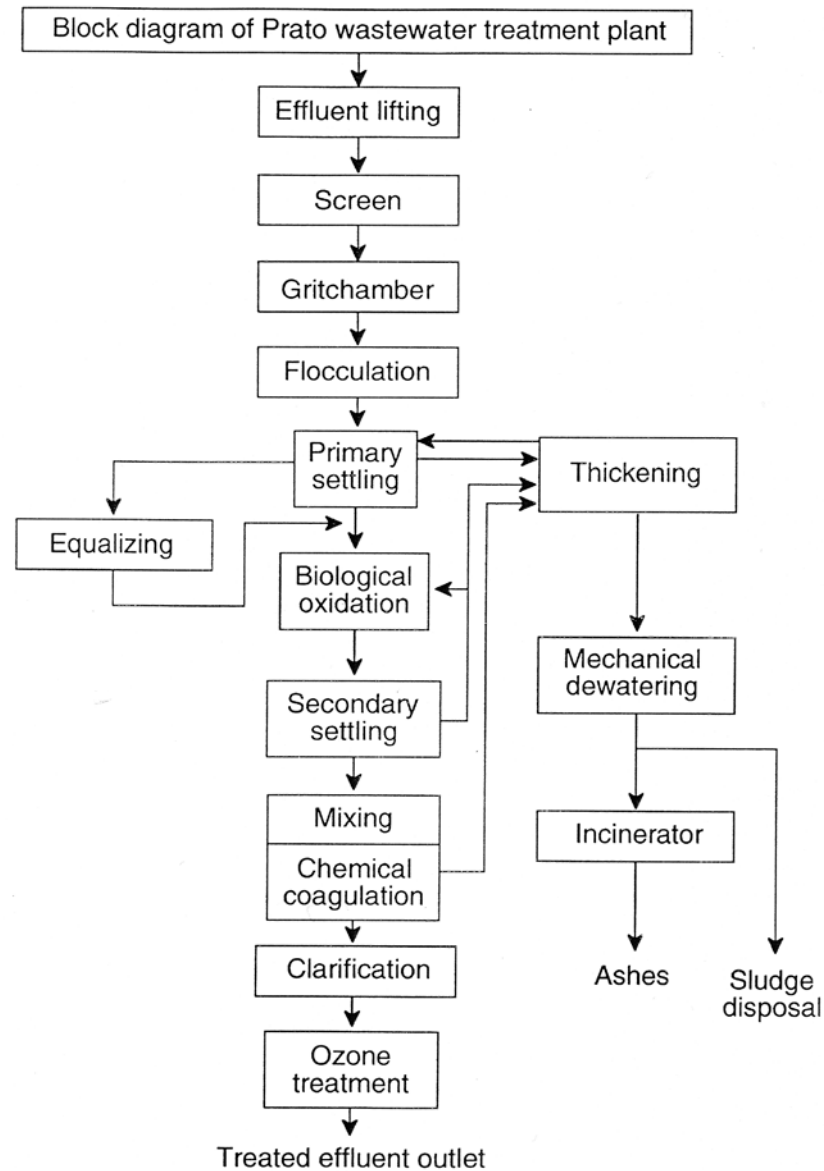
OZONIA
INTERNATIONAL

INLET WASTE WATER

AVERAGE CHARACTERISTICS

COD	800 mg/l
BOD5	300 mg/l
Suspended solids	270 mg/l
Anionic surface active agents	10 mg/l
Ionic surface active agents	40 mg/l

PLANT BUILT FROM 1980 TO 1986 FOR PHASE I AND II
(biological and chemical) AND 1992 (tertiary treatment)



WHY A TERTIARY TREATMENT WITH OZONE ?

- Regulation: reduce the total surface active agents from an average level of 4 mg/l down to 2 mg/l.
- Lack of water and therefore need to recirculate in the industry a part of the treated water.

