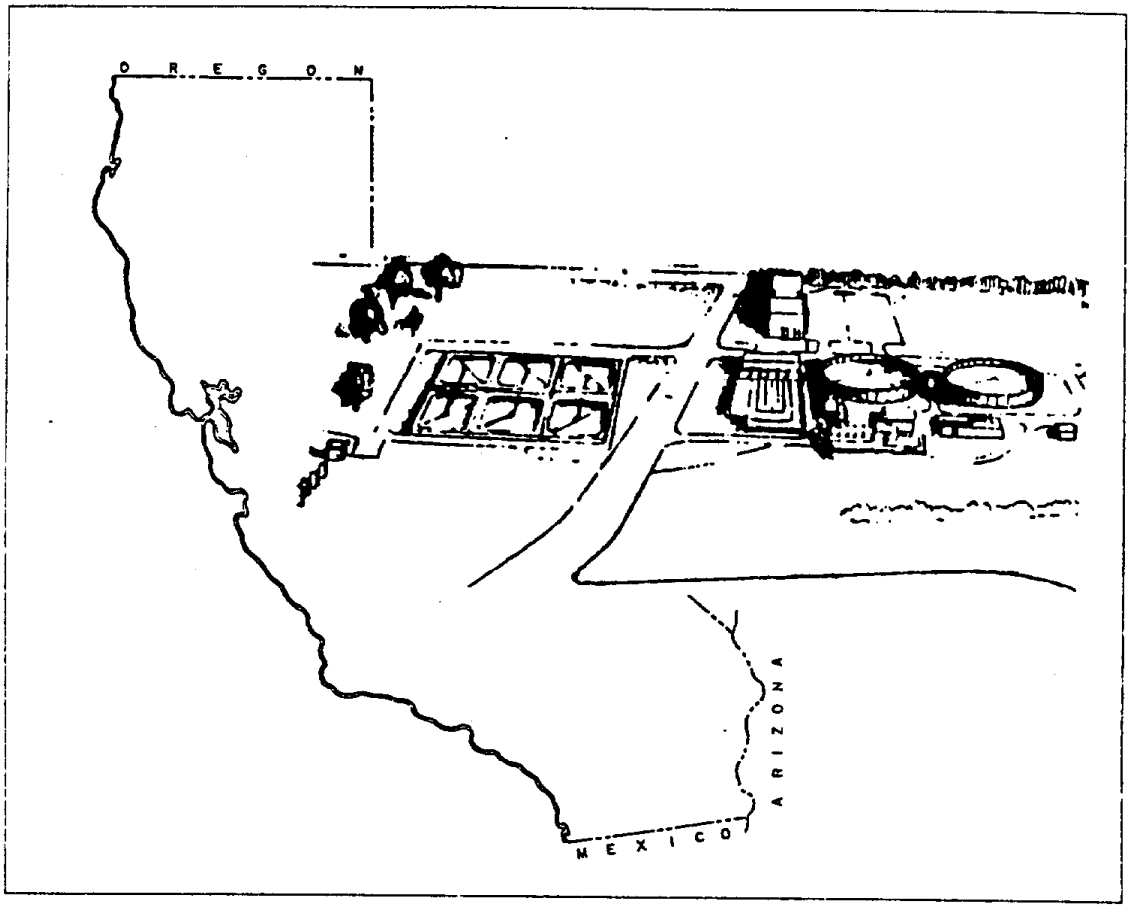

CALIFORNIA WASTEWATER AGENCY SURVEY

91-18CWP

March 1991

WATER RESOURCES CONTROL BOARD
STATE OF CALIFORNIA

STATE OF CALIFORNIA
Pete Wilson, Governor

OFFICE OF ENVIRONMENTAL PROTECTION
James M. Strock, Secretary

STATE WATER RESOURCES CONTROL BOARD
P.O. Box 100
Sacramento, CA 95812-0100
(916) 322-3132

W. Don Maughan, Chairman
Edwin H. Finster, Vice Chairman
Eliseo Samaniego, Member
John Caffrey, Member

Walt Pettit, Executive Director

COVER:
Wastewater Treatment plant.

SOURCE:
State Water Resources Control Board
Division of Clean Water Programs.

To reorder this publication refer to publication 91-16CWP;
California Wastewater Agency Survey.

CALIFORNIA WASTEWATER

AGENCY SURVEY

91-18 CWP

MARCH 1991

PREPARED BY:
BART CHRISTENSEN, JOHN HERREN
LARRY JELLISON AND BORIS TRGOVICH
DIVISION OF CLEAN WATER PROGRAMS

March 1991

WATER RESOURCES CONTROL BOARD
STATE OF CALIFORNIA

ABBREVIATIONS

ADWF	Average dry weather flow
A/E	Architectural/Engineering
BOD	Biological oxygen demand
C&D	Cease and desist order
CWGP	Clean Water Grants Program
CWPCA	California Water Pollution Control Association
DAF	Dissolved air flotation
Division	SWRCB's Division of Clean Water Programs
DO	Dissolved oxygen
DOHS	Department of Health Services
EPA	Environmental Protection Agency
F:M	Food to microorganism ratio
FmHA	Farmers Home Administration
I/I	Infiltration/Inflow
MCRT	Mean cell residence time
mg/l	Milligrams per liter
MGD	Million gallons per day
MLSS	Mixed liquor suspended solids
NPDES	National Pollutants Discharge Elimination System
O&M	Operation and maintenance
OM&R	Operation, maintenance and replacement
pH	Measurement of acidity
POTW	Publicly owned treatment works
PSA	Pressure swing adsorption
PWWF	Peak wet weather flow
RBC	Rotating biological contactor
Regional Board or RWQCB	Any of the nine California Regional Water Quality Control Boards
RO	Reverse osmosis
SCG	Small Community Grant
SRF	State revolving fund
SS	Suspended solids
SWRCB or State Board	State Water Resources Control Board
TDS	Total suspended solids
TFSC	Trickling filter-solids contact
WAS	Waste activated sludge
WDR	Waste discharge requirement
WWTP	Wastewater treatment plant

ACKNOWLEDGEMENTS

The State Water Resources Control Board thanks the many individuals who provided the information included in this survey. The survey team was very impressed with, and appreciative of, the efforts made by local wastewater program workers and managers to provide comprehensive responses to questions in the survey questionnaire.

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EXECUTIVE SUMMARY

Background

The 1989 Survey of Small Wastewater Treatment Facilities was conducted primarily to satisfy the annual survey requirement of the Federal Water Pollution Control Act, Section 210. The 50 agencies surveyed (see Location Map) were randomly selected from a total of more that 250 agencies which had received construction grants in the 1970s. Seventy-five percent of the facilities visited had design capacities less than five MGD.

The purpose of the survey was to evaluate the nature and magnitude of any O&M shortcomings at POTWs. The study was prompted by concerns by SWRCB and San Francisco Bay Regional Board staff that POTWs have deterioriated since they were constructed under the grant program and that POTWs lack proper financial management programs to assure timely replacement of collection and treatment facilities.

Findings

The survey results tend to support the stated concerns. The most significant findings are summarized here:

- Eighty-two percent of the agencies surveyed violated WDRs during the one year period prior to the survey. Twenty-four percent of the facilities violate requirements which the Regional Boards usually consider to be the most significant: e.g., monthly BOD, SS and effluent disinfection.

- Most of the discharge violations identified by survey staff in WDR self-monitoring reports during the 12-month period evaluated in the survey were not acknowledged as WDR violations by the Regional Boards. During the same 12-month period only six enforcement actions were taken against three of the 50 agencies surveyed.

- Over half the agencies surveyed experienced collection system overflows during the previous year. Many WDRs do not appear to cover collection system overflows. Many agencies with such requirements did not report overflows.

- Treatment facilities were found to be in poor physical condition at 13 of 36 agencies with facilities smaller than four MGD. None of the 14 facilities larger than four MGD were in poor condition. Poor physical condition was defined as inoperable major equipment or treatment processes.

- Poor physical condition correlated very closely with low staffing and budget levels.

- The operation of most smaller surveyed facilities was dependent on a single lead operator. Such facilities were found to be operating successfully, or with infrequent WDR violations, largely due to the diligence and resourcefulness of their lead operators. The loss of such

an operator could lead to serious operations problems and WDR violations. This, in fact, did happen to two of the surveyed facilities.

- Design deficiencies were identified at most of the 50 facilities surveyed. Impacts of these deficiencies were greatest on the smaller facilities, which inherently have less operational flexibility. The design deficiencies frequenty resulted in WDR violations.

- Most grant funded mechanical/electrical equipment at plants surveyed has not been replaced. Such equipment, while still functional, is difficult and/or expensive to maintain. In some cases, replacement spare parts are no longer available.

- Very few agencies have set aside funds to replace major equipment. As a result, replacement occurs on an emergency basis when equipment fails.

- Most agencies believe that they will have sludge disposal capacity problems within a few years. Ultimate disposal costs may be very expensive and funds are not being set aside for such disposal.

- Surveyed agencies expect to spend $330,000,000 in construction costs over the next five years to improve and/or expand collection and treatment facilities. Since funds have not been set aside, agencies will have to borrow to raise the needed funds.

- Inadequate revenue for plant operations was a significant factor that contributed to many of the problems observed at smaller communities. Revenue rate increases are not popular with agency managers, elected officials, or the electorate.

Conclusions

- The study findings indicate that surveyed facilities constructed in the 1970s have deferred needed replacement and maintenance and do not have adequate financial management plans for facility replacement, improvement, or expansion.

- A large number of reported (and unreported) discharge violations and deteriorating facility conditions were not receiving regulatory attention.

- With little regulatory pressure there is little incentive for facility owners to improve operation and financial management of their facilities.

Recommendations

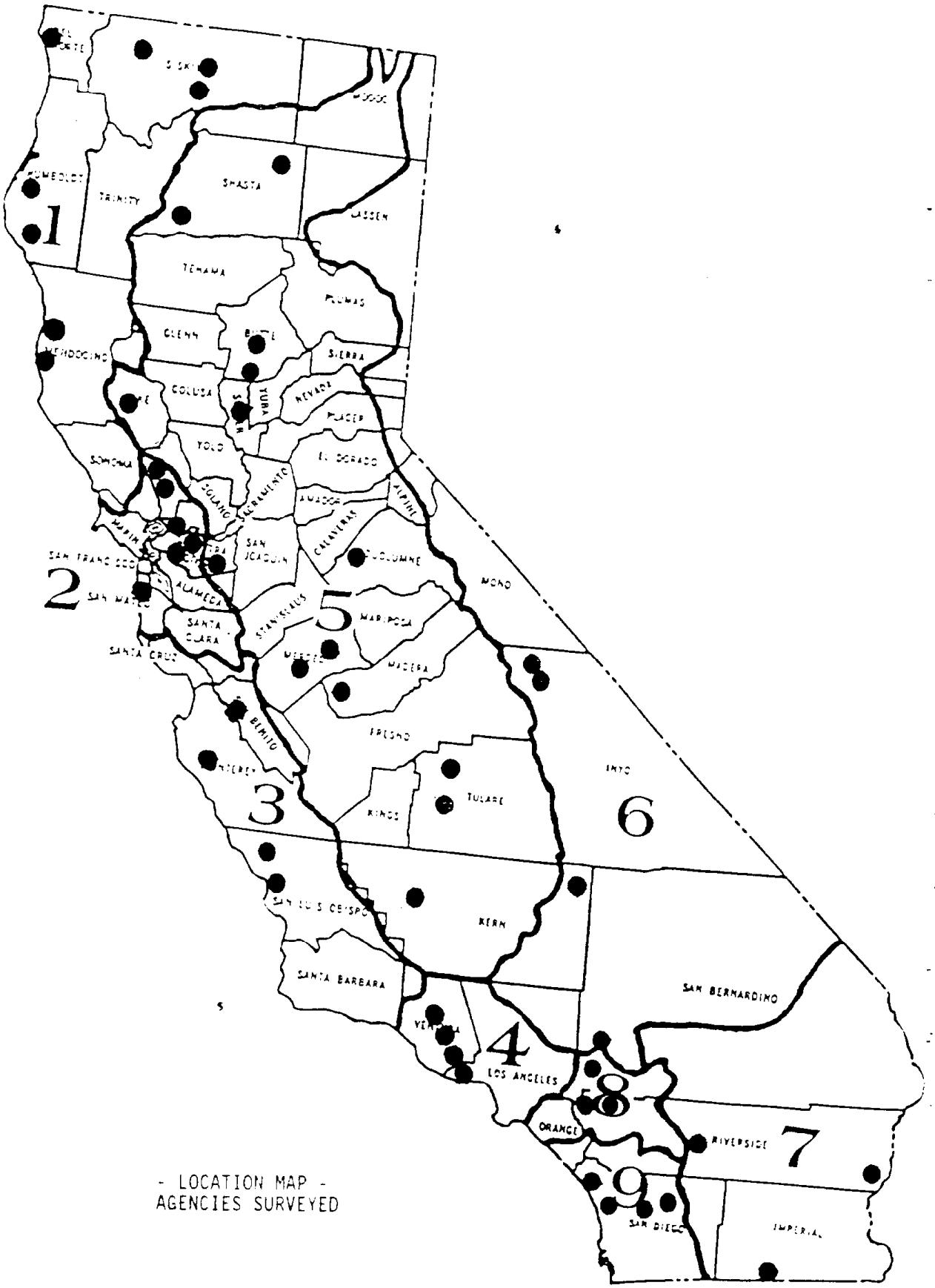
There are a wide variety of actions that owners of small treatment facilities can take to improve the performance and prolong the life of their wastewater facilities and to better financially plan for needed expansions. Our experience in conducting hundreds of final project inspections and revenue program reviews indicates that local agencies improve plant capacity, performance or reliaiblity in response to growth or regulatory pressure. Our suggested recommendations focus on the following regulatory actions:

- All Regional Boards should require that dischargers prepare and submit for review a five-year financial management plan and capacity analysis with NPDES/WDR permit renewal. The plan should address needed wastewater

system capital (replacement/improvements/expansion) and operational costs and how revenues will be generated to cover such costs. Such plans will ensure that all dischargers become aware of the financial needs of treatment facilities.

- All NPDES permits/WDRs should explicitly prohibit collection system overflows. The San Diego Regional Board appears to have model reporting requirements.

- The State and Regional Boards should train and maintain engineering staff with wastewater operations and maintenance expertise and staff capable of reviewing utility financial management plans. Such staff should be dedicated to regulating wastewater facilities. Holding quarterly roundtable/training sessions could establish a peer relationship leading to improved technical skills in observation and evaluation.



- LOCATION MAP -
AGENCIES SURVEYED

CHAPTER II
METHODOLOGY

A. How the Survey Questionnaire Was Used

The survey questionnaire form provided the format for the agency surveys and for the follow-up analysis. Basically an interview approach, the question- and answer format of the questionnaire form provided a consistent method for obtaining the needed information. In completing the questionnaire for each agency, the inspecting engineer relied heavily on comments provided by the agency's personnel. The inspecting engineer attempted to supplement or confirm the information provided through inspection of the facilities, onsite operational and maintenance records, design criteria, process loadings, and laboratory records.

B. How the Survey Was Conducted

The 50 wastewater agencies were surveyed during August and September of 1989. Each survey was conducted in the format of a facilities operation inspection. Each inspection generally consisted of a two-hour "walk-through" of the agency's facilities (the treatment plant and at least one pump station within the collection system), four hours of interviews with the wastewater collection and treatment managers, one hour of interview with a financial management person, and four hours examining the requested data and reports. All persons interviewed were encouraged to discuss any items relevant to the survey.

To achieve consistency among the inspecting engineers, the initial inspections were conducted in groups of two. After the initial three inspections, the questionnaire was slightly modified, and all subsequent inspections were conducted by one inspecting engineer per inspection.

The financial documents (ordinances, annual budget, annual audit) furnished by the agencies were evaluated by the Division's financial analyst. All other materials were evaluated by the inspecting engineers. In order to maintain consistency in the evaluation of the facilities of 50 different agencies, the information in each survey questionnaire was reviewed by the inspecting engineers as a team.

The information from the surveys was summarized in 23 categories. These categories are listed on Table 1. The 23 categories evolved from an evaluation of the questionnaire. Usually, the information for each category was gathered from several different locations in the questionnaire. There is some overlapping of categories. Some categories are more significant than others, and the relative importance of the categories differs for different agencies.

The 50 plants are indicated at the top of Table 1, and are listed in order of the magnitude of their average flow. The term "Agency Code No." Is an identification number which was assigned to each agency to keep the agencies anonymous. The purpose of rating each agency in each of the 23 rating categories was not to draw attention to particular agencies but to develop an overall picture of how well the State's wastewater agencies are

doing in all the important categories. Tabulating and rating the agencies in the different categories helped in identifying trends and relationships. This technique was also extremely useful for developing conclusions and recommendations.

C. Rating Criteria

To quantify the ratings in each category, a zero to three point system was used. A value of "0" was given if there was "no problem" for the agency in that category. A value of "1" was given if there were "minor problems". A value of "2" indicated "significant problems". A value of "3" stood for "major problems". The ratings are very sensitive to the complexity of an agency's facilities, and to the mandated treatment requirements. For example, very small plants may not score well in "redundancy" because small plants typically have few process units. The same plants may score well in "meeting waste discharge requirements" because their WDRs may be easy to meet. Some larger agencies are required to perform thousands of water quality tests over a 12-month period, while other agencies have less than a 100. It is much more difficult for a larger plant to meet all of their WDR parameters all the time, even when the facilities and O&M practices are adequate.

