

Engineering Data Sheet

7128

Process: OPCT™--Optimized Physical/Chemical Treatment

Process Description

The *OPCT™ Process* represents a simultaneous breakthrough in both physical/chemical treatment and in sludge dewatering. Highly effective contaminant precipitation followed immediately by solids removal and sludge dewatering are benchmark characteristics of this process. It may be used in either batch or continuous flow modes of operation. Process control can be accomplished either manually or automatically. When measured against traditional physical/chemical and sludge removal/dewatering processes, the *OPCT™ Process* requires about one quarter the space while costing but half as much to purchase and about half as much to operate. A typical flow schematic is shown on attached engineering drawing S-1900.

Process Application

The *OPCT™ Process* may be considered for both municipal and industrial treatment projects as follows:

PROJECT TYPE	DESCRIPTION
Municipal	<ul style="list-style-type: none"> ◆ Iron and Manganese Removal ◆ Groundwater Treatment ◆ Surface Water Treatment ◆ Landfill Leachate Treatment ◆ Softening
Industrial	<ul style="list-style-type: none"> ◆ Heavy Metals Removal ◆ Removal of Organic Contaminants ◆ Iron and Manganese Removal ◆ Lagoon Decommissioning ◆ Stormwater Runoff ◆ Toxic, Hazardous, and Radioactive Wastewater Treatment ◆ Mixed Waste Treatment ◆ Landfill Leachate Treatment

Contaminants removed through coprecipitation phenomena include divalent cations, turbidity, suspended solids, alkalinity, PCB's, dioxins, pesticides, radioactive nuclides and dissolved organics. Depending on treatment requirements, additional organics and inorganics removal equipment can be added to the basic design to achieve the level of purification desired.

Existing physical/chemical treatment plants, including dissolved air flotation, can be easily modified or retrofitted to the *OPCT™ Process* thereby reducing the size of the facil-

ity through the decommissioning of unnecessary equipment.

Routine plant operation can be batch or continuous. Addition of critical chemicals is achieved through automatic process control. Operator skill requirements are therefore minimal.

Sludge can be removed in a plate & frame filter press or a bag filter at a typical solids concentration range of 25-30%. By utilizing highly compressed air for sludge drying, the solids content can be raised to 50% or more thereby minimizing the weight of the filter cake. The normal rate of flow to the filter press is 60 times the rate normally used (2-5 GPH/sq. ft) for sludge dewatering. This rate of sludge dewatering can be easily demonstrated through jar testing. Normal operating filter press pressure is under 15 PSIG at these highly elevated rates of dewatering. The use of modern coagulants significantly reduces sludge volume when compared with commonly used lime, iron, and alum coagulants.

Equipment Configurations

The *OPCT™ Process* can be supplied on a skid mounted, piped, and prewired basis or on an engineered component basis. It is a prudent engineering approach to have laboratory samples analyzed and tested before proceeding with full scale design. No charge, no obligation laboratory testing is routinely provided by WSE to prequalify the *OPCT™ Process*.

Principal Features

- ◆ User Friendly. Chemical addition is automatically controlled and therefore required operator skills are minimal.
- ◆ Process Simple. Through the elimination of unnecessary flow transfer and process equipment, complexity is minimized. The more simple the system the greater the reliability.
- ◆ Low Cost. Lesser equipment translates into extremely attractive procurement and operational costs.
- ◆ Minimal Space. Accelerated treatment means large flow rates can be accommodated in a small space.
- ◆ Quick Delivery. Less equipment means less lead time necessary to complete manufacturing.

Quality Control

OPCT™ Process plants can be supplied skid mounted, factory assembled, piped, prewired, and fully tested prior to shipment.



Introducing a breakthrough in physical/chemical treatment...

OPCTTM Process

Optimized Physical/Chemical Treatment

OPCT™ uses selected elements
of **existing** technology...

- 💧 Chemical Addition
- 💧 Flash Mixing
- 💧 Flocculation
- 💧 Sludge Dewatering
- 💧 Sludge Disposal

...in combination with WaterSmart's
unique, *cutting-edge* technology

for results thought **impossible** until now!