Several methods of purification have been explored such as :

- Optimization of the biological processes
- Optimization of the chemical processes
- Biological process with activated carbon
- Absorption on activated carbon
- Oxidation with ozone

Conclusion :

Ozone treatment appeared to best way to reduce the concentration of surface active agents below 2 mg/l

OZONIA
INTERNATIONAL

PILOT TESTS

MAIN RESULTS AT TWO DOSAGES OF OZONE
(32 gO₃/m³ and 20 gO₃/m³)

Dosage parameters	Reduction at 32 g/m³	Reduction at 20 g/m³
Total detergents	62% (4 to 1.5 mg/l)	50% (3 to 1.5 mg/l)
Colour	70 to 90%	60 to 80%
Total coliforms	90 to 100%	85 to 100%
Feacal coliforms	95 to 100 %	90 to 100%
Streptococci	90 to 100%	85 to 100%

OZONIA
INTERNATIONAL

Microfiltration Applications

Current

Wine

Dextrose clarification

Haze removal from gelatin

Beer clarification

Pharmaceutical/biological

Municipal Wastewater Treatment

Future

Drinking Water

Hydrocarbon Separation

Milk-fat Separation

Food and Beverage

Industrial Wastewater

Paint

Biotechnology

Ultrafiltration Applications

Current

Juice clarification
Increase cheese yield
Gelatin concentration
Electroplating wastewater
Protein from cheese whey
Concentration of oil emulsions
Pharmaceutical industry
“Grey” water
Industrial Wastewater

Future

Domestic wastewater
More industrial wastewaters
Protein harvesting
Petroleum processing
Wastewater re-use
Potable water (THM concern)
Abattoir (blood recovery)
Pulp and paper industry
etc etc

Reverse Osmosis

Very different process to MF or UF. It is a solubilisation diffusion technique that makes use of a semi-permeable membrane which in turn acts as a barrier to dissolved salts and inorganic molecules.

It also confines organics with molecular weights greater than 100

RO membranes do not have identifiable pores as in MF or UF (i.e. too small - atomic size)