1. Meeting Waste Discharge Requirements

A strict interpretation of the discharge requirements was used in evaluating 12-months of monitoring data and the comments of the agency's personnel. In cases where the WDR explicitly prohibited collection system overflows, these overflows were considered violations. To receive a "0", an agency could not have a WDR violation of any kind for the 12 month period. To receive a "1", an agency could have up to 10 minor violations, such as violations of instantaneous chlorine residual, maximum-day suspended solids, or monthly total dissolved solids. To receive a "2", an agency could have more than ten minor daily violations and up to one significant violation. A significant violation was a monthly average violation of BOD, suspended solids, settleable solids, coliform, or chlorine residual. A "3" would indicate more than one significant monthly average violation or a "cease and desist" order from the Regional Board due to effluent limitation violations.

After the agencies were rated it was decided to compare these ratings with the recorded violations and enforcement actions of the Regional Boards. Regional Board records for the one-year period between August 1, 1988 and July 31, 1989 were compared against survey data for the corresponding period. In some cases of survey data, the 12-month period was slightly different, but the variations were not significant enough to influence the conclusions in this report.

2. Physical Condition of the Wastewater Treatment Plant

This category was evaluated mainly from observations of the inspecting engineer and, secondly, on statements by plant personnel. A "0" was assigned if no physical deterioration was observed or reported. A "1" was assigned if minor problems, such as minor corrosion of surfaces were

observed, or if a few minor pieces of mechanical equipment had been out of service for some time for other than routine maintenance. A "2" indicated significant structural or mechanical problems, such as major items of equipment being inoperable. A "3" indicated long term neglect, with unit processes partially or totally unusable.

3. Physical Condition of the Collection System

Some agencies do not have jurisdiction over all of their contributing collection systems. A "0" was assigned if the collection system was reported to be in good physical condition with very little I/I. A "1" was assigned if there were minor I/I, root intrusion or other blockage or structural problems. A "2" was assigned if excessive I/I occurred, or if other problems caused numerous overflows. A "3" was assigned if serious problems occurred or if major segments of the collection system needed replacement.

4. Design Deficiencies

A "0" indicated no design deficiencies in the collection and treatment facilities. A "1" indicated minor deficiencies which made operations difficult. A "2" indicated deficiencies which affected process performance (e.g., inadequate clarifiers, or a lack of operational flexibility). A "3" reflected deficiencies which affected performance and resulted in WDR violations.

5. Wastewater Treatment Plant Capacity, 6. Collection System Capacity, 7. Effluent Disposal Capacity, 8. Sludge Disposal Capacity

These categories were rated based on the number of years of remaining capacity, and whether the agency had an implementable plan for increasing capacity. If the agency gave no estimate, then the inspecting engineer made the estimate based on available information for design versus actual flows and information on community growth rates. The ratings were assigned as follows:

"0" if ten or more years of reserve capacity were available, or if five-ten years were available and the agency had an implementable plan;

"1" if five-ten years of reserve capacity were available, or if less than five years were available and the agency had an implementable plan which could be put in place before capacity would be exceeded;

"2" if less than five years of reserve capacity remained, and the agency did not have an implementable plan;

"3" if permitted or rated capacity was exceeded.

9. Process Control

The plant process control rating assessed the staff process control expertise and the adequacy of the plant's control systems. The rating was primarily determined by the inspecting engineer's observations and

analysis. A "0" indicates no process control problems. A "1" indicates minor or potential problems. A "2" indicates significant process control problems which could lead to a process upset. A "3" indicates major process control problems resulting in WDR violations.

10. Industrial Treatment

This rating assessed the adverse impact of industrial flow on the treatment plant's performance. A "0" indicates no industrial flow, or industrial flow with a pretreatment program and no industrial waste problems. A "1" indicates the presence of industrial flow causing no problem, with the agency having no pretreatment program. A "2" indicates that the agency had a pretreatment program, but that the industrial flow had caused operational problems at the plant during the previous 12 months. A "3" indicates that the agency had experienced problems with industrial flow at the plant during the previous 12 months and had no pretreatment program.

11. Laboratory Monitoring

This rating assessed the adequacy of laboratory support needed to accomplish all required monitoring and good process control. A "0" indicates that all required monitoring and adequate process control monitoring were performed, with an adequate quality assurance program implemented. A "1" indicates that most, but not all, of the required or desired tests were performed. A "2" indicates, in addition to not performing all tests, the laboratory did not have a quality assurance program. A "3" indicates that the agency was not performing a significant part of its required monthly and quarterly monitoring as required by their WDR.

12. Redundancy

This category rated the back-up provisions for the mechanical facilities of the collection system and treatment plant unit processes. The EPA publication, Design Criteria for Mechanical, Electric, and Fluid System and Component Reliability (EPA-430-99-74-001), was used for these ratings. A rating of a "0" indicates that all pump stations had firm pumping capacities at peak flow conditions, and that all critical mechanical components and unit processes at the plant had back-up units; a "0" indicates that the EPA criteria were met. A rating of a "3" indicates that there was a potential for permanent or unacceptable damage to receiving waters due to a lack of unit redundancy, such as from a pump station lacking peak flow capacity if one of it pumps failed. Ratings "1" and a "2" are subjective gradations between "0" and "3".

13. Power Reliability

The power reliability of the collection system and the treatment plant was rated. A "0" indicates that the collection system and the treatment plant had adequate back-up power provisions to avoid a violation of the WDR during a major power outage. It also indicates that the back-up provisions had been reliable and that the equipment was properly

maintained and tested. A "1" indicates that a few small collection system lift stations did not have back-up power, or that a major power outage could cause operational problems at the plant but not a WDR violation. A "2" indicates that a major power outage would probably cause a WDR violation, the back-up systems were not reliable, or the collection system pump stations lacked back-up power, causing infrequent, minor overflows. A "3" indicates that a WDR violation had occurred at the plant during the previous 12 months due to a power outage, or the collection system had numerous minor overflows or one major overflow during the 12-month period due to power failures.

14. Emergency Response

A "0" indicates that the plant and the pump stations had alarms telemetered and monitored continuously, and that the agency had adequate emergency response procedures, annual emergency response drills, and reasonable safety provisions for workers on emergency calls. A "1" indicates that an agency had most of the above. A "2" indicates that an agency had some of the above. A "3" indicates that an agency had none of the above.

15. Safety

Safety ratings were based on the potential for operator injury, illness, or death due to unsafe working practices or a lack of training. A "0" indicates there were no observed or reported problems. A "1" indicates that working practices or lack of training could result in a minor injury. A "2" indicates that working practices or a lack of training could result in a major injury or death, and a "3" indicates a greater potential for injury or death.

16. Training

The rating indicates the adequacy of operations, maintenance, and safety training. A "0" indicates that training programs and opportunities were adequate, process control training was provided, and the agency budgeted a reasonable amount for training. It also indicates that the agency insures that more than one operator is capable of operating the facilities. A "3" indicates that the agency provided no training. A "1" and a "2" are subjective gradations between.

17. Maintenance Management

The agency's preventive maintenance management system and maintenance practices were rated. A rating of a "0" indicates that an agency had all of the following:

- An adequate preventive maintenance management system, with the system computerized for plants over ten mgd;
- adequate maintenance facilities;
- an adequate collection system cleaning program;

- evidence that the plant was well maintained;
- an adequate spare parts inventory;
- an instrumentation maintenance and calibration program.

A rating of a "1" indicates that there were minor deficiencies in a few areas. A rating of a "2" indicates that there were several deficiencies, and a "3" indicates that there were no formal maintenance management system or resources, or that the plant appeared to have serious deferred maintenance.

18. Reference Documents

The adequacy of the as-built plans and specifications, the O&M Manual, and the manufacturer's manuals were rated. A "0" indicates that the documents were available, updated, and were considered useful. A "1" indicates that all of the documents were available, but had not been updated or were not particularly useful. A "2" indicates that all documents were available, but were not useful and not updated. A "3" indicates that some or all of the documents were unavailable.

19. Staffing

This category covers the adequacy of the staffing for operation and maintenance of the collection system and treatment plant. It considers the number of positions and the certification levels. The recommendations in the plant's O&M manual were the primary reference guide. The comments for the staff and the observations of the inspecting engineer were also considered. A "0" indicates that staffing and certification were adequate. A "1" indicates that staffing was approximately ten percent + short; a "2" indicates that staffing was approximately 20 percent + short; and a "3" indicates that staffing was 30 percent + short or that proper certification was lacking.

20. Administration

This category provides an assessment of management support above the plant superintendent level in all areas that affect the satisfactory operation and maintenance of the wastewater facilities. Adequacy of long range planning, short and long term financing, training programs, staffing, and several other factors were considered. A "0" indicates that administrators were aware of facilities needs and that management support was good. A "3" indicates that a lack of proper management support resulted in major problems in operation and maintenance, plant unreliability, or serious understaffing. Ratings of "1" or "2" indicate less serious problems in the same areas.

21. Revenue Adequacy

Based on 12 months of financial records, the Division's financial analyst rated the adequacy of the service charges to support operation and maintenance. A "0" indicates that revenue was adequate to meet expenses and adequate for establishing an operations reserve. A "3" indicates that

revenue from service charges was inadequate for covering the year's operation and maintenance expenses. A "1" or a "2" indicates that revenue was insufficient for establishing and maintaining an adequate operations reserve.

22. Equitability

The user charge system is rated according to fairness across user classes. An agency would receive a "0" for adhering to all Federal guidelines for revenue equitability. An agency would receive a "3" for having major inequitability in its charging system (e.g., failing to charge industrial users for their organic loading). A "1" or a "2" is a gradation between.

23. Financial Reserves

Ideally, an agency should have one year of operating costs available in liquid assets (e.g., cash and 30-day accounts receivable). Also, the ratio of current liquid assets to current liability (accounts payable, interest for the current year, and payroll) should be at least 20 to one. An agency with operational reserves of this kind would be rated a "0". An operational reserve of six months would rate a "1"; an operational reserve of three months would rate a "2", with less than three months, a "3". The agency's ability to incur long term indebtedness was not considered in the rating.

CHAPTER III
DISCUSSION

A. Meeting WDRs

Finding:

Eighty-two percent of the agencies surveyed had at least one violation of waste discharge requirements during the 12-month period prior to August 1989.

Most of the discharge violations noted during the 12-month period evaluated in the survey were not observed or were not acknowledged as WDR violations by the Regional Boards.

Discussion:

This percentage was determined by a strict interpretation of WDRs taking into account prohibited discharges for both the collection system and the treatment facility. Based on the parts of WDRs pertaining only to the treatment plants, 70 percent of the facilities surveyed had at least one violation during the 12-month period. About 24 percent of the surveyed plants were exceeding monthly averages for significant effluent constituents (BOD, SS, coliform, chlorine residual) during two or more months out of the 12-month period evaluated.

The high number of waste discharge violations suggested a potential problem with compliance monitoring and enforcement by the Regional Boards. Additional questioning of the wastewater facilities staff revealed that the Regional Board staff visited all of the treatment plants surveyed at least once and often two or more times per year. This number of visits by the Regional Board staff appeared reasonable.

After the survey data were analyzed, the number of WDR violations noted during the survey was compared with the number of violations and enforcement actions recorded by the Regional Boards. Twelve of the 50 agencies had major permit violations (score of "3") during the 12-month period evaluated in our survey. Examination of Regional Board records indicated that Regional Boards observed no violations of any kind at eight of those 12 facilities during the same 12-month period. During the same period of time the Regional Boards observed major violations, defined as those "which have the potential to cause or have actually caused adverse environmental effects (e.g., fish kills and oil sheens) or pose human health hazard...", At only three of those 12 agencies. Overall, between August 1, 1988 and July 31, 1989 a total of six enforcement actions were taken against three of 50 agencies surveyed.

Some inconsistencies were noted in WDRs. Collection system spills were not always explicitly prohibited by the WDRs. Where spills were not prohibited, they were not counted as violations. In a few other cases, WDRs were outdated and the agencies were in violation only because the new WDRs had not been issued. A few agencies were occasionally violating their WDR because limits set for a particular effluent constituent (e.g. TDS and chlorides) were lower than actual concentrations in potable water in those particular communities.

Larger, well operated facilities were found to be violating their WDRs as frequently as the small poorly operated treatment plants. Because they usually discharge large quantities of effluent to surface waters, the larger agencies have much stricter requirements in terms of the number of effluent constituents monitored, the permitted effluent concentrations, and the frequency of sampling. Those factors, along with the generally greater complexity of the larger facilities, make it challenging for larger plants to consistently meet WDRs, even under ideal conditions.

The impact of collection system overflows on public health and water quality of receiving waters may be at least as significant as plant effluent violations. Collection system spills are generally not considered serious, but, because raw sewage overflows are not disinfected and their ultimate destinations are difficult to control, potential impacts on water quality and public health can be significant. This problem is further compounded by the fact that collection system spills are not consistently reported or documented and many minor spills may occur unnoticed.

Possible Actions:

Regulatory agencies need to review the WDRs to determine if the existing requirements are practical and achievable. Where changes are needed they should be implemented quickly. Collection system overflows should be prohibited in WDRs.

Stricter enforcement may be a partial solution, but will by no means solve the entire problem. Ultimately, additional funds will be required to deal with some of the problem plants. Smaller, financially strapped communities may require additional grants or low interest loans to deal with the problems.

B. Physical Condition of WWTP

Finding:

Smaller plants were generally in much worse physical condition than the larger facilities.

Discussion:

The difference in physical condition is reflected in Table 1. All of the 13 plants which were found to have significant or major problems with physical condition were among the 36 plants under four MGD. Many of the observed problems could be easily corrected by thorough cleaning, weed control or painting. Although most grant funded mechanical, electrical, and control equipment was in use, most of this equipment will need to be replaced during the next ten years. In some cases, long term neglect resulted in equipment being totally inoperable or unusable. Nine of the 13 facilities that scored poorly (rating two or three) in this category also had significant staffing deficiencies. Ten of the 13 had inadequate maintenance management systems. Eleven of the 13 scored very poorly in administration. Administrative support, including financial assistance, is a critical factor in operation and maintenance of the wastewater treatment facilities. The agency

administrators are responsible for collection of necessary funds (sewer user fees) to support the adequate staff required for proper operation and maintenance of the facilities. In addition to collecting adequate revenues, agencies must ensure that such funds are spent on treatment facilities instead of other public works projects. Diversion of money from sewer funds to other public works projects was observed at several of the 50 facilities surveyed.

Possible Actions:

Most of the observed problems could be solved by minimum increases in staffing, assuming that the additional staff time would be dedicated specifically to maintenance. This solution may or may not require increases in sewer rates. Where rate increases are necessary they are usually cost-effective investments. Increased maintenance effort could pay off in the form of smaller repair and replacement costs.

EPA and SWRCB could help improve the physical condition of the facilities by enforcing the Federal CWGP requirements. Rate increases are usually easier to promulgate if local officials can say that the State or Federal requirements are responsible.

The State and EPA could increase financial and technical assistance through the State's SCG and EPA's Outreach programs. The Regional Boards should insist that neglected equipment be properly maintained.

C. Collection System

Finding:

Most agencies surveyed reported collection system overflows during the previous 12 months.

Discussion:

The number of overflows per agency surveyed ranged from one to over sixty. In the worst reported incident, about 800,000 gallons of raw sewage were spilled. Most collection system spills were caused either by blockages from grease or root intrusion, or by (I/I). Overflows were significantly more frequent in communities where precipitation is high, indicating that collection systems are generally not very tight and need major improvements. Many agencies, including those in the drier areas, reported at least parts of their collection system are in poor condition. As would be expected, the older lines were generally worse. At least one agency had a problem with a relatively new system which they blamed on poor construction.

One commonly observed problem was grease from commercial establishments. Grease tends to be more of a problem in small diameter collection lines where it builds up, blocks the lines and causes overflows. This problem is more common in Southern California than the rest of the state. Root intrusion is a larger problem in Northern California.

Smaller agencies served by treatment plants with ADWF capacities of less than four MGD reported many more serious problems with their collection system than did the larger communities. However, a few agencies over four MGD also reported serious problems at least with parts of their collection systems. Many of the agencies with collection system problems also were rated poorly on staffing, maintenance management, or both. Poor collection system maintenance due to lack of adequate staff is a significant factor leading to many overflows. The age of the systems and their capacities are often other contributing factors.

The major consequences of recurrent collection system problems include undesirable hydraulic loadings on the treatment facilities, long term financial impacts on the communities, violations of waste discharge requirements, and potential threats to public health.

Some waste discharge requirements don't prohibit overflows of sewage from collection systems or require prompt reporting of some discharges. Also, although more than half the agencies had experienced collection system overflows during the previous year in violation of their WDRs, few actions were taken by the Regional Boards in response to those violations.

Agencies usually do not consider sewer overflows to be as important as plant effluent discharge violations, even though public health and water quality consequences may be more serious. Typically, when asked if waste discharge requirements were being met, operators and agency officials did not consider collection system overflows. Some reported only collection system spills estimated to be over certain volumes (usually ten or 100 gallons), even when the reporting requirements required that all spills be reported.

Possible Actions:

Collection system overflows should be treated as seriously as effluent discharge violations. To reduce the problems in this area, agencies should dedicate additional manpower and funds towards good preventive maintenance, repair, and replacement programs. Regional Boards need to examine collection system discharge and reporting requirements to ensure consistency and should require agencies to take positive steps to eliminate problem areas.

D. Design Deficiencies

Finding:

Most agencies reported treatment plant design deficiencies.

Discussion:

Design deficiencies were more common and resulted in greater impacts on plant operation and performance at smaller facilities. Some of the more commonly reported problems were inability to bypass unit processes, lack of operational flexibility (step feeding in aeration tanks, for example), poor flow distribution and unreliable instrumentation. Other problems included inaccessible equipment, undersized secondary clarifiers, improperly located flow meters and inadequate sludge handling facilities.

