WASTEWATER TREATMENT STUDY

CYPRESS BAYOU CASINO

Charenton, Louisiana

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Prepared By

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Corporate Information

Steinmaus Environmental Services is an environmental consulting firm that conducts a broad range of environmental studies including: impact assessments, site assessments, ecological evaluations, compliance audits, permit applications, and training programs. SES provides project management, comprehensive site investigations, detailed assessments, and well-documented project reports.

SES performs environmental services in many varied areas. Primary emphasis has been in three broad areas:

Environmental Studies: including environmental impact assessments, ecological evaluations (habitat analyses and threatened and endangered species studies), land use analyses, spill control plans, RCRA closure plans, and site selection studies.

Environmental Audits: facility and site assessments for real estate transactions and environmental compliance.

Permit Preparation: including various permits/site reports for right-of-way and site construction, hazardous/toxic waste documentation (especially RCRA requirements and SARA requirements), wastewater/stormwater discharge permits (NPDES), air quality permits, and Right-To-Know documentation.

Our staff consists of professional scientists and planners with diverse educational and project-related backgrounds that allow them to apply innovative approaches to meet client needs. Our technical support staff assists in project development by providing design graphics and report generation.

INTRODUCTION

During the relatively short lifetime of the Cypress Bayou Casino, the facility has grown significantly. Increased attendance has meant numerous casino expansions including the addition of food service facilities. Associated with this growth is the major environmental challenge of waste water treatment. The waste water treatment plant (WWTP), designed and built in 1994, has had operational problems resulting from organic loading in restaurant effluent (primarily BOD) in excess of the design capabilities of the plant.

Cypress Bayou Casino, Charenton Louisiana

This report has been prepared to document activities undertaken by the Casino Facilities Maintenance Director to alleviate elevated BOD loads in effluent going to the WWTP. Specific attention is given to the use of a Big Dipper•Thermaco® Superceptor Model S-2750-AST-FP oil, grease and solids removal system. This unit is used by the WWTP operator on a daily basis for pre-treatment of kitchen waste water to reduce organic loading in effluent going to the WWTP.

CASINO HISTORY

In 1985 the Chitimacha Indian Tribe of Southeast Louisiana opened a 30,000 square foot bingo facility. The success of the bingo operations resulted in the opening of Cypress Bayou Casino (in the existing bingo hall) in December of 1993.

Cypress Bayou Casino offered bingo and slot machines. Bingo was discontinued in mid-1994 and the space was converted to table gaming in mid-September. In May, 1995, an addition of approximately 85,000 square feet was opened. This expansion included additional slot machines, a lounge, a full service restaurant (Cafe Bayou) and a steak restaurant (Mr. Lester's). In addition to these restaurants, the casino also has a banquet kitchen that prepares food for numerous parties, an employee cafeteria and a fast food type restaurant called "Eats", located on the casino floor.

WASTE WATER TREATMENT PLANT PROBLEMS

The Casino Facilities Maintenance Director began to suspect that the numbers he was seeing from WWTP effluent samples were skewed low. He felt that samples that were being collected as part of the WWTP operating routine were only indicative of optimal operating conditions and did not represent actual conditions which were suspected to be highly variable.

The Maintenance Director enrolled in a course to help him better understand WWTP operations. He then continued WWTP investigations including frequent observation of plant operations and questioning of the contract operator about day to day operations and/or problems with the WWTP.

Through these investigations, he confirmed that the rapid growth of the Casino and associated food services resulted in an increased load on the WWTP. While peak flows to the WWTP did not approach maximum design capacity (150,000 gallons per day), nutrient loading (especially BOD) had increased such that the WWTP equilibrium was upset and effluent limitations for BOD were exceeded on a regular basis.

Additionally, periodic effluent monitoring by the Maintenance Director confirmed BOD levels that were occasionally above the discharge permit limits. Kitchen waste water flows were recognized as the primary factor in elevated BOD levels of effluent going to the WWTP. Menus at the restaurants which the kitchens serve are highly variable and include a large proportion of fried foods. The increased use of oil for food frying increases the likelihood of residual oil being introduced into waste water which results in increased BOD loads if the oil is not removed prior to treatment.