Applications of Reverse Osmosis

Current

Desalination for potable water

- „ from sea water
- „ from brackish water
- „ for effluent re-use

Ultrapure water for semiconductors

- „ „ for pharmaceuticals
- „ „ for medical use

Boiler feed water

Treatment of hazardous materials

Future

Chemical process industries

Metals recovery

Food processing WWT

Textile wastewater re-use

Pulp and paper WWT

Contaminated land
remediation

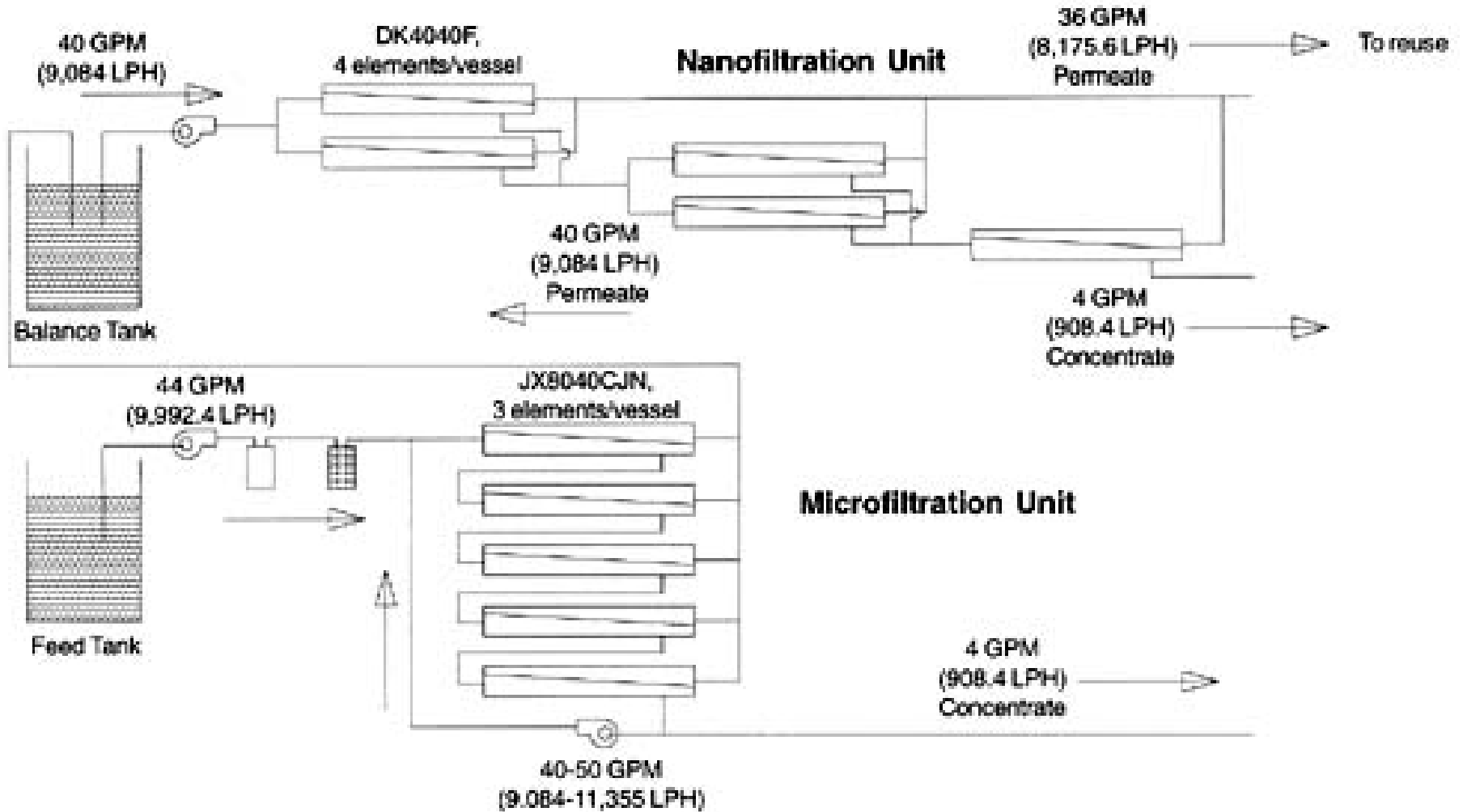
Dairy industry WWT

Ultrafiltration-117 Beverage Process

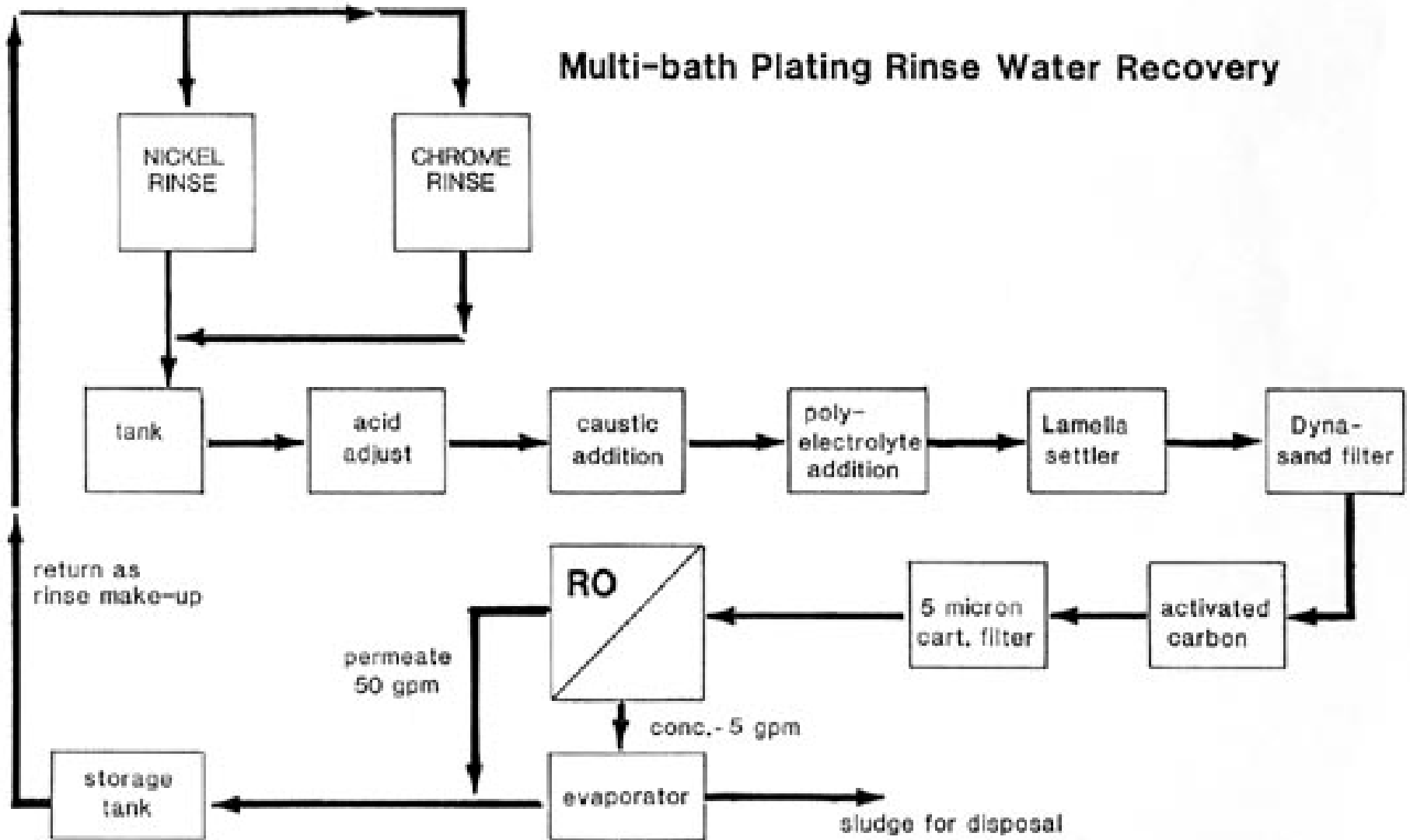
G-50 ultrafiltration elements are being used to remove colloidal and organic contaminants from process water in the beverage industry. The water source is a municipal supply contaminated with color from humic and fulvic acids, and turbidity. Conventional treatment processes have not been as effective in removing these contaminants as ultrafiltration. In addition, chlorine added by the city slowly converts some of the organics to trihalomethanes (THM). Ultrafiltration with the G-50 membrane performs a superior job of reducing trihalomethane precursors. The following water quality data was obtained from G-50 pilot studies conducted on a municipal water source.

Constituent	Raw Water	G-50 Permeate	% Reduction
Bacteria, No/ml	0.00	0.00	NA
Yeast, No/ml	43.00	0.00	100
Turbidity (NTU)	0.52	0.09	83
Color	Highly Colored	No Color	100
Iron, ppm	0.15	< 0.01	> 93
TOC, ppm	3.00	< 1.00	> 67
THM potential reduction			40