Many of the grant funded components (pumps, blowers, electronics) at larger treatment plants have been replaced by the agencies for a variety of reasons, including poor performance, poor materials and workmanship, and high rates of failure. Some larger plants have replaced grant funded equipment with the same brands that prevail at their plants. By standardizing, it is easier for their maintenance staffs to repair and maintain equipment and keep adequate supplies of spare parts.

Undersized clarifiers were frequently a limiting factor affecting the performance of smaller plants. Smaller clarifiers appeared to perform more poorly and had more difficulty handling the design flows than the larger clarifiers designed at comparable overflow rates.

Smaller facilities tend to keep problem equipment until it becomes irreparable, at which time it is replaced or abandoned. Generally, plant staff have dealt with minor design or equipment deficiencies by modifying equipment or adjusting operation and process control. More significant deficiencies are often tolerated for extended periods of time, especially when WDRs can still be met. These deficiencies usually are given low priority if high costs are required to correct them.

Possible Actions:

In retrospect, it would have been advantageous to apply more conservative design criteria to small clarifiers. Many of the design deficiencies could have been avoided if operators were more actively involved (or allowed to be involved) during the planning and design stages of the projects. In future projects the plant staff, including the operators and maintenance staff, should work more closely with the design engineers. The engineers should consider plant staff comments more carefully and incorporate reasonable ideas whenever possible. Selected plant staff should also be actively involved during the construction phase of any new project to become familiar with their facility.

E. Plant Treatment and Disposal Capacities

Findings:

At the time of the survey, approximately 28 percent of the plants visited were at or exceeding their design capacity for treatment or effluent disposal. Another 12 percent had less than five years of treatment or effluent disposal capacity remaining.

Discussion:

A number of agencies have already addressed this problem by expanding or upgrading their treatment plants. Communities have spent millions of dollars on the new facilities during the last few years. Others are at planning stages to increase their plant capacities.

Despite an impressive expansion effort at some communities, the overall capacity expansions have not consistently kept pace with growth throughout the state. Solids handling processes and clarifiers were often the major

bottlenecks where capacity problems were observed. These problems are discussed in more details under the "redundancy", "design deficiencies" and "sludge disposal capacity" headings in this section.

Again, these problems were more prominent at smaller communities which collected inadequate revenues. These communities will shortly face major construction needs with meager or no financial reserves and poor credit ratings. Even if they are able to sell bonds or obtain conventional loans, it will be at a significant price. For some small rural communities grants or subsidized low interest loans may again be the most realistic option.

However, these same communities would not qualify for the State's loan program under the existing priority rules which classify most capacity expansions as low priority.

Possible Actions:

The State could give greater priority to small communities with capacity problems applying for SRF Loans and SCG.

F. Sludge Disposal Capacity

Findings:

Only a few agencies reported problems with sludge disposal capabilities. However, most believe they may have sludge disposal capacity problems within a few years.

Discussion:

In rating this category, sludge disposal was not considered a problem as long as the plant complied with the existing WDR pertaining to sludge handling and disposal. Since many WDRs allow storing of sludge onsite and existing sludge regulations usually are relatively easily met, most agencies scored well in this category. They are likely to have problems, however, once the new sludge regulations are implemented. This is particularly true of those agencies that have been storing sludge onsite for several years.

The Clean Water Act of 1972 and the Water Quality Act of 1987 require the development of sludge management programs and procedures and include comprehensive technical regulations for sludge use and disposal. As the regulations were being developed, many agencies became concerned that unreasonable or practically unattainable use and disposal requirements would be imposed on municipal sludges. Those fears have since been somewhat reduced as greater emphasis is being placed by EPA on maximizing beneficial uses of sludge. Until the EPA's final technical standards are promulgated (by October 1991 at the earliest), many agencies are hesitant to proceed with implementation of major sludge disposal projects.

The problem is further complicated by inconsistencies in waste discharge requirements among different Regional Boards. The EPA's sludge permit

regulations promulgated on May 2, 1989, along with the proposed technical standards are expected to reduce the inconsistencies. However, it may take some time before the State implements the new regulations. Meanwhile, the preferred strategies in many communities appear to be to comply with existing regulations for disposal or to store sludge on site. Fourteen of the 50 plants surveyed were storing their sludge on site. Some of these plants had several years worth of sludge on site. The storage strategy, in particular, may become an immediate problem for these communities once the state agencies come under the new sludge permit regulations. For example, proposed standards under 40 CFR Part 503 define surface impoundments that store sludge for more than one year as disposal sites and would therefore be regulated as such.

Agencies are also finding that sludge disposal at landfills is becoming more difficult and costly, either because of stricter requirements or due to lack of landfill capacity.

Possible Actions:

It is imperative that the leading State and Federal agencies responsible for regulating domestic sludge disposal implement the new regulations as quickly as possible in a consistent and practical manner. Agencies should be issued new sludge permits and allowed a reasonable amount of time to implement new sludge handling programs or adjust existing programs as necessary.

G. Process Control

Findings:

Most plants did not report significant process control problems. The few that did also had serious problems meeting their WDRs.

Discussion:

Reported process control problems included control of nitrification at activated sludge plants, occasional bulking at oxidation ditch and other extended aeration plants, violation of BOD limits at trickling filter plants during the winter months, control of disinfection and dechlorination, and occasional upsets due to shock loads of industrial waste. Overall, the number of reported and observed process control problems was much smaller than expected considering that most small plants do not gather much process control information on intermediate unit processes. Greater process control efforts were observed at the larger, adequately staffed and equipped facilities.

Operators at some facilities appear to successfully meet WDRs despite a lack of process control skills. Their success was due to other factors such as easily met WDRs, infrequent sampling requirements, generous reserve capacities and operators' long-term experience at particular plants.

Possible Actions:

Despite the apparently minor process control problems, it is highly recommended that agencies support and encourage process control training

through continuing education of their operators. Process control knowledge becomes increasingly important as plants approach their design capacities or when unusual events, such as unexpectedly high industrial loadings, occur.

H. Industrial Treatment

Finding:

Only a few agencies reported that industrial waste caused WDR violations or process control problems.

Discussion:

The problems, when reported, were usually caused by "midnight dumpers" or by periodic discharges of process waste from local industries. These industrial wastes often contain concentrated caustic or acidic solutions used in washing of equipment, or high concentrations of BOD, SS, heavy metals or TDS. The more significant of these problems were organic and high or low pH shock loadings. Communities were generally successful in remedying the pH problems by adding appropriate facilities at the plant and by pretreatment enforcement. Communities were less successful in handling or preventing organic shock loadings. The larger communities have pretreatment programs that are more carefully monitored and strictly enforced. The smaller communities have ordinances or programs, but often they are not strictly enforced.

One commonly observed problem was grease discharged from commercial establishments. Although most communities have grease trap ordinances, the degree of enforcement varies greatly. Some communities are successful in reducing grease problems through inspection programs for grease traps, along with penalties for violations.

Possible Actions:

Where industries discharge industrial wastes to the local WWTP the agency should work with the industries to develop a pretreatment program to prevent treatment plant upsets. Any unusual or accidental discharges should be immediately reported to the treatment plant staff. Penalties should be prescribed and enforced when industries violate pretreatment ordinances.

Grease traps should be regularly inspected and the owners should be required to provide proof (such as receipts) that their grease traps are regularly pumped out and that the grease is disposed of in an acceptable manner.

I. Laboratory Monitoring

Finding:

Laboratory monitoring, for the most part, did not appear to be a problem.

Discussion:

Agencies have been complying with their monthly reporting requirements. Sampling is generally performed by WWTP staff with samples analyzed at the plant laboratories. Plant laboratories were found to be properly equipped for most ordinary analyses. Analytical procedures that require sophisticated equipment are normally contracted out to commercial laboratories, but a few of the larger agencies have both the equipment and laboratory staff to perform some of the more complex procedures. Effluent monitoring was generally found to be adequate, but many small facilities would probably benefit in the long run from additional process control monitoring.

During the last several years, the DOHS did not have an active wastewater laboratory certification program due to budget constraints. Recently, however, the laboratory certification program was re-implemented. Some of the small agencies indicated they cannot afford the fees required to make the certification program self supporting. Others which can afford the fees may find that performing their own lab work is not cost-effective compared with contracting out. As a result, smaller agencies may choose to contract out their lab work for monitoring tests required in their WDRs. This would be unfortunate, since most of them have adequate laboratory facilities, funded under the CWGP. The plant staff and the treatment plants also benefit if staff perform as many of their own analysis as practical. By doing their own lab work, staff develop a better understanding of the significance of lab results and operating parameters used for process control.

Certification of plant staff would also ensure better quality control for all analytical procedures.

Possible Actions:

The Regional Boards, SWRCB and EPA should request DOHS to explore possibilities for revising the certification program fee structure to alleviate some of the financial burden on small communities. The communities should be encouraged to do their own testing and have their laboratories certified.

J. Power Reliability and Redundancy

Findings:

Less than 20 percent of the agencies surveyed had unreliable power supplies at either their treatment plants or collection system pump stations. Another 40 percent had deficiencies that could cause minor problems at the facilities during a major power outage. None of the 50 communities reported violations of their WDR as a direct result of power failure. On the other hand, some sewer overflows were reported as a result of power outages.

Discussion:

Power reliability problems were more common at smaller communities which lacked emergency generators at their facilities, particularly at collection system lift stations. The lack of adequate backup power may simply be a

matter of economics at many communities. A backup power supply can involve a significant expenditure of funds for a very small apparent return. Since occasional daily WDR violations and collection systems overflows are generally tolerated by the regulatory agencies, there is little incentive for many communities, particularly the poor ones, to spend money in this area.

Lack of equipment and unit process redundancy was a significant problem at eleven of the 50 plants surveyed if EPA's reliability criteria are strictly followed. The smaller plants were generally more adversely affected by this problem than the larger plants.

Lack of backup clarifiers was frequently a limiting factor affecting the performance of smaller plants. This problem is intensified during peak flow periods. Plants with single clarifiers have an additional problem when the unit has to be shut down for maintenance or emergency repairs.

Many agencies reported inadequate collection system pumping capacities at peak flows. The consequences of this problem usually involved raw sewage overflows. The obvious solution is to install additional pumps capable of pumping the peak flows. However, the solution may not be as simple if sewer lines downstream have inadequate capacity. In such cases the agencies may often have to make decisions based on economics.

As long as occasional spills are tolerated by the public and regulatory agencies, most communities will be reluctant to spend their limited funds on what they may perceive as a minor problem.

Possible Actions:

Those communities that wish to increase the reliability of their systems should be given high priority when applying for a loan or SCG.

Since the lack of unit operations reliability is often responsible for discharge violations, particularly sewer overflows, increasing the plant or collection system reliability and redundancy in some communities should reduce the number of discharge violations.

K. Safety and Emergency Response

Findings:

Most small agencies had inadequate safety programs. The larger agencies rated relatively well in this category. The most frequently observed inadequacies included lack of adequate written safety procedures, training and drills.

Discussion:

Most small agencies did not have adequate written emergency procedures. Occasionally, where emergency procedures were written, operators were unfamiliar with them. Many of the written emergency procedures were outdated or did not reflect current conditions.

Another commonly observed problem was a lack of a formal call-back procedure to insure the safety of operators responding to alarms. Most of the agencies surveyed send only one person to respond to an alarm condition that might be dangerous. This person should at the minimum keep in phone or radio contact with a dispatcher or other Predesignated person to ensure fast response if a dangerous or life threatening situation occurs.

Possible Actions:

Agencies must ensure that their safety procedures reflect current needs and conditions. Safety procedures should be reviewed annually and modified when necessary. Steps should also be taken through training and drills to ensure that the workers are familiar with the procedures and that they follow them. Regional Boards should insist on updated emergency response procedures and incorporate them in WDRs. This practice has already been implemented in some regions.

L. Training

Finding:

All of the agencies had some type of training for their operations and maintenance staff, with only 14 percent having significant deficiencies in their training programs.

Discussion:

All of the significant deficiencies were observed at facilities under three MGD. Lack of process control training followed by the lack of safety and maintenance training were the most commonly observed inadequacies. Availability of funds dedicated strictly for training purposes was an important factor affecting the training program.

Larger facilities generally had good training programs supported by reasonable training budgets.

Possible Action:

Training in the areas of safety, process control and maintenance are worthwhile investments that could be given higher priority by managers of small facilities.

M. Maintenance Management

Findings:

Maintenance management was a problem with most of the small agencies surveyed. On the other hand, 12 of the 14 largest facilities (over four MGD) had completely satisfactory maintenance management programs.

Discussion:

Most instances of significant or major maintenance management deficiencies were at plants with inadequate staffing. The consequences were apparent in the physical condition of the treatment plants.

Possible Actions:

Agencies with maintenance management problems should investigate needs for additional staff, better maintenance facilities, increased spare parts inventory and preventive maintenance training. Development and implementation of suitable maintenance programs to deal with both corrective and preventive maintenance can be particularly effective in preventing premature mechanical, electrical and instrumentation problems.

The Regional Boards should insist on adequate staffing and maintenance management programs during their inspections.

N. Staffing

Finding:

Approximately 50 percent of the agencies surveyed were understaffed. This problem was particularly noticeable at smaller communities (under four MGD ADWF).

Discussion:

Inadequate staffing was reflected by deterioration of physical condition, inadequate maintenance programs and, to a certain extent violations of WDRs. Smaller plants are also much more vulnerable to process control problems and WDR violations if they lose the operators who are normally in charge of the facilities. These operators often run their treatment plants single-Handedly or with a minimum of help and resources. They often make the difference between failing and successfully operating plants. The few smaller facilities that received high overall ratings (low numerical scores) were usually successful because of strong management support (adequate funding) and dedicated operators who have worked at the same facilities for a long time.

Another problem sometimes observed at the smaller wastewater treatment plants is that the operators may have other designated duties such as water treatment plant operation or collection system maintenance. Unless manpower requirements in each area are carefully evaluated by agency management, staff may not have enough time to meet actual needs at each facility.

Possible Actions:

Agencies should periodically update their O&M manual staffing recommendations to provide for adequate operations, corrective and preventive maintenance needs. Regional Boards should enforce staffing requirements.

O. Administration

Finding:

Poor administration of wastewater conveyance and treatment programs was a significant factor that contributed to many of the problems observed. Poor administration was more evident with smaller agencies.

Discussion:

It was observed during the survey that well operated and maintained facilities must have adequate financial and management support in addition to competent staff. Conversely, if agency managers above the plant superintendent level are not familiar with or responsive to plant needs, then treatment plant condition, performance, safety programs, plans for future needs, and staff morale inevitably suffer. The plant superintendent's ability to communicate plant and staff needs accurately and assertively to the administration can also be an important factor.

Administrative deficiencies observed during the survey most commonly involve lack of adequate financial support and resistance to providing adequate staffing. Sometimes, even budgeted positions are left unfilled to reduce expenses. Small rural community managers are frequently unwilling to push for unpopular sewer use fee increases, even when they are cognizant of sewer and treatment plant needs. This reluctance will eventually magnify the problems through delayed action.

Possible Actions:

Agency managers need to become familiar with short and long term needs for their treatment and collection facilities. They should be aware of their responsibilities to meet WDRs and plan for adequate resources. Plant superintendents should be consulted and encouraged to state their opinions on matters pertaining to the operation and maintenance of the facilities. Once the needs are established, short and long term alternatives should be developed, studied and implemented in a timely manner.

P. Financial Adequacy

Findings:

Revenue adequacy - 20 percent of the agencies surveyed are not collecting adequate funds to pay the OM&R costs of their facilities.

Equitability - Commercial and industrial users are often overcharged to keep residential rates low.

Reserves - Over half the facilities surveyed have less than a three month operating reserve.

Discussions:

In addition to the 20 percent of surveyed agencies not collecting adequate revenues, many others are operating on a bare bones philosophy. The low OM&R reserves at most facilities indicate that not enough revenues are being collected to pay for extraordinary or unanticipated expenses.

Of even greater concern is the fact that very few agencies are making arrangements to replace structures and equipment at the end of their useful lives. When facility replacements or major expansions are required, the agencies will be in the same situation they were in prior to the CWGP, i.e., they will be facing large capital expenses with no money in reserve to pay for them. It appears that from a utilities financing standpoint, the Grants Program has only postponed incurring large debt service costs at most of the agencies surveyed. The Grants Program's goal of requiring agencies to become financially self sufficient has not been accomplished.

The survey also substantiates the impression gained in previous revenue program audits that many agencies have changed their approved charge methods without notifying the Division. It appears, in most cases, that commercial/industrial users are being overcharged in an attempt to keep residential charges low.

Another issue of major concern is that plant superintendents, and other personnel directly responsible for facilities operation, are very seldom involved in the budget process. This concern has also been frequently noted during previous revenue program audits. Normally the agency manager is asked to justify budget requests for the plant; but, since the agency manager is not intimately involved with the operation of the plant, he often will not argue strenuously for badly needed facilities, equipment or staff.

Possible Actions:

The State and Regional Boards should review all wastewater utility financial management plans for adequacy and, where applicable, for conformance with State and Federal regulations. State and Regional Board staff should receive training to enable them to perform in-depth reviews of financial management plans. Wastewater agencies should make greater efforts to involve key wastewater operations personnel (e.g., plant superintendents) in their budgeting processes.

Q. Construction Needs

Finding:

The estimated construction costs over the next five years for the 50 agencies participating in the survey totalled $330,000,000.

Discussion:

Construction needs in the immediate future were much greater than anticipated by State Board staff. Assuming the survey sample is representative of the

entire state, the statewide total cost for agencies with plants under 20 MGD will be about 4.5 billion dollars, or nearly one billion dollars annually. The costs include treatment and disposal facilities along with collection and conveyance systems.

Many agencies had recently completed sizable construction projects, or had work in progress. Others, particularly the smaller communities (most often, facilities smaller than four MGD), appeared to have been deferring much needed plant and collection system expansions and improvements because of financial problems.