Typical effluent rates during the week range from 75,000 gallons per day to 120,000 gallons per day. Flow rates are variable throughout the day and are typically lowest in the early morning hours and highest in the evening (particularly on weekend nights) during peak meal service hours. Because of the highly variable flow rates with associated increases in nutrient loading, the WWTP was subject to frequent "shocks". These system "shocks" would effect system equilibrium which in turn meant incomplete treatment of waste water and ultimately discharge of water that exceeded permit BOD levels.

Other evidence of high BOD loading from kitchen waste water was an increase in grease trap maintenance from once to twice per month, increased use of water treatment chemicals (enzymes for digestion of solids buildup in effluent handling infrastructure) and routine operation of the WWTP by outside contractors was increased from three to seven days per week.

EFFLUENT SOURCES

The Casino operates a number of food service facilities all of which discharge waste water to the WWTP. Daily meal service rates are as follows:

Cafe Bayou (full service restaurant):
1,000 to 1,500 meals per day (Sunday through Thursday)
1,500 to 2,000 meals per day (Friday and Saturday)
*Totaling up to 11,500 meals per week

Mr. Lester's (steak house):
90 meals per night (week nights)
200 meals per night (weekend evenings)
*Totaling up to 850 meals per week

Restaurant meal service totals approximately 12,350 meals per week

Banquet kitchen (food prepared for parties and the employee cafeteria):

10 parties per month at 800 meals per party, totaling up to 2,000 meals per week
3 meals and two snacks per day for 850 casino employees
*Totaling up to 17,850 meals and 11,900 snacks per week

"Eats" (fast food type service, prepared in the banquet kitchen)
800 to 900 meals per day
*Totaling up to 6,300 meals per week

Banquet kitchen meal service totals approximately 26,150 meals and 11,900 snacks per week.

There is also a bakery and butcher shop that support the above food service facilities.

WASTE WATER TREATMENT PLANT DESIGN

The Cypress Bayou Casino WWTP is rated at 150,000 gallons per day of flow with a maximum BOD load of 200 - 250 mg/L (milligrams per liter). The plant is designed as an extended aeration activated sludge system. System components include:

- Three 50,000 gallon capacity aeration basins
- Secondary clarifier
- Four tertiary pressure filters
- Chlorine contact chamber
- Aerobic sludge digester/holding tank
- Sludge drying beds

The State of Louisiana has issued a permit for the WWTP (Louisiana Water Discharge Permit number WP2205). The daily average discharge limitation for BOD is 10 mg/L with a daily load limit of 13 pounds per day based on a 150,000 gallon per day flow.

Prior to being piped to the WWTP, all effluent associated with food preparation and service passes through one of two grease traps. A 1000 gallon capacity grease trap services the banquet kitchen and a 2000 gallon capacity trap services Mr. Lester's steak restaurant and Cafe Bayou.

RECOMMENDATIONS

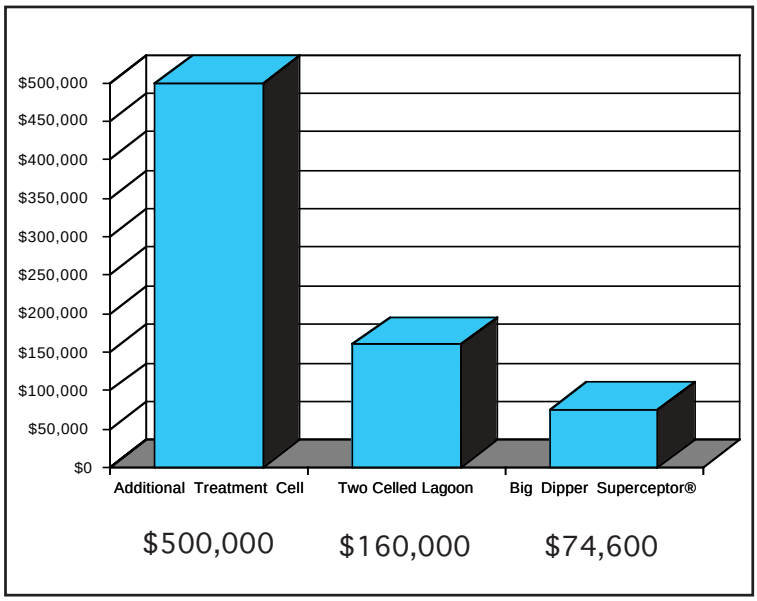
During 1996, a number of studies were conducted by engineering firms to identify problems with effluent treatment at the WWTP and to design potential cures for those problems. These studies all corroborate that the major problem affecting the WWTP is high BOD loading in kitchen waste water. The Casino Facilities Maintenance Director also initiated a number of "housekeeping" measures to help lower restaurant waste effluent contributing to BOD loading.