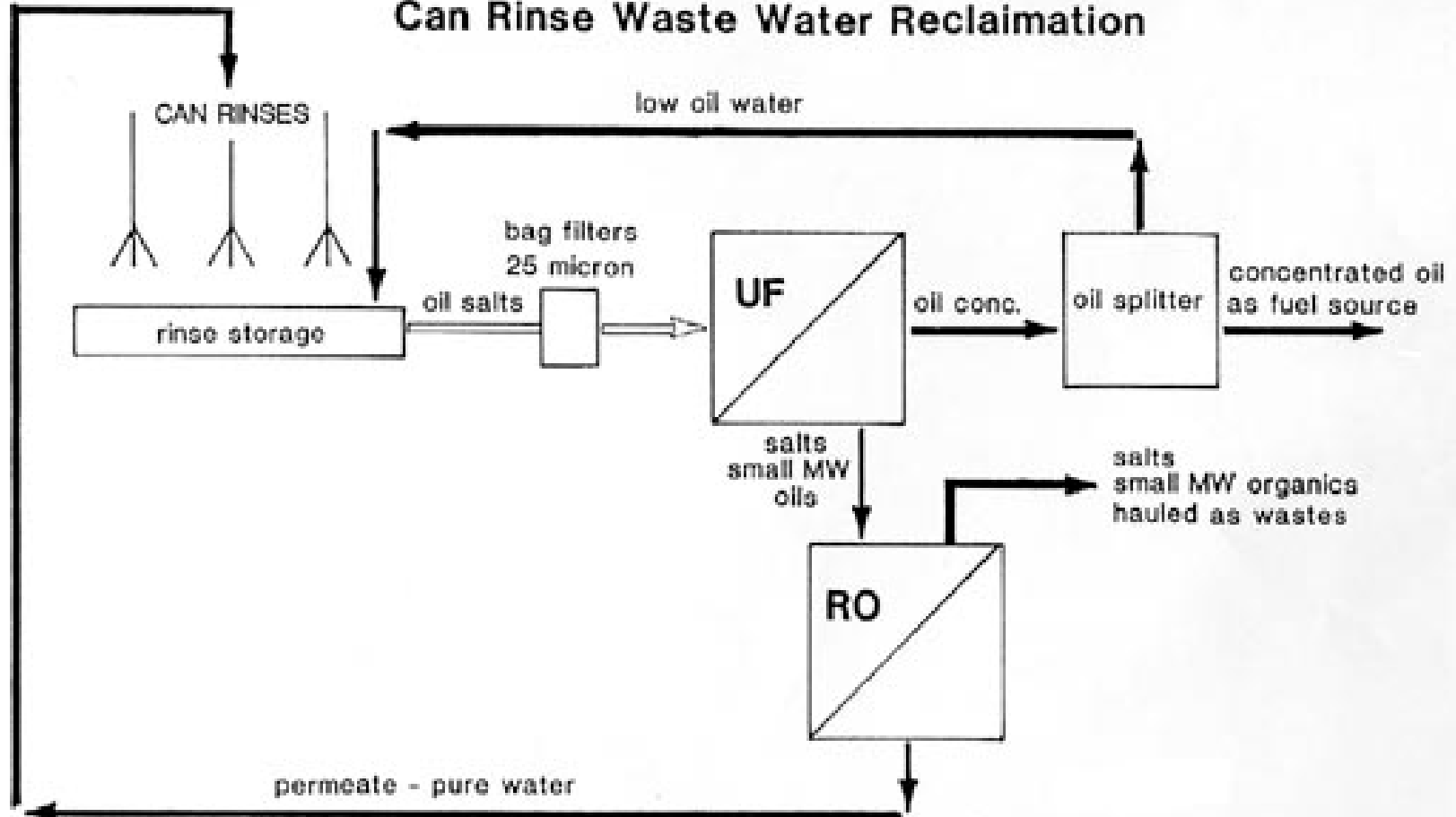
Laundry



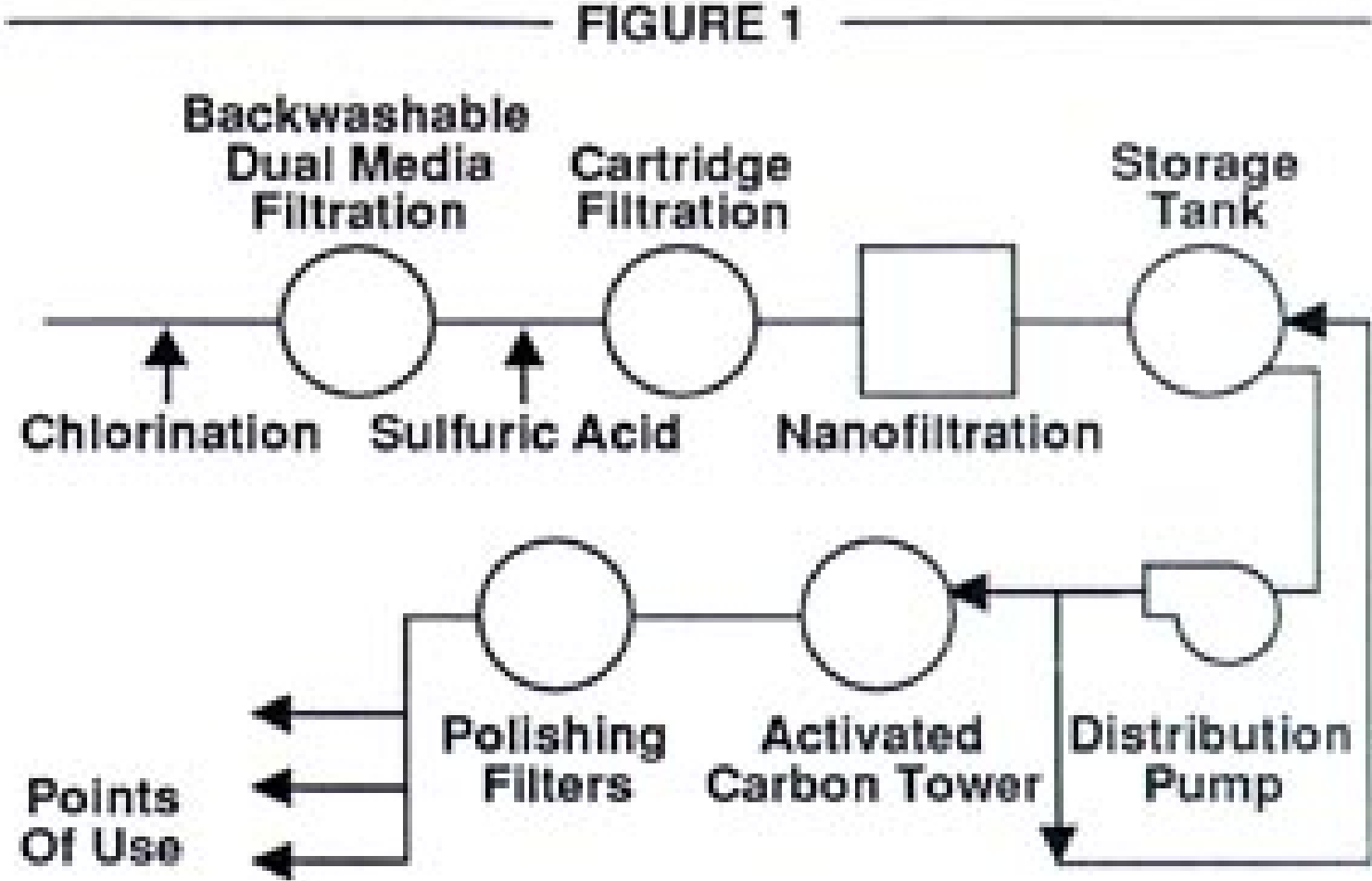
Multi-bath Plating Rinse Water Recovery



Can Rinse Waste Water Reclamation



Product water for soft drink manufacturing



<http://www.carbofil.com>

<http://huber.de>

<http://www.zenon.com/MBR>

<http://www.cheresources.com/memreactor.shtml>

[http://www.gewater.com/library/tp/835 Ultrafiltration .jsp](http://www.gewater.com/library/tp/835_Ultrafiltration_.jsp)

<http://www.kochmembrane.com>

<http://www.ionics.com/technologies/mbr>

<http://www.h2o2.com>

<http://www.calgoncarbon.com/industry/wastewater.html>

<http://www.epa.gov>

Pulp and paper wastewater

Dairy Wastewater

Application of CW