Possible Action:

The State Board and the EPA should consider increasing the number of small communities participating in the SRF loan program. Some of the smaller communities may also be eligible for other federal or state financial assistance programs.

R. Other Comments

Although the survey did not intend to deal with all potential problems, operators and city managers sometimes expressed opinions and complaints on several subjects not included in the questionnaire. Some of the more frequent compliants or comments are listed below:

1. At several treatment plants operators were complimentary of Regional Board staff. They thought that the Regional Board staff knew their plants, listened to their problems, and were generally fair in dealing with agencies. Overall, it was observed that Regional Boards were much more involved in monitoring (inspection visits, replicate sampling, etc.) of the wastewater treatment facilities than they were a few years ago.

2. On the other hand, at a few plants administrators and operators complained that WDRs set higher standards for certain effluent constituents than for the communities' potable water supply, which in effect, required the WWTP to treat the cities' potable water. Some complained about what they considered irrelevant or excessive monitoring requirements.

3. Others complained that their Regional Boards are slow to respond to agencies' requests and concerns. For example, one of the communities visited expanded the capacity of their treatment plant about two years ago. Even though they presently have more than adequate treatment capacity, they have been occasionally violating the discharge requirement with respect to flow. The Regional Board has been promising to revise their flow discharge requirement to reflect the new plant capacity for the last three years. At the time of the survey the agency still did not have the revised WDR and was technically in violation of their WDR.

4. Regional Boards were sometimes viewed as having inadequate staffing, high employee turnover, and occasionally unqualified area engineers.

5. Overall, grantees felt that the CWGP was very successful in abating water pollution. At the same time, most complained that the grant process was

filled with much red tape and too many conditions, causing numerous and expensive delays. Several grantees surveyed indicated that they would not want to engage in a similar process in the future under similar conditions. Instead, some felt that the communities, particularly the larger ones, should pay for their facilities with their own money. Others, however want more grant or Federal loan money for plant expansion.

6. A few agencies complained about the increasingly burdensome task of answering to an increasing number of regulatory agencies. Typical examples are the air quality monitoring required by Local Pollution Control Districts and emissions inventories required by the EPA.

S. Interest in SRF Loan Program

Interest in the SRF loan program was mixed. Most agencies would be reluctant to apply for loans unless the number of conditions were substantially reduced from CWGP requirements. As a result, agencies with solid financial bases or good credit ratings may prefer higher interest bond money. The lower SRF interest rate may be a more significant benefit for smaller, financially strapped communities. The smaller communities also have the greatest needs for improvements. Collection systems and treatment facilities should be given equal consideration when developing loan or grant priority lists. Failure or deterioration of either system can lead to public health and/or water quality problems. Focusing the loan program to accommodate smaller, needier communities may provide the greatest benefits in the long run.

The State Board should also consider expanding its existing small communities assistance program to allow grant assistance for needy communities with populations up to 10,000. Under the existing rules, communities of more than 3,500 people would not qualify for grant assistance.

The single most important condition that a funding agency can attach to a loan (or grant) is a requirement for a revenue program that is carefully monitored and strictly enforced. This is particularly true with smaller communities, where sewer use fees are rarely adequate to support the operation and maintenance of wastewater treatment and collection systems. The Clean Water Grant Revenue Program regulations have been used successfully in many communities to raise the revenues needed for operation and maintenance of treatment and collection facilities.

TABLE 1

1989 ANNUAL CALIFORNIA WASTEWATER AGENCY SURVEY

AGENCY CODE NO.	9A	4D	1E	1G	1D	5A	5C	3C	2B	5F	5E	2A	5H	7A	6D	1B	5O	1F	9B	1C	4A	7C	5N	6B	5L	1A	3B	7D	5K	5J	5G	3D	2C	8A	6C	6A	2D	3A	5I	5D	8C	5B	8B	5M	4B	7B	4C	2E	9C	9D
AVERAGE FLOW (MGD)	.1	.1	.2	.2	.3	.4	.4	.5	.5	.6	.6	.6	.7	.7	.9	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	4	4	5	7	7	9	9	10	10	10	10	13	14	16	17
TYPE OF PLANT	PD	BD + F	OD	PD	AS + F	OD	OD	P + PD	TF + F	TF	OD	PD + F	PD	EA , EA	P + PD	TF	OD	TF + PD	AS , RO	AS	TF	TF	OD	P + PD	AS	BD	AS	AS	TF	PD	TF	PD	AS	OD	P + PD	AS , TF	AS	TF	AS + F	TF + AS	AS + F	AS	AS	AS + F	AS	AS	TF + F	AS , AS	AS
MEETING WDR	1	1 *	1	3 *	1 *	1	0	1	0	3 *	1 *	3 *	0	0	1	1 *	2 *	0	2 *	3 *	1 *	3 *	1 *	3 *	0	3 *	2 *	1 *	2 *	1 *	1 *	2 *	3 *	1 *	3 *	3 *	2 *	1	1 *	0	1 *	1 *	3 *	1 *	2 *	1	2 *	0	1 *	3 *
PLANT WDR VIOLATIONS																																																		
PHYSICAL COND. OF WWTP	0	0	3	0	0	1	0	2	0	2	2	1	0	0	0	2	3	1	1	2	1	1	0	3	2	2	2	3	0	0	0	0	1	0	3	1	0	0	1	1	0	0	0	0	0	0	0	1	0
PHYSICAL COND. OF COLL. SYS.	1	1	2	0	0	1	0	1	0	3	2	3	1	1	0	2	1	3	1	2	0	2	0	1	0	2	1	1	1	0	2	2	3	2	0	3	1	0	1	1	0	0	0	0	1	0	0	1	1	0
DESIGN DEFICIENCIES	0	1	2	1	2	3	2	1	0	3	2	2	0	1	1	2	1	0	1	0	1	1	0	2	2	2	2	2	0	2	2	0	1	0	1	2	3	2	1	1	1	1	1	0	1	0	1	0	2	0
WWTP CAPACITY	1	0	2	1	1	3	3	0	1	3	3	3	0	0	0	1	3	0	2	1	0	2	0	2	0	3	0	3	0	1	0	1	1	1	0	0	1	0	0	0	2	1	3	0	0	3	0	0	1	1
COLL. SYS. CAP.	0	0	1	0	0	0	1	0	0	0	3	3	0	1	0	0	0	1	1	0	1	1	0	0	3	2	2	1	0	0	0	3	3	0	0	3	0	0	0	1	0	1	1	0	0	0	0	0	1	1
EFF. DISP. CAP.	0	0	0	0	0	0	0	0	0	3	1	1	0	0	0	0	0	0	0	0	0	3	0	3	0	0	1	2	0	0	1	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	1
SLUDGE DISP.CAP.	0	0	0	1	0	1	1	1	0	2	2	2	0	1	0	1	1	0	1	0	0	1	2	1	0	1	2	1	0	0	0	0	1	1	1	1	1	0	0	0	1	1	1	0	0	0	0	1	1	1
PROCESS CONTROL	0	0	1	1	1	0	1	0	0	3	2	0	0	0	0	1	1	0	1	1	0	1	0	2	0	1	1	0	0	0	1	0	1	0	2	1	1	0	0	0	1	1	2	0	0	1	0	0	0	0
INDUST. TREAT.	0	0	0	0	0	0	0	0	0	0	1	2	0	2	0	1	0	0	0	1	0	0	0	0	0	2	2	0	0	0	2	0	0	0	2	0	0	0	2	0	2	0	2	0	0	0	0	0	2	2
LAB. MONITORING	3	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	2	0	0	1	1	0	0	1	1	1	1	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REDUNDANCY	0	1	2	0	1	2	1	2	0	3	1	2	0	0	2	1	1	1	1	1	1	0	0	1	0	3	1	2	1	0	1	0	1	2	0	1	0	1	0	0	0	1	2	0	1	0	1	0	2	0
POWER RELIABILITY	1	1	0	0	1	1	0	1	0	1	2	0	0	1	1	2	2	0	2	1	0	1	0	1	2	2	2	0	1	1	1	2	1	0	0	0	1	0	0	2	1	0	0	0	1	0	1	0	0	1
EMERGENCY RESP.	1	1	2	1	2	1	2	3	1	1	2	1	2	0	2	3	2	0	0	1	0	2	2	3	2	2	2	2	2	0	0	2	0	0	3	1	1	1	1	1	1	2	0	0	0	0	0	0	0	0
SAFETY	1	1	2	1	1	0	1	2	0	1	1	1	1	1	1	1	1	0	0	1	0	2	2	1	2	1	1	1	1	0	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
TRAINING	0	0	2	1	0	1	1	2	0	1	2	1	0	0	0	2	2	1	0	0	0	1	2	2	1	0	1	1	0	1	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0
MAINT. MANAGE.	0	0	2	1	0	0	0	1	0	2	2	1	1	0	0	2	3	2	1	1	1	1	1	3	2	2	1	2	1	0	0	1	1	0	2	2	1	2	0	0	0	0	2	0	0	0	0	0	0	0
REF. DOCUMENTS	0	1	2	0	1	0	0	1	0	2	3	1	1	0	1	0	1	0	0	1	0	0	0	1	1	2	1	2	0	1	0	1	2	0	1	2	1	2	1	1	0	0	1	0	0	0	0	0	1	0
STAFFING	0	0	2	1	0	1	1	1	0	3	3	2	0	0	0	2	2	1	0	2	0	2	0	2	2	2	1	0	0	0	0	0	1	1	1	1	1	2	0	2	0	0	0	1	0	0	0	0	1	0
ADMINISTRATION	0	0	3	0	1	1	2	2	1	3	1	2	1	0	1	2	3	1	1	1	1	2	2	3	2	2	2	2	0	2	0	1	2	0	3	2	0	1	0	1	1	0	1	1	0	0	1	0	0	0
REVENUE ADEQUACY	2	1	2	2	3	3	2	1	2	2	2	1	3	2	3	2	1	3	2	0	3	2	2	1	2	0	2	3	2	2	1	3	3	1	2	2	1	0	0	2	1	1	1	2	1	1	3	1	0	1
EQUITABILITY	1	1	2	1	1	1	3	1	2	1	2	1	3	0	0	1	2	2	1	0	1	1	2	1	3	3	2	3	1	3	2	3	3	0	1	1	2	3	1	2	3	2	1	3	1	1	2	1	1	2
FINA. RESERVES	2	1	1	2	3	3	2	2	3	2	2	2	2	1	2	2	1	3	3	0	3	1	2	2	2	2	2	3	2	2	3	1	1	2	1	2	1	1	0	1	2	2	1	1	1	1	1	0	1	0	1

KEY: 0=NO PROBLEM; 1=MINOR PROBLEMS; 2=SIGNIFICANT PROBLEMS; 3=MAJOR PROBLEMS; P=PRIMARY CLARIFIER; PD=PONDS; TF=TRICKLING FILTERS; BD=BIODISKS; EA=EXTENDED AERATION; OD=OXIDATION DITCH; AS=ACTIVATED SLUDGE; F=EFFLUENT FILTRATION; RO= REVERSE OSMOSIS; A COMMA (,) INDICATES TWO PLANTS; * = VIOLATIONS

TABLE 1

1989 ANNUAL CALIFORNIA WASTEWATER AGENCY SURVEY

AGENCY CODE NO.	9A	4D	1E	1G	1D	5A	5C	3C	2B	5F	5E	2A	5H	7A	6D	1B	5O	1F	9B	1C	4A	7C	5N	6B	5L	1A	3B	7D	5K	5J	5G	3D	2C	8A	6C	6A	2D	3A	5I	5D	8C	5B	8B	5M	4B	7B	4C	2E	9C	9D
AVERAGE FLOW (MGD)	.1	.1	.2	.2	.3	.4	.4	.5	.5	.6	.6	.6	.7	.7	.9	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	4	4	5	7	7	9	9	10	10	10	10	10	13	14	16	17
TYPE OF PLANT	PD	BD + F	OD	PD	AS + F	OD	OD	P + PD	TF + F	TF	OD	PD + F	PD	EA , EA	P + PD	TF	OD	TF + PD	AS , RO	AS	TF	TF	OD	P + PD	AS	BD	AS	AS	TF	PD	TF	PD	AS	OD	P + PD	AS , TF	AS	TF	AS + F	TF + AS	AS	AS + F	AS	AS	AS + F	AS	AS	AS + F	TF + AS	AS , AS	AS
MEETING WDR PLANT WDR VIOLATIONS	1	1 *	1	3 *	1 *	1	0	1	0	3 *	1 *	3 *	0	0	1	1 *	2 *	0	2 *	3 *	1 *	3 *	1 *	3 *	0	3 *	2 *	1 *	2 *	1 *	1 *	2 *	3 *	1 *	3 *	2 *	1 *	1 *	0	1 *	1 *	3 *	1 *	2 *	1 *	2 *	0	1 *	3 *
PHYSICAL COND. OF WWTP	0	0	3	0	0	1	0	2	0	2	2	1	0	0	0	2	3	1	1	2	1	1	0	3	2	2	2	3	0	0	0	0	1	0	3	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0
PHYSICAL COND. OF COLL. SYS.	1	1	2	0	0	1	0	1	0	3	2	3	1	1	0	2	1	3	1	2	0	2	0	1	0	2	1	1	1	0	2	2	3	2	0	3	1	0	1	1	0	0	0	0	1	0	0	1	1	0
DESIGN DEFICIENCIES	0	1	2	1	2	3	2	1	0	3	2	2	0	1	1	2	1	0	1	0	1	1	0	2	2	2	2	2	0	2	2	0	1	0	1	2	3	2	1	1	1	1	1	0	1	0	1	0	2	0
WWTP CAPACITY	1	0	2	1	1	3	3	0	1	3	3	3	0	0	0	1	3	0	2	1	0	2	0	2	0	3	0	3	0	1	0	1	1	1	0	0	1	0	0	0	2	1	3	0	0	3	0	0	1	1
COLL. SYS. CAP.	0	0	1	0	0	0	1	0	0	0	3	3	0	1	0	0	0	1	1	0	1	1	0	0	3	2	2	1	0	0	0	3	3	0	0	3	0	0	0	1	0	1	1	0	0	0	0	0	1	1
EFF. DISP. CAP.	0	0	0	0	0	0	0	0	0	3	1	1	0	0	0	0	0	0	0	0	3	0	3	0	0	1	2	0	0	1	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1
SLUDGE DISP.CAP.	0	0	0	1	0	1	1	1	0	2	2	2	0	1	0	1	1	0	1	0	0	1	2	1	0	1	2	1	0	0	0	0	1	1	1	1	1	0	0	0	1	1	1	0	0	0	0	1	1	1
PROCESS CONTROL	0	0	1	1	1	0	1	0	0	3	2	0	0	0	0	1	1	0	1	1	0	1	0	2	0	1	1	0	0	0	1	0	1	0	2	1	1	0	0	0	1	1	2	0	0	1	0	0	0	0
INDUST. TREAT.	0	0	0	0	0	0	0	0	0	0	1	2	0	2	0	1	0	0	0	1	0	0	0	0	2	2	0	0	0	2	0	0	0	2	0	0	0	2	0	2	0	2	0	0	0	0	0	0	2	2
LAB. MONITORING	3	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	2	0	0	1	1	0	0	1	1	1	1	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REDUNDANCY	0	1	2	0	1	2	1	2	0	3	1	2	0	0	2	1	1	1	1	1	1	0	0	1	0	3	1	2	1	0	1	0	1	2	0	1	0	1	0	0	0	1	2	0	1	0	1	0	2	0
POWER RELIABILITY	1	1	0	0	1	1	0	1	0	1	2	0	0	1	1	2	2	0	2	1	0	1	0	1	2	2	2	0	1	1	1	2	1	0	0	0	1	0	0	2	1	0	0	0	1	0	1	0	0	1
EMERGENCY RESP.	1	1	2	1	2	1	2	3	1	1	2	1	2	0	2	3	2	0	0	1	0	2	2	3	2	2	2	2	2	0	0	2	0	0	3	1	1	1	1	1	1	2	0	0	0	0	0	0	0	0
SAFETY	1	1	2	1	1	0	1	2	0	1	1	1	1	1	1	1	1	0	0	1	0	2	2	1	2	1	1	1	1	0	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
TRAINING	0	0	2	1	0	1	1	2	0	1	2	1	0	0	0	2	2	1	0	0	0	1	2	2	1	0	1	1	0	1	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0
MAINT. MANAGE.	0	0	2	1	0	0	0	1	0	2	2	1	1	0	0	2	3	2	1	1	1	1	1	3	2	2	1	2	1	0	0	1	1	0	2	2	1	2	0	0	0	0	2	0	0	0	0	0	0	0
REF. DOCUMENTS	0	1	2	0	1	0	0	1	0	2	3	1	1	0	1	0	1	0	0	1	0	0	0	1	1	2	1	2	0	1	0	1	2	0	1	2	1	2	1	1	0	0	1	0	0	0	0	0	1	0
STAFFING	0	0	2	1	0	1	1	1	0	3	3	2	0	0	0	2	2	1	0	2	0	2	0	2	2	2	1	0	0	0	0	0	1	1	1	1	1	2	0	2	0	0	0	1	0	0	0	0	1	0
ADMINISTRATION	0	0	3	0	1	1	2	2	1	3	1	2	1	0	1	2	3	1	1	1	1	2	2	3	2	2	2	2	0	2	0	1	2	0	3	2	0	1	0	1	1	0	1	1	0	0	1	0	0	0
REVENUE ADEQUACY	2	1	2	2	3	3	2	1	2	2	2	1	3	2	3	2	1	3	2	0	3	2	2	1	2	0	2	3	2	2	1	3	3	1	2	2	1	0	0	2	1	1	1	2	1	1	3	1	0	1
EQUITABILITY	1	1	2	1	1	1	3	1	2	1	2	1	3	0	0	1	2	2	1	0	1	1	2	1	3	3	2	3	1	3	2	3	3	0	1	1	2	3	1	2	3	2	1	3	1	1	2	1	1	2
FINA. RESERVES	2	1	1	2	3	3	2	2	3	2	2	2	2	1	2	2	1	3	3	0	3	1	2	2	2	2	3	2	2	3	1	1	2	1	2	1	1	0	1	2	2	1	1	1	1	1	0	1	0	1