Engineering firm recommendations included:

- Construction of an additional treatment cell which would increase the WWTP capacity to 3-4 times its current rating. The cost range for this alternative was $250,000.00 to $500,000.00.
- Construction of an aerated pond system
- Installation of a roughing filter
- Construction of a two celled lagoon with surface aeration. The cost estimate for construction was $160,000.00.

Faced with a substantial capital outlay for construction of additions to the existing WWTP, the Casino Facilities Maintenance Director followed up on an advertisement seen in a trade magazine for Big Dipper•Thermaco, Inc. Thermaco representatives recommended installation of one grease and solids removal unit at a cost of $74,600.00.

Cost Comparisons Of Options For Cypress Bayou Casino



Other "housekeeping" measures initiated to help lower restaurant waste effluent contributing to BOD loading included:

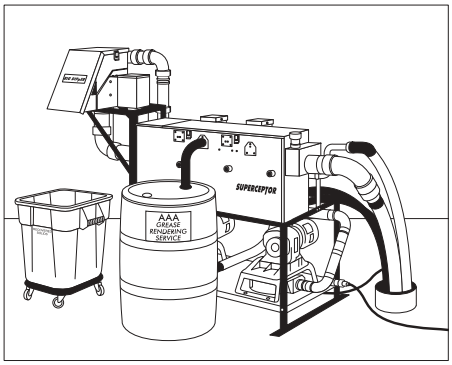
- Disposing of as much food waste as possible into waste compactors
- Pumping both grease traps twice per month
- Use of biodegradable chemicals for maintenance and cleaning
- Addition of enzymes at the lift station

After implementation of "housekeeping" measures, BOD levels in effluent going to the WWTP were lowered, but still remained at about three times the design capacity of the plant.

SOLUTION

Casino management decided to install one Big Dipper•Thermaco Model S-2750-AST-FP Superceptor. The unit was installed in January 1997 upstream of the WWTP and in parallel with the grease trap that services the kitchens for Cafe Bayou and Mr. Lester's steak restaurant.

This unit was chosen because of ease of installation and because it could successfully process high strength effluent (high concentrations of fats, oil, grease and settleable solids).



Superceptor S-2750-AST-FP

BIG DIPPER® SYSTEM OPERATION

The Big Dipper•Thermaco system installed at Cypress Bayou Casino has been designed to remove free floating grease and oils, as well as coarse solids from the 2000 gallon grease trap serving Cafe Bayou and Mr. Lesters. The system operates as follows:

1. Fats, oil, grease and solids from kitchen effluent enter the grease trap.

2. A time controller activates the Superceptor at 3 a.m. daily.

3. Lift pump 1 removes heavier than water solids from a hopper shaped compartment on the bottom of the grease trap tank. This flow is brought to the Big Flipper, which is a coarse solids separation system.

4. Wastewater flow from the dewatering process is pumped to the Big Dipper, where smaller solids are separated and macerated until particle size is fine enough for direct discharge to a sanitary sewer.

5. The wastewater then passes through the Big Dipper automatic grease and oils recovery unit and is returned to the grease trap.

6. Lift pump #2 activates to remove accumulated fats, oils, grease and lighter than water entrained solids from the top 2 to 3 inches of the grease trap separator tank. The coarse solids are separated and sent to the waste container while smaller solids are macerated and sent to the sewer.

7. The fats, oils and grease in wastewater are heated. The grease and oils are then removed and recovered in a grease collection chamber.