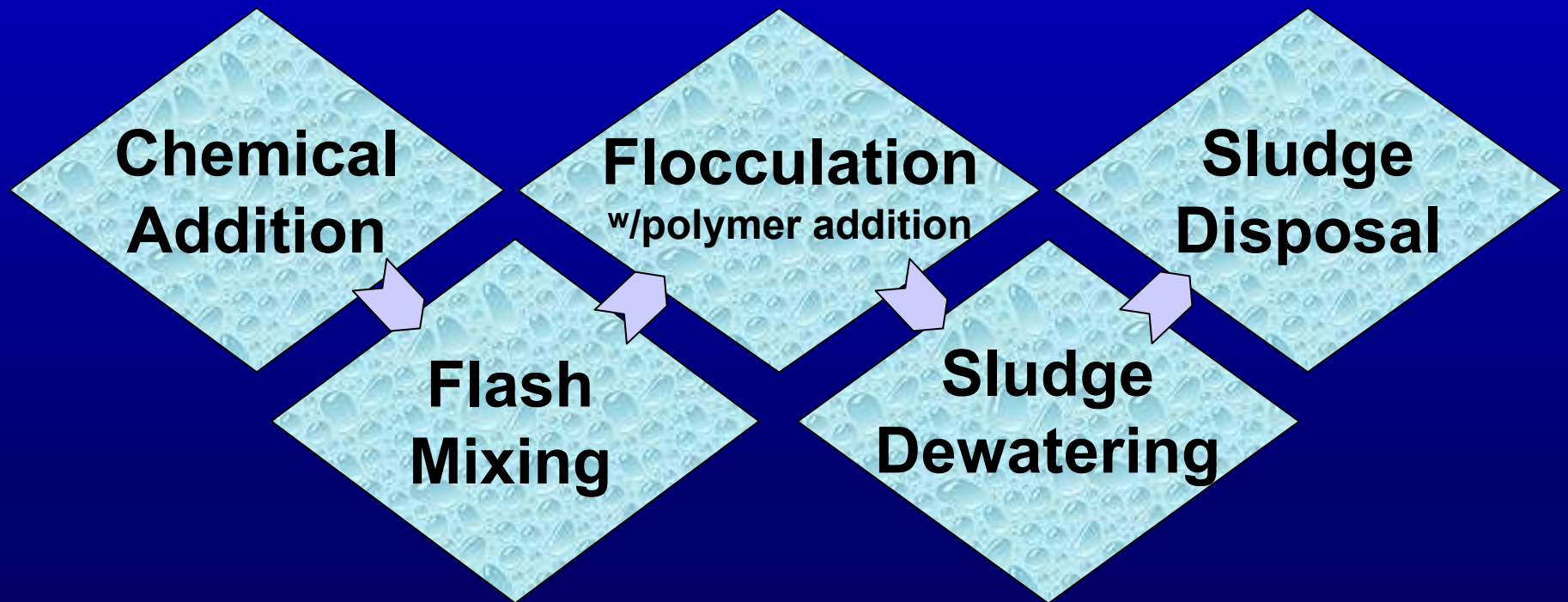
Individual Steps in Existing Physical/Chemical Treatment Technology

1. Chemical addition--alum or iron salts are typical
2. Flash Mixing--rapid mixing for 1-3 minutes.
3. Flocculation (with or without polymer addition)--gentle mixing for 20-30 minutes.
4. Clarification--particle separation for 2-4 *hours*.
5. Filtration at 1-5 GPM per square foot, typical.

And the auxiliary requirements of:

- Sludge Thickening
- Sludge Dewatering
- Filter Backwashing

The OPCT™ Process



OPCT™ *eliminates*

- 💧 Clarification
- 💧 Filter Backwashing
- 💧 Media Filtration
- 💧 Sludge Thickening
- 💧 Filter Backwash Water Management

Simplifying the process saves **time.**

Approximate time per step in minutes

	Flash Mixing	Flocculation	Clarification	Filtration	Sludge Thickening	Sludge Dewatering	Sludge Disposal	Total Time
Existing Technology	1-3	20-30	120-240	4-6	20-480	200-300	Req'd	150 minimum
OPCT™ Process	1	2	0	0	0	5-10	Req'd	13 maximum

Simplifying the process saves **space**.