KEY: 0=NO PROBLEM; 1=MINOR PROBLEMS; 2=SIGNIFICANT PROBLEMS; 3=MAJOR PROBLEMS; P=PRIMARY CLARIFIER; PD=PONDS; TF=TRICKLING FILTERS; BD=BIODISKS; EA=EXTENDED AERATION; OD=OXIDATION DITCH; AS=ACTIVATED SLUDGE; F=EFFLUENT FILTRATION; RO= REVERSE OSMOSIS; A COMMA (,) INDICATES TWO PLANTS; * = VIOLATIONS

PLANT ID #	TYPE OF AGENCY	INSPECTOR	TYPE OF PLANT	PLANT CAPACITY (MGD)	ESTIMATED YEARS OF CAPACITY		CONSTRUCTION NEEDS THROUGH 1995	EST. COST OF NEEDS THROUGH 1995 (MILLION)	SEWER USE FEE ($/MO/EDU)	CONNECTION CHARGE ($/EDU)	LAST FEE INCREASE (YEAR)	WDR PROHIBITS OVERFLOWS	WDR REQUIRES CAPACITY REPORTING
					PLANT	COLL. SYS.							
1F	CITY	JH	T. FILTERS + PONDS	1.0	15	15	POND REPAIR	$0.1	11.05	150	1989	NO	YES
5H	CITY	BC	PONDS	1.1	10	10	STORAGE BUILDING	$0.1	6.10	900	1988	NO	NO
9B	CITY	BC	ACT. SLUDGE +REVERSE OS.	1.1	0	0	PLANT EXPANSION	$10.0	15.50	4575	1989	YES	YES
4A	CITY	BT	T. FILTERS	1.3	5	0	PLANT EXPANSION, COLL. SYS. EXPANSION	$4.0	10.50	3184	1989	NO	YES
7C	CITY	BC	T. FILTERS	1.5	2	0	PUMP STATION REPLACEMENT	$4.0	14.59	825	1989	NO	NO
5N	DISTRICT	BT	OX. DITCH	1.5	7	7	CHLORINATION, EFFLUENT DISPOSAL	$0.5	15.50	2140	1989	YES	YES
6B	CITY	BC	PRI. CLAR. + PONDS	1.6	0	20	DEFERRED MAINTENANCE, SLUDGE BEDS	$0.5	9.42	0	1987	YES	NO
5L	CITY	LJ	ACT. SLUDGE	1.6	20	0	TRUNK SEWER REPLACEMENT	$2.0	9.77	0	1988	NO	NO
1A	CITY	BT	BIODISKS	1.8	10	10	PRIMARY CLARIFIER, COLL. SYS. REHAB.	$4.3	11.15	2300	1989	YES	YES
3B	CITY	BT	ACT. SLUDGE	1.8	10	0	PLANT SOLIDS HANDLING, COLL. SYS. EXPANSION	$5.0	8.40	1400	1983	NO	NO
7D	CITY	BC	ACT. SLUDGE	1.9	0	5	PLANT EXPANSION	$2.5	8.00	720	1989	NO	NO
5K	CITY	BT	T. FILTERS	2.0	10	15	PRIMARY CLARIFER, NEW INTERCEPTOR	$1.0	10.00	2000	1985	YES	NO
5J	CITY	LJ	PONDS	2.5	2	20	PLANT EXPANSION	$3.0	5.85	2500	1983	NO	YES
5G	DISTRICT	LJ	TRICKLING F.	2.6	6	15	PLANT IMP., I/I CORR., COLL. SYS. EXPANSION	$3.0	9.50	1000	1989	NO	YES
3D	CITY	BT	PONDS	2.7	2	5	PLANT EXPANSION, COLL. SYS. REHAB.& CAP. INC.	$4.0	3.80	N/A	1983	YES	YES
2C	CITY	BT	ACT. SLUDGE	3.0	15	15	PLANT IMPROVEMENTS, COL. SYS. REHAB.	$5.0	10.50	500	1989	YES	NO
8A	DISTRICT	BC	OX. DITCH	3.1	7	N/A	PLANT EXPANSION	$3.0	5.67	1400	1989	NO	NO
6C	CITY	BC	PRI. CLAR. + PONDS	3.1	0	10	GW. EXTRACTION PUMPING	$1.0	5.84	540	1987	YES	NO

TABLE 2

1989 ANNUAL CALIFORNIA WASTEWATER AGENCY SURVEY

PLANT ID #	TYPE OF AGENCY	INSPECTOR	TYPE OF PLANT	PLANT CAPACITY (MGD)	ESTIMATED YEARS OF CAPACITY		CONSTRUCTION NEEDS THROUGH 1995	EST. COST OF NEEDS THROUGH 1995 (MILLION)	SEWER USE FEE ($/MO/EDU)	CONNECTION CHARGE ($/EDU)	LAST FEE INCREASE (YEAR)	WDR PROHIBITS OVERFLOWS	WDR REQUIRES CAPACITY REPORTING
					PLANT	COLL. SYS.							
9A	DISTRICT	BC	PONDS	0.04	10	10	PRIMARY CLARIFIER	$0.1	3.91	2000	1987	YES	YES
4D	CITY	BT	RBC + FILTERS	0.08	20	20	INSIGNIFICANT IMPROVEMENTS	$0.0	71.00	800	1988	YES	YES
1E	CITY	BT	OX. DITCH	0.2	5	5	PLANT REHAB., COLL. SYS. REHAB.	$2.0	15.25	850	1980	YES	YES
1G	DISTRICT	JH	PONDS	0.2	20	20	POND LINING	$0.1	10.00	500	1988	YES	YES
1D	DISTRICT	JH	ACT. SLUDGE +FILTERS	0.3	20	20	BELT PRESS	$0.3	7.40	1000	1989	YES	YES
5A	CITY	JH	OX. DITCH	0.4	10	10	CLARIFIER, CCC,FILTERS ENG.-GEN. SET	$1.5	13.45	1125	1989	YES	NO
5C	DISTRICT	BC	EX. AERATION	0.4	1	5	PLANT EXPANSION	$2.0	11.00	600	1986	NO	NO
3C	CITY	BT	PRI. CLAR.+ PONDS	0.5	5	5	DIGESTER, CLARIFIER, COLL. SYS. EXPANSION	$1.6	7.20	700	1983	YES	NO
2B	CITY	LJ	TRICKLING F.+ FILTERS	0.5	3	20	PLANT EXPANSION	$0.6	11.00	3760	1988	YES	NO
5F	CITY	LJ	TICKLING F.	0.6	0	20	NEW PLANT, COLL. SYS. REHAB.	$10.0	17.00	800	1989	NO	NO
5E	CITY	LJ	OX. DITCH	0.6	0	0	PLANT EXPANSION, TRUNK SEWER REPLACEMENT	$3.0	9.50	1633	1983	NO	NO
2A	CITY	LJ	PONDS + FILTERS	0.6	0	0	PLANT EXPANSION, COLL. SYS. REHAB.	$3.7	11.00	3000	1988	YES	NO
1B	DISTRICT	JH	TRICKLING F.	0.6	5	10	DIGESTER, LAB. AND ADMIN. BUILDINGS.	$1.1	7.00	1540	1986	YES	YES
7A	DISTRICT	BC	2 PLTS: BOTH EX. AERATION	0.7	3	10	PLANT EXPANSION	$1.0	6.00	1150	1988	NO	NO
6D	DISTRICT	BC	PRI. CLAR.+ PONDS	0.9	10	20	PRI. CLARIFIER, LAGOON	$0.3	9.00	1500	1987	YES	NO
5D	CITY	BT	OX. DITCH	1.0	1	10	PLANT EXPANSION, COLL. SYS. REHAB.	$2.0	8.00	800	1986	YES	NO
1C	CITY	BT	ACT. SLUDGE	1.0	5	10	PLANT SOLIDS HANDLING, COLL. SYS. REHAB.	$0.5	9.75	600	1987	YES	YES

PLANT ID #	TYPE OF AGENCY	INSPECTOR	TYPE OF PLANT	PLANT CAPACITY (MGD)	ESTIMATED YEARS OF CAPACITY		CONSTRUCTION NEEDS THROUGH 1995	EST. COST OF NEEDS THROUGH 1995 (MILLION)	SEWER USE FEE ($/MO/EDU)	CONNECTION CHARGE ($/EDU)	LAST FEE INCREASE (YEAR)	WDR PROHIBITS OVERFLOWS	WDR REQUIRES CAPACITY REPORTING
					PLANT	COLL. SYS.							
6A	DISTRICT	BC	2 PLTS:1 AS, & 1 T.FILT.	3.5	5	7	PLANT EXPANSION, PARALLEL OUTFALL	$15.0	25.25	4139	1988	YES	NO
2D	CITY	LJ	ACT. SLUDGE	4.0	20	20	CHLORINATORS, CENTRIFUGE	$0.5	9.67	700	1985	YES	NO
3A	CITY	BT	T. FILTERS	4.9	10	5	NEW INTERCEPTOR, COLL. SYS. EXPANSION	$3.0	8.25	1213	1987	NO	NO
5I	DISTRICT	LJ	ACT. SLUDGE	6.5	15	20	REDUCE COLL. SYS. I/I	$1.0	8.00	900	1977	NO	NO
5D	CITY	LJ	T. FILTERS +ACT. SLUDGE	7.0	15	10	PLANT REHABILITATION	$5.0	10.75	600	1988	NO	NO
8C	CITY	BC	2 PLTS: 1 AS 1 AS + FIL.	8.5	2	8	CONSTRUCT A THIRD PLANT	$60.0	11.00	1980	1985	NO	NO
5B	CITY	BC	ACT. SLUDGE + FILTERS	8.8	2	7	CONSTRUCT A THIRD PLANT	$10.0	10.00	1400	1989	NO	NO
8B	DISTRICT	BC	ACT. SLUDGE	10.0	1	0	PLANT EXPANSION, COLL. SYS. EXPANSION	$30.0	17.00	2030	1989	NO	NO
5M	CITY	LJ	ACT. SLUDGE	10.0	5	10	PLANT EXPANSION COLL. SYS. IMPROVEMENTS	$20.0	8.40	379	1987	NO	YES
4B	CITY	BT	ACT. SLUDGE + FILTERS	10.0	15	10	PLANT EXPANSION, NEW INTERCEPTORS	$20.0	10.50	3600	1988	YES	YES
7B	DISTRICT	BC	ACT. SLUDGE	10.0	3	20	PLANT HYDRAULIC CAPACITY	$20.0	10.00	1750	1989	NO	NO
4C	CITY	BT	BIODISKS, AS. + FILTERS	13.0	20	20	PLANT EXPANSION	$5.0	9.56	2270	1988	YES	YES
2E	DISTRICT	LJ	T. FILTERS +ACT. SLUDGE	13.5	5	20	PLANT EXPANSION	$15.0	7.00	1000	1989	YES	NO
9C	CITY	BC	2 PLTS: BOTH ACT. SLUDGE	16.2	3	3	PLANT MODIFICATION AND EXPANSION	$30.0	14.25	1565	1987	YES	YES
9D	CITY	BC	ACT. SLUDGE	16.5	5	4	PLANT MODIFICATION AND EXPANSION	$15.0	19.58	4356	1989	YES	YES
*** FIFTY WASTEWATER AGENCY AVERAGES:				3.7	7.3	10.3		$6.6	11.56	1518	1987		
*** FIFTY WASTEWATER AGENCY TOTALS:				186.2				$332.3					

STATE OF CALIFORNIA
GEORGE DEUKMEJIAN, Governor

STATE WATER RESOURCES CONTROL BOARD
DIVISION OF CLEAN WATER PROGRAMS
[illegible] T STREET, SUITE 130
[illegible] BOX 944212
SACRAMENTO, CA 94244-2120
(916) 739-xxxx
(916) 739-2300 FAX

_____
_____
_____
_____

Dear _____:

OPERATIONS AND MAINTENANCE SURVEY OF WASTEWATER FACILITIES

A brief inspection of your wastewater facility has been scheduled for ___. The inspection is part of a statewide survey which is being conducted by the Division's Operations Section. Data gathered from the survey will be used to determine the efficiency of the operation and maintenance of wastewater facilities as required by Section 210 of the Clean Water Act. This survey will be used also to assess general conformance with federal revenue program and state operator certification requirements and to assess the ability of statewide facilities to meet future needs.

We will spend one day at your facility interviewing appropriate personnel and analyzing and checking operational data, maintenance logs, management procedures and financial records. It is essential that the operational data and plant records be complete and ready for examination to answer survey questions.

The inspection will consist of a two-hour "walk-through" of agency wastewater facilities, four hours of interview with the wastewater collection and treatment managers and two hours of interview with a financial management person with responsibility for the wastewater utility. Please arrange for these people to be available for the inspection.

We have enclosed a list of documents which will be required for the survey, and which should be provided to the inspection at the start of the inspection.

A survey form will be completed by the inspector with information provided by agency personnel.

If you have any questions regarding the OPERATIONS AND MAINTENANCE SURVEY, contact _____ at (916) 739-____.

Sincerely,

James George Giannopoulos, Chief
Operations Section

Enclosure

OPERATIONS AND MAINTENANCE SURVEY
OF WASTEWATER FACILITY

List of Survey Documents

(To be provided to inspector at the start of the inspection)

1. A copy of the wastewater treatment plant waste discharge requirements.
2. Summaries of available wastewater treatment plant unit process and effluent data for the last year and the most recent annual monitoring report to the Regional Board.
3. Process schematics and design criteria for the wastewater treatment plant.
4. A map of the collection system, including (if available) line sizes and capacities and pump stations information (number of pumps and design capacity).
5. A treatment plant and collection system personnel organization chart.
6. The most recent annual wastewater system budget, and any available future budgets for capital replacement, system expansion, etc.
7. A copy of the current rate ordinance/resolution.
8. A copy of the latest audit report.

WASTEWATER FACILITIES SURVEY

Wastewater Facilities Status

1) **Physical Condition of Facilities**

a) Is there evidence of concrete deterioration at the plant?
Yes, No, Explain.

b) Is there evidence of mechanical deterioration at the plant?
Yes, No, Explain.

c) Is there evidence of electrical deterioration at the plant?
Yes, No, Explain.

d) Describe general upkeep/housekeeping.

e) Are pump stations reported to be in good condition?
Yes, No, Explain.

f) Are collector lines reported to be in good condition?
Yes, No, Explain.

g) List all abandoned, unused or unusable wastewater components.
Explain.

2. **Instrumentation**

a) Describe the plant and collection system instrumentation system.

b) List all the problems reported/observed.

c) Is there an instrument maintenance and calibration program for:

1) Flow meters? Explain.

2) Chlorine residual? Explain.

3) Other? Explain.

d) When and by whom where the last calibrations performed on flow meters, residual analyzers, digester gas meters, etc..

e) When and by whom was the last check on capacity and efficiency of centrifugal pumps made?

3. **Collection System**

a) Are I/I problems reported by collection system or plant operations personnel? Yes, No, Explain.

b) Have there been any sewer overflows? Yes, No, Explain.

c) Do all pump stations have on-site alternate power provisions? Yes, No, Explain.

d) Are standby generators exercised on a schedule? Yes, No, Explain.

e) How frequent are power outages? Explain.

f) Which pump stations rely on mobile generators?

g) Are mobile generators shared with other departments? Yes, No, Explain.

h) What collection system service equipment is available? (i.e., high velocity jet cleaner, rodding machine, bucket machine, TV camera, dedicated backhoe, etc..)

i) How many collection system overflows have occurred in the past year due to I/I, blockage and inadequate capacity?

j) What percent of the system has been TV inspected in the past year?

k) What percent of system which has been cleaned in the past year?

l) Do all pump stations have standby pumps? Yes, No, Explain.

m) What are the consequences of pump station failure?

n) Is there a master sewer system plan for future growth?

4. **Operation and Maintenance Manual**

a) When was the manual written?

b) How is the manual used?

c) What revisions have been made by operators?

d) What revisions have been made by consultants?

e) Are all manufacturer's manuals on-site? Yes, No, Explain.

5. As-Builts

a) Are the collection system and treatment plant as-built drawings on-site and up-to-date? Yes, No, Explain.

Wastewater Utility Performance/Reliability

1. **Waste Discharge Requirements**

   a) Has the agency met waste discharge requirements for the past year? Yes, No, Explain.

   b) Are flow, BOD, Suspended Solids, and Coliform in conformance? Yes, No, Explain.

   c) Is chlorine residual in conformance? Yes, No, Explain.

   d) Are trace organics and heavy metals in conformance? Yes, No, Explain.

   e) Are there nuisance complaints from the public? Yes, No, Explain.

   f) When was the last Regional Board inspection?

      1) What did the Regional Board find?

   g) Are changes in WDR's anticipated? Yes, No, Explain.

2. **Laboratory**

   a) What is the frequency of various compliance monitoring tests performed by agency staff? Explain.

1) Does the quantity of laboratory work satisfy the minimum stipulated in the WDR or NPDES Permit? Yes, No, Explain.

b) What process control tests are run? Explain.

c) How many lab people are employed?

d) Is there a quality assurance program. Yes, No, Explain.

e) Do laboratory people take the samples?

f) Are lab facilities adequate? Yes, No, Explain.

g) List lab work which is contracted out.

3. Sampling

a) How are influent samples obtained at the plant? Problems? Explain.

b) How are effluent samples obtained? Problems? Explain.

c) Are recycle flows monitored (quantity and quality)? Yes, No, Explain.

d) Does the plant receive septage? Yes, No. Explain.