8. The cleaned water passes through the unit and returns to the grease trap.

SYSTEM PERFORMANCE

The Big Dipper unit has been in use at the Casino for over 11 months. The benefits from the use of the equipment are as follows:

- The fat, oil, grease and solids removal process occurs upstream of the WWTP thereby lowering BOD loading which increases plant efficiency to a point where effluent is within discharge permit limitations.

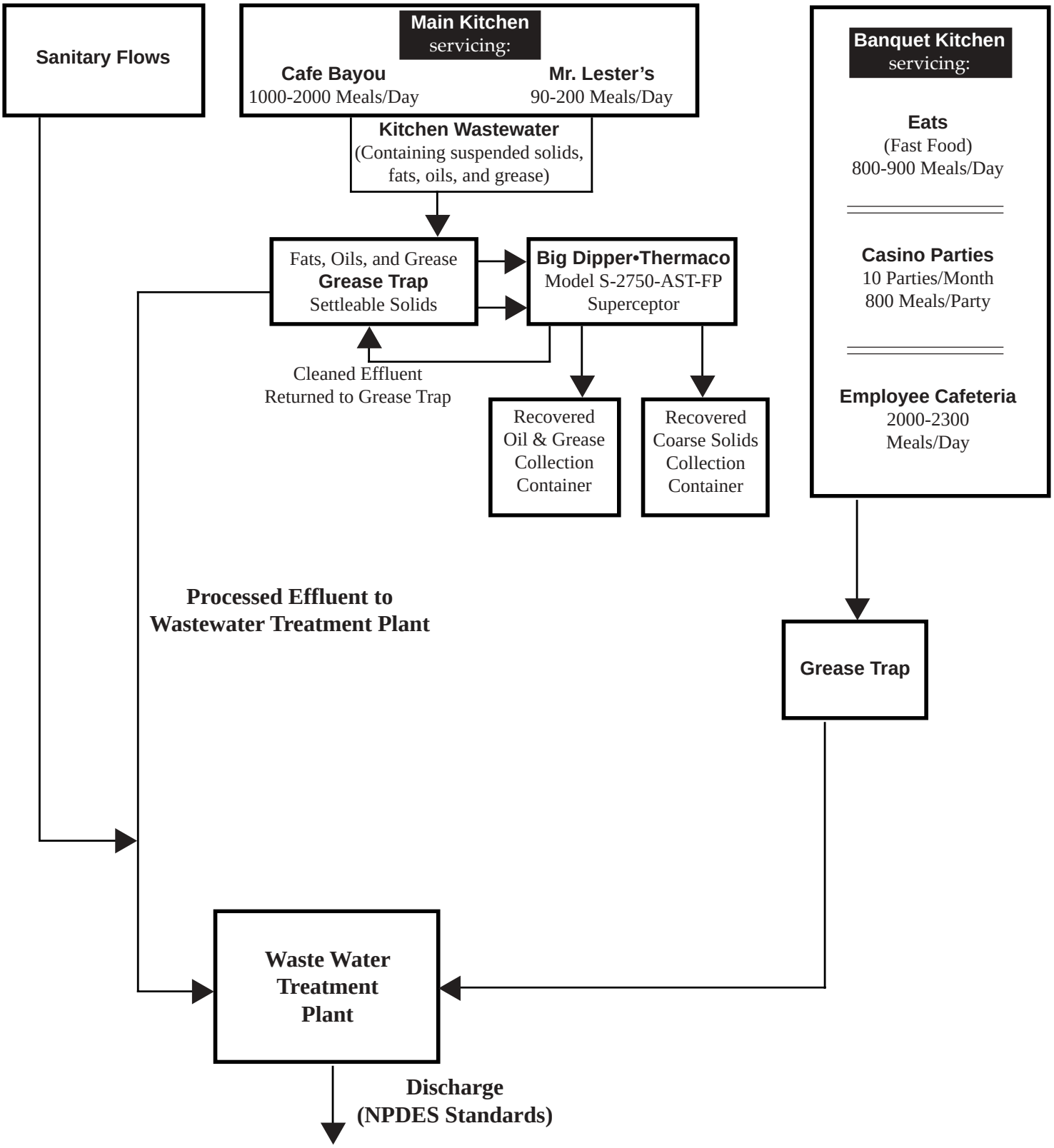
- Chemical consumption at the WWTP was reduced by 50% and one chemical was eliminated completely. Cost savings on chemical use is estimated at $1,350.00 per month.