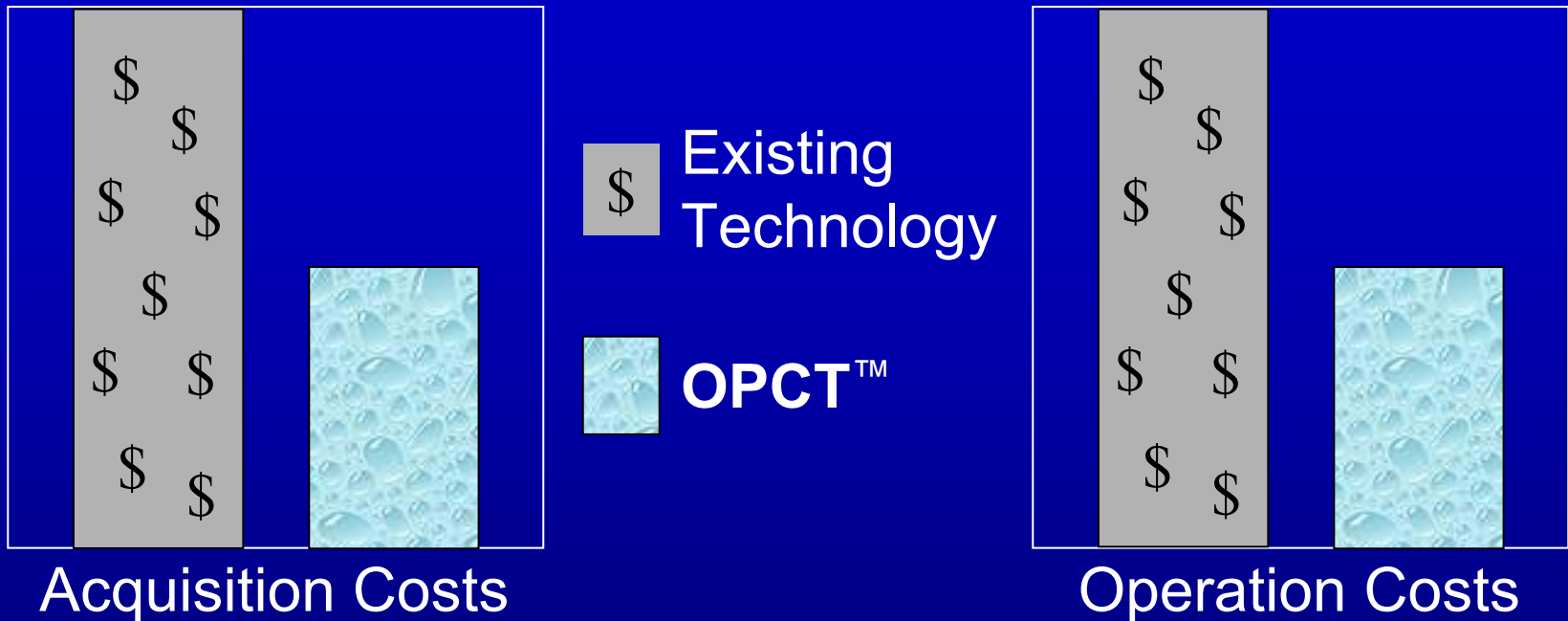


OPCT™ requires about 25% of the space required by commonplace physical/chemical treatment plants.

The accelerated OPCT™ process accomplishes much greater treatment per square foot.

Even existing physical/chemical treatment plants, including dissolved air flotation, can be easily upgraded to the OPCT™ process, thereby reducing the size of the treatment facility through the decommissioning of unnecessary equipment.

Simplifying the process saves **money**.



Less equipment translates into extremely attractive procurement and operational costs. When measured against traditional physical/chemical treatment equipment the OPCT™ process costs about half as much to purchase. The OPCT™ process can also halve plant operating costs.

OPCT™ is *flexible*

Contaminants Removed

- 💧 Alkalinity
- 💧 Dissolved Organics
- 💧 Emulsified Oils
- 💧 Hardness
- 💧 Heavy Metals
- 💧 Iron & Manganese
- 💧 Suspended Solids
- 💧 Turbidity

Applications Include

- 💧 Groundwater Treatment
- 💧 Surface Water Treatment
- 💧 Landfill Leachate
- 💧 Softening
- 💧 Stormwater Runoff
- 💧 Lagoon Decommissioning
- 💧 Toxic, Hazardous, and Radioactive Wastewaters

Routine plant operation can be batch or continuous and process control can be manual or automatic. The OPCT™ process can be ordered factory assembled or on an engineered component basis. The tremendous versatility of the OPCT™ process means it can be tailored to fit virtually all physical/chemical water treatment projects, municipal or industrial.

OPCT™ is *reliable*

- ◆ Through the elimination of unnecessary flow transfer and associated equipment, process complexity is minimized--a simpler system always translates into greater reliability.
- ◆ Less equipment means less lead time necessary to complete manufacturing. Quicker delivery helps keep plant construction schedules on time and under budget.
- ◆ Process automation substantially diminishes chemical feed costs while eliminating treatment upsets due to changes in raw water characteristics.
- ◆ Automated controls also reduce required operator skill, thus increasing plant efficiency.
- ◆ End users can be confident of total quality control, because OPCT™ process plants can be supplied skid-mounted, factory assembled, and fully tested prior to shipment.

OPCT™!

Complexity minimized,
reliability maximized!

Lower procurement & operational costs.

Process Simple

Automated controls mean minimal operator skills.

Low Cost

User Friendly

Less equipment means less lead time for manufacturing.

Accelerated treatment = higher flow rates in less space.

Quick Delivery

Plants can arrive skid-mounted, factory assembled and fully tested.

Quality Control

Minimal Space