1) Is it monitored (quantity and quality)?

4. **Process Control Problems**

a) List all major process control problems reported for the past two years.

b) List all observed process control problems.

c) List process loading of problem unit processes at ADWF, PDWF and PWWF (with and without units out of service) and compare with textbook numbers.

d) Are personnel familiar with process loading and performance calculations? Yes, No, Explain.

e) List obvious process control changes which should be investigated.

5. **Power Supply (Treatment Plant)**

a) What is the number and duration of power outages in the past year?

b) Is standby power available? Yes, No, Explain.

1) Do outages cause problems? Yes, No, Explain.

2) What type? Explain.

3) How frequently are generators tested?

c) Does the treatment plant have a load shedding program? Yes, No, Explain.

d) List equipment on standby power.

e) Are critical equipment items not on standby power? Yes, No, Explain.

6. **Alarm System/Paging System**

a) Describe the alarm/paging system employed for the collection system and treatment plant.

b) Explain the alarm response procedures.

1) How many people are sent to respond? Explain.

7. **Emergency Response Procedures**

a) Are emergency response procedures written for:

1) Power loss? Yes, No, Explain.

2) Chemical leak/spill? Yes, No, Explain.

3) Toxic upset? Yes, No, Explain.

4) Medical emergency? Yes, No, Explain.

5) Collection system spill? Yes, No, Explain.

6) Confined spaces? Yes, No, Explain.

7) Other? Yes, No, Explain.

b) Date of last update?

c) How frequent are drills or tests run to ensure understanding?

d) Are there mutual aid agreements with other departments or nearby wastewater utilities? Yes, No, Explain.

8. Redundancy

a) Do critical unit processes and in-plant pump stations have redundant (standby) features? Yes, No, Explain.

b) What are the consequences of failure?

1) Water quality? Yes, No, Explain.

2) Public health? Yes, No, Explain.

3) Safety? Yes, No, Explain.

Long-term Planning

1. **Collection and Treatment System Capacity**

   a) Are actual flows <80 percent of design flows?

      1) For ADWF? Yes, No.

      2) For PWWF? Yes, No.

   b) What is the highest recorded one-hour flow at the plant to date?

      1) What was the cause?

   c) Does the agency have plans for expansions of:

      1) The collection system? Yes, No, Explain.

      2) The treatment plant? Yes, No, Explain.

   d) How many years remain before full use of acted capacity, based on annual flow increases for:

      1) The collection system?

      2) The treatment system?

2. **Design/Capacity Deficiencies**

   a) List all design deficiencies.

b) Can deficiencies be remedied by staff? Yes, No, Explain.

c) Are corrective measures planned or budgeted? Yes, No, Explain.

d) How are corrective actions prioritized?

3. **Effluent Disposal**

a) How is the plant effluent disposed of.

b) What regulatory restrictions apply to effluent disposal?

c) What is the life expectance of current disposal methods?

d) Is there a long-range effluent disposal plan? Yes, No. Explain.

4. **Sludge Disposal**

a) What type of sludge is produced by the plant?

b) Does it contain hazardous materials? Yes, No, Explain.

c) How is sludge disposed of?

d) Are there regulatory restrictions on sludge disposal? Yes, No, Explain.

e) What is the life expectance of current methods?

f) Is there a long-range sludge disposal plan? Yes, No, Explain.

5. **Air Quality**

a) Are there any existing or expected air quality restrictions on operation of the wastewater system? Yes, No, Explain.

b) Explain how any restrictions will be resolved.

6. **Groundwater**

a) Has groundwater contamination been associated with wastewater conveyance or treatment? Yes, No, Explain.

b) Explain how any contamination issues will be resolved.

Wastewater Utility Management

1. Wastewater System Staffing

a) How many staff are employed by the agency for:

1) Collection system operation and maintenance?

2) Wastewater treatment plant operation and maintenance?

b) How many hours of overtime are worked?

c) How many positions are recommended by system Operation and Maintenance Manuals?

d) How many positions were filled in the past year?

e) How many people have left in the past year?

1) Where did they go?

2) Why did they leave?

f) Wastewater treatment plant operator certification:

1) What is the plant class?

2) How many operators are certified?

3) Are all certificates current? Yes, No.

4) Are all certificates posted? Yes, No.

5) Is the number and grade of certified operators appropriate? Yes, No, Explain.

6) Does the agency pay costs for application, examination and renewal of certificates? Yes, No, Explain.

7) Does the utility encourage certification of lab analysis, collection system crews, mechanical and electrical people, and industrial waste inspectors in the CWPCA Voluntary Certification Program? Yes, No, Explain.

g) Does staff have other duties (e.g., water treatment)? Yes, No, Explain.

h) Do other agency personnel work in wastewater? Yes, No, Explain.

i) Are contract operations used? Yes, No.

1) How many contract staff are employed?

2) How many hours of overtime did they work in the past year?

3) What is the dollar amount of the contract for the past year for:

   a) Collection system operation and maintenance?

   b) Treatment plant operation?

   c) Treatment plant maintenance?

4) Wastewater treatment plant operator certification:

   a) What is the plant class?

   b) How many operators are certified?

   c) Are all certificates current? Yes, No.

   d) Are all certificates posted? Yes, No.

   e) Is the number and grade of certified operators appropriate, compared to O&M Manual recommendations? Yes, No.

5) Does contract staff have any other duties? (e.g., water treatment)? Yes, No, Explain.

6) What is the duration of the contract for operation and maintenance services?

7) What are the provisions for major repairs and replacements?

8) Who buys energy, chemicals and supplies?

9) Who supervises the issue of compliance with the terms of the contract?

10) Does the contract include an industrial waste pretreatment monitoring program? Yes, No, Explain.

11) Does the contract assign responsibility for fines and penalties? Yes, No, Explain.

2. A/E Services

a) Have A/E services been used in the past year? Yes, No, Explain.

b) List all services that have been used in the past year.

c) How much was spent on A/E services in the past year for:

1) The Collection system?

2) The treatment plant?

d) How much "in-house" engineering is used?

3. Maintenance Management

a) Explain type of maintenance management system.

b) Does the plant/collection system have a preventive maintenance system? Yes, No, Explain.

c) Does plant/collection system have a predictive maintenance system? Yes, No, Explain.

d) Are maintenance facilities large enough? Yes, No, Explain.

e) Are spare parts inventories equal to manufacturer's recommendations? Yes, No, Explain.

1) What is the estimated dollar amount of inventory?

2) What is the availability of key parts?

f) Describe maintenance staffing and staff duties.

1) Do maintenance people do major replacement work that could be done by construction contract? Yes, No, Explain.

4. Industrial Pretreatment

a) Does the agency have an industrial pretreatment ordinance? Yes, No, Explain.

b) Does the agency experience industrial loading or dumping into the collection system which adversely effects compliance with WDR's? Yes, No, Explain.

c) How many industrial pretreatment people are employed?

d) How many enforcement actions have been taken in the last five years?

e) How is the cost of the pretreatment program financed?

f) How and where is the program supervised?

5. Training

a) Does the agency have a training program? Yes, No, Explain.

b) Is safety training provided for:

1) Right-to-know training? Yes, No.

2) Confined spaces? Yes, No.

3) Toxics and chemical handling? Yes, No.

4) First Aid/CPR? Yes, No.

5) Hearing/eyesight? Yes, No.

6) Other? Explain.

c) Is training specifically addressed in the budget? Yes, No, Explain.

1) Is process monitoring training provided? Yes, No, Explain.

6. **Budget and Service Charge Rates**

a) What are the wastewater collection and treatment rates?

b) Is the wastewater fund operated as and enterprise fund? Yes, No, Explain.

c) What is the basis of accounting (accrual, modified accrual or cash)?

d) What is the basis for charges to each of the various customer classes:

1) Flat rate?

2) Volumetric?

4) Combinations of fixed and variable charges?

e) Are all charge rates fair and equitable from one customer class to another? Yes, No, Explain.

1) Are rates the same (or have justified differences) across political boundaries? Yes, No, Explain.

f) What is the source of funding (service charges, connection fees, taxes, other) for:

1) Operation and maintenance?

2) Major repairs and renovations?

3) New or expanded capital facilities?

g) Are there operation and maintenance contingency or reserve funds? Yes, No, Explain.

1) How much?

2) How are expenditures from such funds approved? Explain.

h) To what extent are system development charges (connection fees) assessed for new developments within the service area? Are such funds restricted to debt reduction, system expansion or increased capacity. Explain.

i) Are all rates and charges in agreement with an approved revenue program? Yes, No.

j) How frequently are rates and charges reviewed for adequacy?

k) Do budget needs control rates and charges or do rates and charges dictate allowable budgets?

l) Who participates in the development of rates and charges and in the development of annual expenditure budgets?

INFORMATION PROVIDED BY:	NAME	TITLE	PHONE NO.
o Collection Systems			
o Treatment Plant Operation			
o Treatment Plant Maintenance			
o Laboratory			
o Financial			
o Other			

ANNUAL WASTEWATER FACILITIES SURVEY

A. Waste Discharge Requirements

1. Has the agency met waste discharge requirements for the past year?

2. What action has the regional board taken for each type of violation?

3. When was the last regional board inspection and what did they find?

4. Are WDR changes anticipated?

5. Are there nuisance complaints from the public? Yes. No. Explain.

B. Physical Condition of Facilities

6. Is there evidence of structural deterioration at the plant? Yes. No. Explain.

7. Is there evidence of mechanical deterioration at the plant? Yes. No. Explain.

8. Is there evidence of electrical deterioration at the plant? Yes. No. Explain.

9. Describe general upkeep/housekeeping.

10. List all abandoned, unused or unusable wastewater components. Explain.

11. List all the problems reported/observed.

C. Physical Condition of Collection System

12. Are pump stations reported to be in good condition? Yes, No. Explain.

13. What is the age of pump station?

14. What is the age of pumps?

15. Are collector lines reported to be in good condition? Yes, No. Explain.

16. Describe the plant and collection system instrumentation systems.

17. What is the PWWF/AWDF ratio at the treatment plant?

18. How many collection system overflows have occurred in the past year due to:

    (a) power or equipment failure?

    (b) I/I?

    (c) blockage (explain cause)?

    (d) inadequate capacity?

19. Are spills considered to be a WDR violation?

20. Are spills reported to the regional board?

21. What percentage of the system has been TV inspected in the past year?

22. What percentage of the system has been cleaned in the past year?

23. Do all pump stations have standby pumps at the peak wet weather flow? Yes, No, Explain.

24. Does the agency have a grease trap ordinance?

25. How is it enforced?

D. Design Deficiencies

26. List all design deficiencies for:

    (a) collection system

    (b) treatment plant?

27. When were they (or how will they be) corrected?

28. Who is designing the changes?

E. Collection and Treatment System Capacities

29. Is ADWF <75 percent of design flows for:

    (a) Collection System? Yes, No

    (b) Treatment Capacity? Yes, No

30. Is PWWF <75 percent of design flow for:

(a) collection system? Yes, No

(b) treatment capacity? Yes, No

31. How many years remain before full use of actual capacity, based on annual flow increases for:

(a) collection system?

(b) treatment capacity?

32. What projects and costs are budgeted for the next 5 years for:

(a) collection system? Explain.

(b) treatment plant? Explain.

33. Is there a wastewater system master plan for future growth?

34. When was it last updated?

35. What is the highest recorded one-hour flow at the plant to date?

36. What was the cause?

37. Does the regional board require submission of capacity analysis and expansion plans when plant flow reach a percentage permitted flows?

F. Sludge Disposal Capacity

38. How is sludge being disposed of?

39. How long will this method be available?

40. Do WDRs allow on-site stockpiling of sludge?

G. Process Control

41. List all major process control problems reported for the past two years.

42. What process control tests are run? Explain.

43. Are personnel familiar with process loading and performance calculations? Yes, No, Explain.

44. List obvious process control changes which should be investigated.

H. Industrial Pretreatment

45. Does the agency have an industrial pretreatment ordinance? Yes, No, Explain.

46. Does the agency experience industrial loading or dumping into the collection system which adversely effects compliance with WDR's? Yes, No, Explain.

47. How many industrial pretreatment people are employed and who supervises them?

48. How many enforcement actions have been taken in the last five years?

49. How is the cost of the pretreatment program financed?

50. How and where is the program supervised?

I. Laboratory Monitoring

51. Does the quantity of laboratory work satisfy the minimum stipulated in the WDR or NPDES Permit? Yes. No. Explain.

52. How and by whom are the influent and effluent samples obtained?

53. Is there a quality assurance program? Yes. No. Explain.

54. Is the laboratory certified?

55. Are lab facilities adequate? Yes. No. Explain.

56. List lab work which is contracted out.

J. Redundancy

57. Do critical unit processes, in-plant pump stations and collection system have redundant (standby) features? Yes. No. Explain.

58. What are the consequences of failure on the following:

    (a) water quality?

    (b) public health?

    (c) safety?

K. Treatment Plant Power Reliability

59. What were the number and duration of power outages during the last two years?

60. Is standby power available for:

    (a) treatment plant?

    (b) collection system pump stations?

61. What type of problems do outages cause?

62. How frequently are generators exercised under load?

63. List plant equipment on standby power.

L. Emergency Response

64. Describe the alarm/paging system employed for the collection system and treatment plant.

65. Explain the alarm response procedures.

66. How many people are sent to respond?

67. Is there a provision to ensure respondent's safety when on call alone?

68. Are emergency response procedures written for:

    (a) power loss? Yes. No. Explain.

    (b) hazardous materials? Yes. No. Explain.

(c) medical emergency? Yes, No, Explain.

(d) confined spaces? Yes, No, Explain.

(e) other? Yes, No, Explain.

69. How frequent are drills run to ensure understanding?

70. Are there air packs and gas meters available at the plant?

M. Training and Safety

71. How many training courses did each plant and collection system employee attend last year?

72. Is training specifically addressed in the budget, and if so, how much is allowed per person per year.

73. Is safety training provided for:

(a) right-to-know training? Yes, No

(b) confined spaces? Yes, No

(c) hazardous materials? Yes, No

(d) first aid/CPR? Yes, No

(e) other, Explain.

74. Is process monitoring training provided? Yes, No, Explain.

N. Maintenance Management

75. Explain type of maintenance management system.

76. How many man-hours would it take to clear up your existing backlog of corrective maintenance work orders?

77. Do the plant and the collection system have a preventive maintenance program? Yes, No, Explain.

78. Is there an instrument maintenance and calibration program for:

    (a) flow meters? Explain.

    (b) chlorine residual analyzers? Explain.

    (c) other? Explain.

79. Describe maintenance staffing and staff duties.

80. Are maintenance facilities large enough? Yes, No, Explain.

81. Are spare parts availability and inventory adequate? Yes, No, Explain.

O. Reference Documents

82. When was the O&M Manual written and when was it last revised?

83. Are all manufacturer's equipment manuals on site? Yes. No. Explain.

84. Are the collection system and treatment plant as-built drawings on-site and up-to-date? Yes. No. Explain.

P. Wastewater System Staffing

85. How many staff are employed by the agency for:

    (a) collection system operation and maintenance?

    (b) wastewater treatment plant operation and maintenance?

    (c) laboratory analysis?

    (d) other?

86. How many positions are recommended by system Operation and Maintenance Manual for:

    (a) collection system?

    (b) treatment plant?

87. How many positions were filled in the past year?

88. How many vacancies are there now?

89. How many additional staff do you think <u>you</u> need and what would they do?

90. How many hours of overtime per month are worked?

91. What is the plant class?

92. How many operators are certified?

93. Are all certificates current and posted? Yes, No

94. Is the number and grade of certified operators appropriate? Yes, No, Explain.

95. Does the agency pay costs for application, examination and renewal of certificates? Yes, No, Explain.

96. Does staff have other duties (e.g., water treatment)? Yes, No, Explain.

97. Do other agency personnel work in wastewater collection or treatment? Yes, No, Explain.

98. Does the agency have, on staff, an appropriately certified operator to fill a vacancy of the chief operator position.

Q. <u>Revenue Adequacy</u>

99. What are the wastewater collection and treatment rates?

100. When was the last increase implemented?

101. What have been the (1) budgeted and (2) actual expenses for wastewater treatment and disposal for each of the past five years?

102. What have been the (1) budgeted and (2) actual expenses for wastewater collection for each of the past five years?

103. How much of the (1) budgeted and (2) actual amounts for each of the past five years came from:

1) services charges?
2) connection fees?
3) ad valorem taxes?
4) bonds?
5) other?

104. What have the sewer service and sewer connection fees been for each of the last five years? What reserve accounts/funding are maintained? What is the source of funding for each account/fund?

105. What has been the balance of each individual wastewater enterprise fund at the end of each of the least five years?

106. What is the projected source of money for capital projects over the next five years?

107. Is the agency interested in the SRF Loan Program or the Small Community Grant Program? (a) for what purposes; (b) under what conditions.

(a)

(b)

If interested, in the Small Community Grant Program, complete the attached form.

R. **Administration**

INFORMATION PROVIDED BY:	NAME	TITLE	PHONE NO.
o Collection System			
o Treatment Plant Operation			
o Treatment Plant Maintenance			
o Laboratory			
o Financial			
o Other			

WASTEWATER FACILITIES SURVEY 1A

The City wastewater treatment plant is an RBC system designed for an ADWF of 1.9 MGD (4.2 MGD PWWF). Other unit processes include chlorination, gravity sludge thickener and an anaerobic digester. Discharge is through an outfall to the ocean.