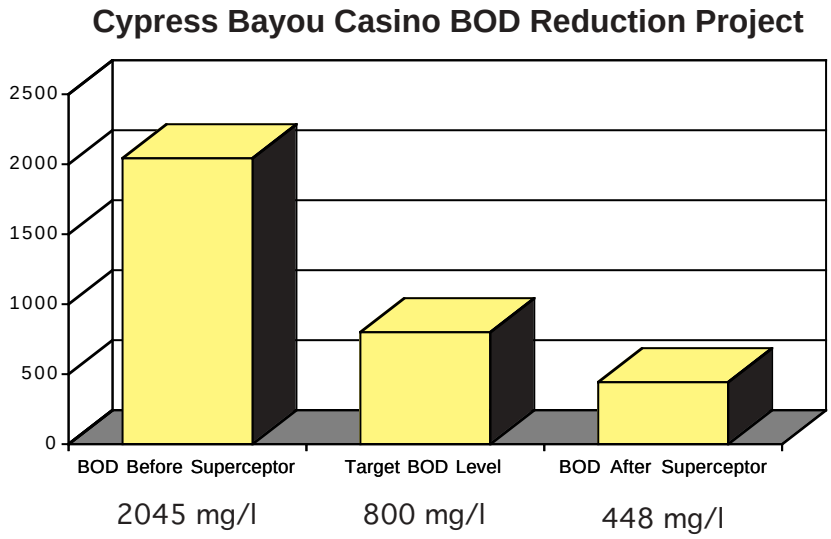
- The grease trap associated with the Big Dipper has not been pumped in over 11 months. Approximately $3,000.00 is saved per month on pumping costs.

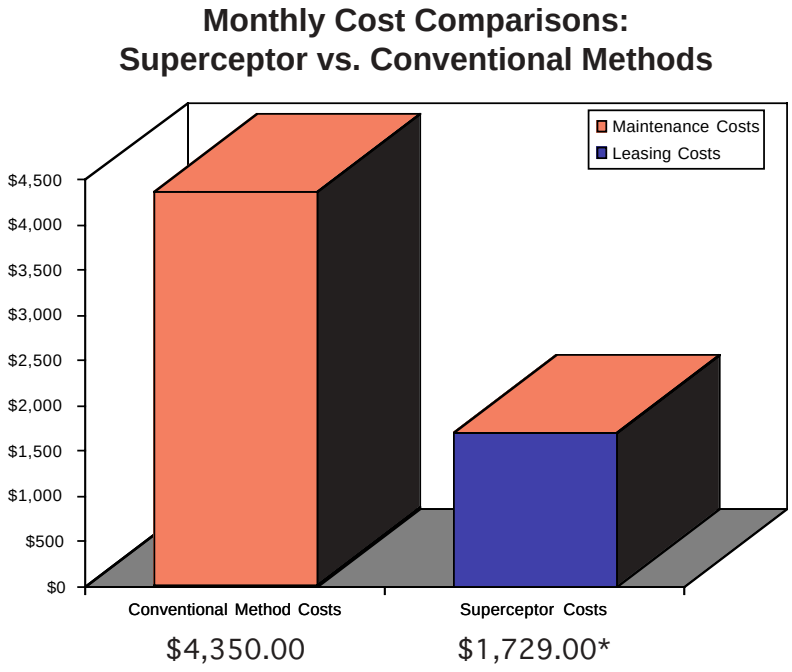
- Captured grease and oil are sold to a rendering facility at 40 % of the current commodity price.

*The potential exists to sell the recovered settleable solids as a food product to livestock growers.