The plant is reasonably well operated but does not meet the discharge requirements consistently. Occasionally, coliform and flow limits are exceeded. Sewage spills due to high flows are also a problem. The plant is poorly maintained and experiences odor problems. The collection system is in poor condition and needs major repair work. Infiltration and inflow can reach up to 8 MGD during the winter. The primaries can handle only 4 MGD. When a local fish processing plant runs, the RBC's are organically overloaded. The City has no as-built plans or updated O&M Manual. Capacity limitation, design deficiencies and inadequate staffing are some of the factors contributing the plant's problems.

The City is planning to upgrade the wastewater treatment facility and to rehabilitate some of the sewer system in 1990. About $1.7 million has been budgeted ($200,000 in FmHA grant funds, the rest in loan) for this work. Additional work will be needed in the near future to keep up with the problems. User fees are about $11.15/month.

The City may be interested in the SRF Loan Program for future needs.

WASTEWATER FACILITIES SURVEY 1B

The plant is a 1.0 MGD monthly average flow trickling filter facility with discharge to the ocean.

Plant staff includes the superintendent, 4 operators and a 3/4-time lab technician, but they spend about 1/3 of their time on the water system. Staffing looks to be low by one full-time operator. There is obvious deferred maintenance, notably corrosion of equipment. The plant superintendent is the only staff person who understands the treatment processes.

During the past year, there have been minor violations of the 30 MG/L suspended solids limit, but the RWQCB has taken no action.

City recently added a belt filter press, because of poor drying capabilities of drying beds in a coastal environment. The biggest problem is poor digester performance. The boiler seems to be a undersized and cannot produce enough heat to raise the digester temperature above 90^{0}F.

Needed improvements are an adequate boiler for the digester; a secondary digester; and building expansions to provide adequate laboratory, administrative, maintenance, and chemical storage space. The estimated cost of these improvements is $700,000. Actual flows average 0.6 MGD, so no immediate expansion plans are needed.

Work planned for the next year consists of a collection system expansion to the north, estimated at $400,000.

The City may be interested in the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 1C

This is an activated sludge plant designed for an ADWF of 1.2 mgd (3.0 MGD PWWF). Effluent is chlorinated and percolated through percolation ponds or discharged directly to the river bed. Sludge is aerobically digested, air dried and spread on median strips along city roads or on other City property.

Effluent quality is good most of the time, but plant maintenance is poor. Infiltration and inflow are the major problems during the winter months when total flows into the plant can exceed 7 mgd. Numerous overflows in the sewer system reportedly occur during heavy rains. Flow, coliform, and pH violations from the treatment plant have also been recorded.

Treatment plant flow capacity will be reached in 5-7 years. Solids handling capacity will be reached in 1-2 years. The collection system will need to be replaced or completely rehabilitated within the next 10 years. Additional manpower is needed to keep up with plant and sewer system maintenance. Sewer rates are $9.75/month. The City received a $500,000 Clean Water Grant for the rehabilitation of the sewer system.

Additional funds will be required in the near future to complete sewer system rehabilitation (or to replace portions of the collection system) and to upgrade and expand the treatment facility.

No improvements are scheduled. The Director of Finance appeared to know little or nothing about the wastewater finances. My impression was that the City is in poor financial condition and is potentially interested in SRF Loan Program.

WASTEWATER FACILITIES SURVEY 1D

The wastewater treatment facility is a 0.3 MGD ADWF extended aeration plant with dual media filters and chlorination.

Actual flows are only about 0.1 MGD ADWF. Influent BOD is higher than expected, averaging around 400 MG/L. Plant capacity should be adequate for many years.

As would be expected, there is no problem meeting the 30 BOD/30 SS discharge requirement. Staffing of two people is adequate; both the superintendent and plant operator have been at this facility may years and have a good understanding of the unit processes.

The biggest plant drawback is inadequate sludge drying bed capacity as has been found with many north coast facilities. Long drying time ultimately limits the wasting capability in the activated sludge process, making it difficult to deal with recurring filamentous bulking problems. Excess sludge is stored in a flow equalization pond originally intended only to store wet weather flows and untreated sewage during power failures.

Odor complaints have been received from neighbors located within a few feet of the drying beds.

Design is currently underway for a belt filter press to alleviate the solids dewatering problem. The estimated cost is $250,000.

The City is mildly interested in the SRF Loan Program, but would be much more interested in the Small Communities Grants Program.

WASTEWATER FACILITIES SURVEY 1E

The City wastewater treatment plant consists of an oxidation ditch, clarifier, chlorination system and a sludge drying bed. The plant is rated at about 0.2 MGD. Effluent is disposed either to the river or, during the dry season, to the percolation ponds in the dry river bed.

Two operators maintain the treatment plant collection system and City's water system. The plant appears to run and meet the discharge requirements most of the time despite its deficient design, deterioration, and poorly maintained condition.

Major deficiencies include the following: cracks in the oxidation ditch, clarifier, and the sludge drying bed; lack of process control capability, as-built plans, and an adequate O&M Manual; organic and hydraulic overloadings; inadequate operator training; understaffing; and underfinancing.

In 1989, the user fees were increased to $13.75 per month. The last increase before that was in 1984.

Presently, there are no plans for expansion or upgrading of either the plant or the collection system. Both are needed, but the City may not be able to afford it. Even if they did they would have to ensure that the new facility is adequately funded and maintained. This may not be easy in this economically depressed area.

The City is interested in the SRF Loan Program, but cannot afford any additional payments.

WASTEWATER FACILITIES SURVEY 1F

The sewerage systems of these two cities are operated and maintained by the same agency.

The plant flow train at the larger facility (0.6 MGD ADWF design) includes bar screens, an Imhoff tank, and a single trickling filter followed by effluent storage ponds. Final disposal is to percolation beds or spray irrigation of pasture lands.

The plant flow train at the smaller facility (0.4 MGD ADWF design) consists of an aerated lagoon followed by three facultative lagoons. All effluent is disposed of to land.

Major drawbacks to the system at the larger facility include:

- an Imhoff tank which is difficult to monitor and to remove sludge from
- rushes and duckweed in the pond that are difficult to control

At the smaller plant:

- limited control of the aerators
- many sewers needing replacing

There is only one operator to operate and maintain both systems and he is obviously overworked. If he leaves or gets sick, for even short periods of time, the system is likely to suffer.

Scheduled improvements for the next year include:

- additional rock rip-rap on the effluent storage pond berms at the larger plant, collection system improvements and timers for the pond aerators

- hiring an operator trainee

There are no long term plans for major system improvements (i.e.: plant expansions), however, the sewerage system is managed as an enterprise fund and a portion of the revenues are set aside for future expansions.

WASTEWATER FACILITIES SURVEY 1G

The plant is a 0.15 MGD aerated lagoon (3 cells) with discharge to percolation beds.

Occasional effluent BOD violations of the 50 mg/l limit have occurred since plant start-up in 1980. The RWQCB overlooked the violations.

Major drawbacks are percolation capacity, which is adequate at present flows of 1/2 of design capacity, but probably will not handle design flows; and the first-stage lagoon is nearly full of sludge.

Only one operator runs the plant, and he plans to retire within two years. No one else knows the operation or can do the lab work.

Work needed within the next year is sludge removal from aeration cell no. 1. The District will probably do this work themselves. Also needed is either deep ("subsoiler") ripping of the pond bottoms or removal of accumulated solids, mostly from duckweed and algae.

Other planned work is concrete lining of the aerated lagoon slopes to control sloughing and weed growth. This work is expected to cost $50,000-$100,000.

The improvements needed by the City could be a good candidate for the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 2A

The City operates and maintains a 0.62 MGD oxidation pond-tertiary level treatment plant and a collection system. An alum coagulation-flocculation-sedimentation system followed by effluent filtration provides the tertiary treatment. The tertiary facilities were part of a 1977 Clean Water Grant Project. The tertiary treatment processes work well. The plant is adequately operated and maintained. The plant had difficulty meeting its effluent BOD_5 and SS limitations in 1988 due to extreme pH and BOD loadings from bottling companies in 1988. The staff has worked with the bottling companies to reduce the shock loadings. It was reported that the plant was meeting WDR in 1989.

The collection system is reported to be in poor condition. I/I is high. Perhaps 25 percent of the system needs replacement due to deterioration. The collection system maintenance crew is understaffed; there has been a hiring "freeze" due to "city budget limitations". The plant has numerous facility deficiencies which the RWQCB staff has closely monitored. Present ADWF is 0.7 MGD, and the City has fallen behind in its capital improvements schedule, apparently from a lack of funds. The City has completed $240,000 of treatment plant improvements during the past year. In past years the sewer enterprise funds were used by other departments.

The City is doing preliminary planning for collection system rehabilitation; the needed improvements could cost $3 million. A completed facility plant recommends $3.5 million of treatment plant improvements over the next ten years.

The City is very interested in an SRF loan.

WASTEWATER FACILITIES SURVEY 2B

The City operates and maintains a 0.55 MGD advanced secondary level trickling filter plant and the community's collection system. Present flow is 0.4 MGD. The collection system was rehabilitated in 1988 with a $300,000 contract. 1989 flow records indicate that most of the I/I was eliminated. Ninety percent of the lines were cleaned.

The plant is operated and maintained very well. The staff has performed a lot of major rehabilitation and replacement of work, as much of the plant is 40 years old. The operators have a lot of mechanical expertise.

The major drawback of the plant is that it is complicated. It requires more O&M expertise than average for a plant of this size. The plant meets its WDR.

Presently, a 0.3 MGD treatment plant expansion is being designed.

The City may be interested in the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 2C

The wastewater treatment facility is an activated sludge plant rated at 3.0 MGD ADWF. Sludge handling unit processes include DAF thickening, anaerobic digestion and centrifugation. Effluent is discharged to surface water.

Overall, the plant performance is good. There are frequent settleable solids and coliform violations. Violations are typically minor and of short duration. Filamentous bulking and nitrification are reported to be occasional problems.

Overall, the plant is in relatively good shape despite its age. General housekeeping and painting could be improved. There are no major treatment plant drawbacks.

A significant problem may be frequent sewer overflows, largely due to high I/I during the rainy season.

This treatment plant has undergone significant improvements during the last few years. Old equipment, and instrumentation in particular, are being replaced by state-of-the art components. The City plans to spend another $3 million on plant and collection system upgrades and renovations over the next two years.

Construction will most likely be funded with bond money.

WASTEWATER FACILITIES SURVEY 2D

City wastewater treatment facilities consist of a 4 MGD activated sludge plant. The plant was expanded in 1985 with City funds. Present flow is 1.7 MGD ADWF. Capacity is projected to be sufficient to year 2010.

The plant is operated and maintained satisfactorily and efficiently. The plant meets its WDR, with the exception of coliform violations. The City's collection system preventive maintenance is "average", and is currently being upgraded with new equipment and additional budgeted maintenance positions. The operators are successful in keeping the activated sludge process out of nitrification by operating at an F:M of 0.3 and maintaining D.O. between 0.75 and 1.5 mg/l. The plant needs new chlorinators and another centrifuge. Unless the WAS is controlled and thickened better, another digester may soon be needed.

The plant has an average level of operation and maintenance difficulties such as some plant odor, difficulty with sludge wasting control, WAS thickening, and WAS digestion. The chlorine contact fiberglass baffles were never sealed which results in short circuiting. The superintendent prefers their center feed secondary clarifiers over the peripheral feed clarifiers, based on performance.

The collection system has a moderate amount of I/I and structural degradation, as some of the lines are old.

Information was not provided on total revenue.

The City is not interested in the SRF Loan Program at this time.

WASTEWATER FACILITIES SURVEY 2E

The District originally operated a new regional 9.5 MGD coupled activated sludge treatment plant. The plant started operation in 1981. The plant was expanded to 13.5 MGD and is presently in construction for an increase to 16.5 MGD. All expansions were done with local funds. Present flow is 10 MGD. The District also maintains the major pump stations, 20 percent of the service area collection system, and the water and wastewater plants for a small service area.

The regional plant's performance and reliability have been very good. The District received the EPA National Award for "Operations and Maintenance Excellence" for large secondary plants. The plant is well staffed in all categories. The plant operations, maintenance, laboratory support, financial support, and management are all excellent.

There are no major drawbacks with District wastewater facilities.

The District carries a large capital reserve of approximately $20 million.

The District's long-term capital improvements plan shows a multitude of collection system and plant improvements averaging $4 million per year for the next 15 years.

The District may be interested in the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 3A

The City trickling filter plant was expanded in 1988 from 2.2 to 4.9 MGD at a cost of about $5 million. Effluent discharge is to percolation ponds. Sludge is anaerobically digested, air dried and landfilled.

Overall, this plant appeared well operated and maintained. The operators are quite knowledgeable about the entire system and should be considered a significant asset. Industrial discharge is an occasional problem that can affect plant's compliance with the WDR.

The major drawback is lack of any organized maintenance or record keeping system. The operators perform the needed maintenance as they see it fit. This procedure may be sufficient so long as these operators are in charge of the facility. If they leave, the plant could experience serious maintenance problems. The plant staffing is also inadequate for the facility of this size and complexity.

During the expansion, the plant has undergone major overhauls so that most of the equipment is new or refurbished. As a result, the lack of adequate staffing is not yet reflected in the plant operation and general appearance. However, this could drastically change once the warranty period expires and normal operating problems become more frequent.

During the next couple years the City plans to hire another operator and spend about $0.5 million on various plant and collection system upgrades.

Some additional upgrading is planned for the City's collection system and 10 lift stations.

The City appears to have enough reserves to handle these projects but may be interested in the SRF Loan Program if the conditions are right. In either case, the sewer user fees will need to be increased from the existing $8.25/month.

WASTEWATER FACILITIES SURVEY 3B

The treatment facility consists of primary sedimentation, activated sludge, secondary clarifiers, anaerobic sludge digestion, and a belt filter press. Sludge is air dried on site and disposed by land application. The plant capacity was recently expanded from 1.2 to 1.75 MGD with the exception of sludge handling unit processes which are rated at 1.2 MGD. The collection system includes nine lift stations. Effluent is discharged into the ocean.

The plant meets the discharge requirements most of the time but the effluent quality tends to deteriorate during the summer months (based on 1988 data). WDR violations were caused primarily by high BOD and settleable solids concentrations. Maintenance of the treatment plant also needs to be improved.

Major concerns at this facility is sludge handling and disposal, both of which are at capacity. Sludge digesters also need new heating and mixing systems. Other problem areas include the raw sludge pumps, scum handling, foaming and filamentous growth in the aeration tanks, and capacity problems at peak flows for the outfall and portions of the collection system.

Sewer rates have not been increased since 1983. As a result, the sewer fund had a deficit of about $125,000 in the fiscal year 1988. In 1989, City adopted new sewer rate increase.

The City plans to upgrade and expand the sludge handling facility and some of the lift stations that are presently near capacity. These improvements are scheduled for the next two years.

The City may be interested in SRF Loan Program, depending on conditions and requirements.

WASTEWATER FACILITIES SURVEY 3C

The City wastewater treatment processes consist of primary sedimentation, anaerobic digestion and sludge drying beds. Primary effluent is further treated in the polishing ponds before disposal by percolation, evaporation and spray irrigation. Sludge is disposed by mixing with soil and spreading it on the pond levee roads. The rated capacity is 0.5 MGD. The collection system includes three lift stations.

The wastewater treatment plant appears to meet the WDR despite the minimum attention given. The chief operator (also the director of public works) was not present so the details of the everyday operation and maintenance were not available. It appears that no one else was really very familiar with the facility. General maintenance and housekeeping are very poor. My impression was that the plant is understaffed and financially neglected.

Based on the visual observations and limited information available, this project has sufficient hydraulic capacity, but its single clarifier appears to perform poorly. The plant has no redundant or backup equipment. If something breaks, the flow has to be diverted into one of many ponds. Fortunately, pumps and motors, some of which date to 1977 have been relatively reliable. The City has a mobile emergency generator, but the pump stations are not properly equipped to accept it.

The City should be given credit for developing two wastewater facilities masterplan studies. Although the conclusions of the two studies do not agree, it is safe to assume that major expansion and upgrade of the treatment and collection system will be required by 1997, at the latest. As one of the first steps, the City will have to increase its user fees, which have not been increased in six years. The existing user fees, depending on source of information, are either $5/month or $7.23/month.

The proposed expansion and upgrades for the plant and the collection system are estimated to cost about $4 million.

The City may be interested in the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 3D

The City wastewater treatment plant consists of facultative treatment ponds and percolation ponds rated at 2.7 MGD, ADWF.

This facility is well operated and maintained, partially due to its simplicity. Occasional low oxygen concentration in the ponds have been recorded in the last year but generally remain within the acceptable level.

The treatment facility has no major drawbacks but parts of the collection system are reportedly approaching capacity. Collection system lift stations do not have an adequate alarm system. Sewer overflows due to capacity and blockage problems are common.

This community experienced major damage during recent earthquake. The treatment plant withstood the quake without any damage. The status of the collection system is not clear but it is likely that much of it was damaged.

Both the treatment facility and the collection system are scheduled for expansion during the next five years. The estimated needs are approximately $4-5 million, significantly more than $1.5 million the city has in the sewer reserve fund.

The City was interested in a loan program at the time of the survey.

WASTEWATER FACILITIES SURVEY 4A

The City wastewater treatment plant consists of headworks, a trickling filter, primary and secondary clarifiers, chlorine systems, an anaerobic digester and sludge drying beds. It is rated at 1.3 MGD, ADWF. Effluent is disposed of either by percolation or by direct discharge to the river.

This facility is well operated and meets the discharge requirements with the exception of infrequent boron and chloride violations.

Portions of this facility are old and need to be upgraded or replaced (grit, scum and sludge handling systems, for example).

The operators appeared to be quite competent and may be the main reason this plant operates as well as it does. Some parts of the collection system are at or near capacity.

Scheduled improvements (starting in the year 1990) include a capacity expansion to 2.2 MGD, correction of design deficiencies, and enlargement of the collection system. These projects are planned to be done in four phases with anticipated completion by 1997 at a cost of approximately $5 million.