Cypress Bayou Casino Flow Diagram







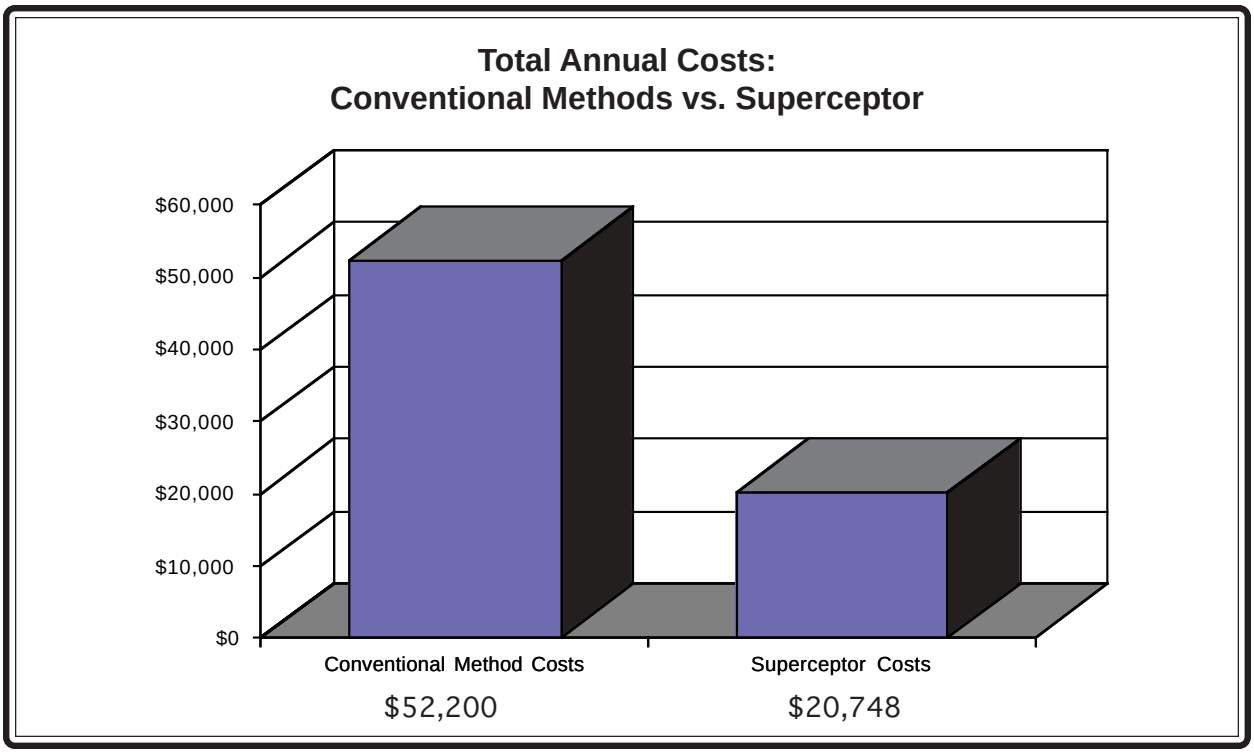
* Maintenance - $25.00
Leasing Costs - $1,704.00

Leasing Factors Based on 48-Month Lease

FUTURE PLANS

Plans are progressing for a number of expansions at the casino. Additions include a 49,000 square foot banquet hall (currently under construction), a hotel, a recreational vehicle park and a four lane highway for better access to the facilities and a new waste water treatment plant with a capacity of 250,000 gallons per day.

Because of the success of the first Superceptor in lowering organic loading to the WWTP, the casino Facilities Maintenance Manager has plans to install up to two additional Superceptor units to pretreat kitchen effluent.



CONCLUSIONS

The primary reason for installation of the Big Dipper•Thermaco Superceptor system was to reduce organic loading (fat, oil, grease and suspended foodstuffs) in kitchen effluent sent to the WWTP. Evidence of this success is shown in plant effluent BOD levels which have been below water discharge permit limits when the Superceptor is in use.

Additional benefits to the casino resulting from Superceptor use include:

- Reduced water treatment chemical use (elimination of one treatment chemical).
- Reduced servicing of grease traps (the trap associated with the Superceptor has not needed pumping since the Superceptor was installed and placed on-line).
- Decreased treatment plant maintenance cost.
- Decreased sludge handling costs.
- Revenue from the sale of recovered grease and oil to a rendering plant.