The City plans to finance these projects by increasing the user fees (presently at $10.50/month). Like many others, this community has had an unpleasant experience with the grant program's delays and red tape and is hesitant to participate in the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 4B

City wastewater facilities consist of a tertiary treatment plant, which includes primary sedimentation, activated sludge reactors, secondary sedimentation, multi-media filtration, and chlorination/dechlorination. Effluent is discharged to a creek. Sludge is DAF thickened, anaerobically digested and air dried on sludge drying beds.

Overall, the plant is very well operated, maintained and managed. A number of turbidity violations have been recorded in the past, apparently caused by hydraulic overloading of the filters. These violations should be resolved after the plant expansion. Chlorides have also been a problem in the past but a significant improvement was made after the potable water source was changed in late 1988. Other parameters are generally well within the discharge permit limits.

The plant is presently undergoing major expansion and upgrade. The City is also replacing and rehabilitating many parts of the collection system.

The City management feels strongly that the grant program has made the wastewater agencies over dependent on federal and state governments. They feel that wastewater projects should be financed locally. Scheduled improvements and expansion during the next five years are estimated to exceed $20 million. The City probably would not be interested in the State's loan program as long as the loan is accompanied by any significant conditions or restrictions.

WASTEWATER FACILITIES SURVEY 4C

After recent upgrades the wastewater treatment facility consists of flow equalization, RBC's, activated sludge basins, primary and secondary clarifiers, dual media filters, a chlorination/dechlorination system, DAF units, anaerobic digesters and belt filter presses. The ADWF capacity was increased from 9.1 MGD to the present 12.5 MGD.

The plant is very well operated and maintained. Several chloride and boron WDR violations were recorded during the last year. These constituents are generally found in high concentrations in the City's drinking water so that their concentration in the plant effluent is very difficult to control.

No major problems were observed at this facility. Control of the secondary treatment unit processes is sometimes difficult because of the low MCRT and MLSS concentration at which the plant is operated in order to avoid nitrification. The activated sludge system lacks some flexibility because there are no provisions for step feed or taking a single aeration basin out of service.

This plant has a large professional staff along with a supportive board of directors.

During the last few years, the City has spent over $20 million on plant improvements and capacity expansion - Phase I of an ongoing four phase expansion and upgrade program designed to increase the plant capacity to 17.5 MGD by the year 2012. Some of the unit processes have been already expanded to meet the ultimate (2012) ADWF capacity.

During the next year no major projects are planned. Any future upgrades will most certainly be done with City funds. The management strongly believes that the larger cities should pay for their projects with their own funds. It is unlikely that this community would be interested in the SRF Loan Program if it is accompanied by any significant conditions or restrictions.

WASTEWATER FACILITIES SURVEY 4D

The wastewater treatment plant is primarily a package plant consisting of primary clarifiers, RBCs, secondary clarifiers, a sand filter, an aerobic sludge digester and a raised bed leachfield. It is designed for an ADWF of 75,000 gpd.

This facility appeared to be well operated and maintained. Much of the original grant funded equipment (pumps, cast iron piping, blower, flow meter, alarm system) had to be replaced with new and better quality equipment shortly after the original installation. The new equipment has performed significantly better than the original, grant funded equipment.

The plant experiences occasional hydraulic overloads during the heavy rains. In those times, the clarifiers become the bottlenecks. The sand in the sand filters has to be replaced annually due to grease buildup. The sewer system was built in 1965 and is considered to be in relatively good condition. Storm water inflow during heavy rains may be a problem.

This facility appear to be very well financed and maintained, especially when compared to other small communities surveyed. The user fees are $730/year. The reserve is presently about $125,000.

No major improvements are scheduled for the near future. The community is presently built out with no more than a dozen new connections expected.

It is unlikely that this community will need or have an interest in the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 5A

The plant is a single train oxidation ditch, rated 0.41 MGD ADWF, 2 MGD PWWF. Disposal is by percolation in summer, and to the adjacent river in the winter.

Present excellent plant performance is due to the efforts of the lone operator. This operator resolved historical percolation problems (studied by numerous engineers for many years) by systematically cleaning the pond bottoms.

Major drawbacks are an inadequate clarifier which cannot handle over 0.6 MGD without losing all solids, a chlorine contact pipe that cannot be cleaned because of internal baffles, and a lack of standby power.

If the plant operator leaves (he is scheduled for back surgery on September 18, 1989) the plant could be in big trouble.

Scheduled improvements for the next year are tertiary filters which will allow a 3-month longer river discharge period, chlorine contact pipe replacement, and a recirculation pump from the perc ponds to the headworks for an estimated cost of approximately $0.75 M.

Other needed improvements in the next five years are a new (larger) clarifier and standby power for an estimated cost of $0.75 M.

The City is definitely interested in the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 5B

The City wastewater treatment facility is an 8.8 MGD activated sludge plant with anaerobic digestion, sludge storage lagoons and a plate and frame filter press.

The plant is well operated and maintained. Peak flows are in excess of 35 MGD. There have been some problems caused by industrial wastes.

The plant is approaching its ADWF capacity. Peak flows exceed the reliable influent pump station capacity. The landfill that currently receives City sludge will close in 6 months, which will require additional trucking to a substitute County landfill.

The plant generally meets its WDR. There are some odor complaints associated with the sludge lagoons, which receive undigested waste activated sludge, digester supernatant and filter press filtrate. There have been a few effluent coliform violations.

The method for handling undigested waste activated sludge (in unlined, unmonitored lagoons) would not be acceptable in most areas due to potential groundwater/river contamination and odors. A few minor collection system spills were reported. Emergency response procedures have been developed for most conditions, but not all. The entire City wastewater system appears to be very well managed.

Construction will begin soon on a new 2 MGD treatment plant, at an estimated cost of $8-10 million. Major collection system expansions are planned.

The City may be interested in the SRF Loan Program, although local funding and reserves are adequate for immediate needs.

WASTEWATER FACILITIES SURVEY 5C

The District operates a 0.44 MGD oxidation ditch/percolation pond treatment system. Sludge is dried on conventional drying beds and is trucked to a landfill for disposal. Flows currently average .3 to .35 MGD.

The plant appears to be well operated and maintained, mostly due to the extraordinary efforts of the operator, who also is responsible for wastewater collection and potable water distribution. The operator has made a number of improvements to the original plant, including the addition of a static screen for grease and floatables removal. The District has added sludge lagoons to the plant.

The major drawback noted at the plant is a shortage of manpower. If the chief operator were to leave, the District would be in serious trouble. In addition, the plant clarifiers are very small and shallow. Reference documents have not been updated.

An additional clarifier would be beneficial, especially because the area is growing rapidly.

The District has completed plans for a major $1-2 million conversion of their plant to the TFSC process with a capacity of 1 MGD.

The District is interested in the SRF Loan Program if they would qualify. The District faces a major expenditure in the next 2-3 years.

WASTEWATER FACILITIES SURVEY 5D

The plant, which had its last major expansion and upgrade in 1977, is a 7 MDG, ADWF, PSA pure oxygen activated sludge plant. The plant discharges to percolation ponds adjacent to a river. Reportedly, the plant has not discharged to the river since February 1989. A winter river discharge is allowed.

The plant received a CWPCA Plant Class "C" Plant of the Year Award. The plant meets its WDR. Present ADWF is 4 MGD, and the present organic loading is only one-half of design loading. Consequently, the roughing filter has been permanently shut down, and typically only two of the three aeration basins are used. Plant operation appears to be good and plant maintenance appears satisfactory but barely adequate. The maintenance staff is very capable but appears to have difficulty keeping up due to major maintenance of aging equipment. The plant is budgeted for 13 positions while the 1976 Operation and Maintenance Manual recommends 16. The laboratory support is excellent. Another notable program which the City pays for is an intensive instrumentation monitoring, servicing and replacement program provided by an instrument service firm. The firm provides an annual computerized report which details the maintenance costs of the plant's instrumentation systems and recommends replacement or upgrading when such work is shown to be cost-effective. The maintenance of the electrical and control systems is excellent. The City has had some difficulty obtaining spare parts, notably, circuit boards.. The maintenance staff level and the budget for the collection system appear satisfactory.

The plant is very energy intensive. Approximately 1 kwh is expended per lb/BOD_5 treated. Approximately 20 percent of this is provided by the plant's new cogeneration system which was funded by the City. The high consumption of energy in addition to the complexity of the plant's mechanical and instrumentation systems are the plant's chief drawbacks.

The plant has ample capacity for future years. Although present rehabilitation and replacement is costing the City up to $1 million per year, no major plant expansion will be needed within fifteen years unless major food processing industries significantly increase their discharges.

The collection system is reported to be in good condition.

The City expressed an interest in the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 5E

The City's existing plant is a 0.6 MGD oxidation ditch plant built in 1980. The plant and percolation ponds are presently overloaded. The plant meets its WDR, except for odor.

The plant appeared to have deferred maintenance problems. Plant operational control expertise is satisfactory. A new French drain effluent extraction system is working well and is providing tertiary level effluent for discharge to a creek. The City does not have a preventive maintenance program for the collection system. Maintenance for the collection system is minimal.

The present plant has several deficiencies such as an abandoned comminutor, inadequate aeration, inadequate sludge wasting control, an inability to control bulking sludge and plant odors, and inadequate percolation disposal.

The City's population is expected to double in four years. "Developer fees" ($1,633 residential connection charges) are funding the present $3 million plant expansion. The City is 50 percent completed with construction of the plant expansion which will expand the treatment capacity to 1.8 MGD and remedy present plant deficiencies.

The City is interested in the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 5F

The City's 0.57 MGD treatment plant was upgraded in 1979, but much of the plant is 50 years old. The grant funded improvements were not sufficient for the plant to meet WDR, handle I/I flows, or provide for the City's moderate population growth.

The present level of staffing is not adequate for the operation and maintenance of the systems. Preventive maintenance is minimal at the plant and non-existent for the collection system. Process operation control is minimal. General housekeeping is good, and the plant grounds are attractive.

In addition to overflows from the effluent storage reservoir, the treatment plant frequently violates effluent standards for settleable solids, BOD, and coliform. The collection system is plagued by I/I and deteriorating collector lines.

A recent engineering study recommends abandonment of the treatment facility (which would have been a good solution in 1979). A new facility would be built at the present effluent storage and disposal site. The effluent disposal facilities would also need to be expanded to eliminate reservoir overflows which spill into a nearby lake. The RWQCB has issued the City a Cease and Desist Order to prohibit the City from discharging waste in violation of the WDR. The order requires the City to have all improvement in place by 1992. The City is unlikely to meet this deadline because the design work has not started and the financial plan has not been adopted. The $9,000,000 proposed project will likely be supported by revenue bonds backed by service fees and connection charges.

The City is interested in a SRF loan.

WASTEWATER FACILITIES SURVEY 5G

The District operates and maintains a 2.6 MGD secondary level trickling filter treatment plant which was upgraded in 1978 and in 1987 with Clean Water Grant funds. The District also operates one smaller treatment plant and numerous community collection systems. The present flow to the main plant is 1.3 MGD.

The District's operation and maintenance of their sewerage systems are satisfactory. Maintenance expertise is strong. The operations staff does not monitor the loadings to any of the unit processes. The staff has the opinion that the plant is "organically overloaded", although engineering calculations and effluent quality indicate otherwise. The plant does meet its WDR well (only one max. day coliform violation in 12 mo.)

The plant has a few troublesome features such as inadequate trickling filter recirculation pumping, inadequate sludge pumping control from the clarifiers, inadequate sludge storage and drying (old beds need to be rehabilitated), and a bad chlorine residual analyzer. The treatment plant needs a backup chlorinator and an equalization basin for septage.

The District is planning a new collection system, estimated to cost $2 million.

The District may be interested in the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 5H

The City wastewater treatment plant is a .65 MGD ADWF, 2.62 MGD PWWF aerated lagoon/polishing pond treatment system with effluent disposal to percolation ponds. Raw wastewater reaches the treatment plant via an inverted siphon under a river.

Collection system and wastewater treatment O&M is excellent.

Plant performance is good. Although actual wastewater flows are approaching design conditions, the plant appears to have additional capacity. The plant design is very reliable and a backup "old plant" is available if needed. Operations appear to be good. The collection system pump stations are in good condition.

The two observed problems were the lack of maintenance facilities at the plant, and high peak wet weather flows (3+ MGD).

The plant design is very reliable with many failsafe features. It is very difficult to imagine problems with the City wastewater system anytime in the future. Some formal emergency response procedures should be developed, however.

They plan to add a maintenance area to the plant operations building. Cost is expected to be less that $100,000.

The City expressed little need for or interest in the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 51

The District's plant was significantly upgraded (activated sludge and effluent filtration) and expanded to 5.3 MGD with a Clean Water Grant in 1977. Subsequently, the District expanded the plant to its current 6.5 MGD capacity. Present average flow is 2.9 MGD. The present capacity is anticipated to be adequate for 15 years.

The operation, maintenance, lab support, and management are all above average. The plant has energy intensive aerobic digesters, therefore, the plant consumes 1 KWH/#BOD_5 applied. The plant has had an average level of problems resulting from equipment obsolescence from pre-1980 technology. The plant has some difficulty keeping out of nitrification. This, coupled with old, unreliable chlorine residual analyzers has made meeting the 0.1 mg/l chlorine residual effluent limitation an occasional, but infrequent problem. Reportedly, the plant reliably meets its WDR in all other categories. There are no major wastewater facility drawbacks except that the member agencies have problems with I/I. They are making progress with rehabilitation to reduce I/I.

The superintendent did not express an interest in the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 5J

The City operates a 2.5 MGD ADWF oxidation pond treatment plant and disposal system. The present flow is 1.9 MGD, with an average influent BOD_5 of 600 mg/l. The pond system was expanded in 1979 with Clean Water Grant funds. An aerated primary treatment lagoon was added to mitigate the high organic loading.

The plant meets its WDR, except for occasional daily low dissolved oxygen readings in one or two of the oxidation ponds. The operation and maintenance of the plant and of the collection system are above average for the type of facilities the City has. This is reflective of the good management provided by the Public Works Department. Without the designed utilization of the aerated lagoon, the plant is currently at its organic loading capacity. The aerated lagoon is presently used as a final polishing pond instead, because the City reportedly had difficulty with odors from the lagoon. Subsequent experimentation with pond loadings indicated that aeration costs could be significantly reduced if the organic loading were split among all of the oxidation ponds. Total energy consumption for the entire plant is a very low 0.15 KWH/#BOD_5. Disposal is achieved by evaporation and percolation from the ponds.

Service fees are low due to efficiency within the Department of Public Works, low cost pond treatment, and very easy WDR (which are essentially "no nuisance" standards). The City staff is "burnt out" by the Clean Water Grant Program, and is not receptive to an SRF Loan Program at this time.

The City has purchased 500 additional acres for an expansion of its pond system. The improvements to increase the plant's capacity to 3.7 MGD are currently being designed.

WASTEWATER FACILITIES SURVEY 5K

The wastewater treatment facility was upgraded in 1988 from a 1.2 MGD aerated lagoon to an over-designed 2.0 MGD, ADWF trickling filter/polishing lagoon plant. Effluent is disposed of by irrigation.

Existing excellent operation and maintenance is due to the efforts of the plant supervisor and the managers for the utility district who supported him. The utility district has recently merged with the city. It is hoped that this winning strategy continues under the city council.

The main problem appears to be a flow discharge violations due to a technicality. The district has applied for a revised discharge permit in 1986. As of 1989 the Regional Board has not acted on it.

With the exception of the primary clarifiers which are at design capacity, the 1988 plant expansion provided more than adequate treatment capacity for future growth. That project was funded by an FmHA loan in the amount of about $3.2 million.

The city is presently in the design stage for a new 24-inch trunk line to be built in the near future.

The city may be interested in the SRF Loan Program if this work is found to be eligible.

WASTEWATER FACILITIES SURVEY 5L

The City's wastewater treatment plant is a secondary level, double train activated sludge plant. Each independent train is currently rated to handle 0.8 MGD ADWF. Present flow is 0.7 MGD. The plant was designed for domestic and industrial flows to be separately treated. Each train has polymer addition facilities, flocculation basins and dissolved air flotation thickening primary sedimentation basins for treating the industrial (cotton seed) waste. Soon after the plant was built (1977), the industrial dischargers pulled out of the City's treatment plant due to the cost of the treatment. Therefore, the plant has been underutilized.

The plant meets its 30-30 discharge standards, but discharge presently is only to percolation ponds rather than to irrigation as planned. Although the collection system is reported to be in satisfactory condition, some trunk lines are also reported to be near capacity. Only a minimal level of preventive maintenance is done on the collection system.

Operation and maintenance is remarkable in that so much major rehabilitation and capital improvement is accomplished by a two-person operation and maintenance crew. This is work which most other agencies contract out. For example, the operator is fabricating and installing a fine bubble aeration system. This improvement should significantly decrease the plant's energy costs. In addition, the staff performs a lot of lab work as well as the conventional operation and maintenance duties. Considering the present workload, the plant could use an additional maintenance person. Presently, preventive maintenance is irregular and records are no longer kept.

The plant is very energy intensive (2 kwh/lb/BOD_5 applied). It has inadequate facilities for critical solids control of the activated sludge system.

In 1988, the City raised the residential service fee to $9.77/month, which should allow the City to hire another maintenance person and provide the needed materials and parts for the plant.

Reportedly, $121,000 is budgeted for plant improvements this year, which includes a new headworks. The City is also thinking of constructing a new 2 MGD treatment lagoon system if substantial residential growth occurs ($3 million). The plant would be funded by developer fees. Presently, connection charges are a minimal charge for costs incurred by the City for making the connection. The replacement of undersized trunk sewers will cost $2 million. The City does not have a capital reserve fund for the plant.

The City could be a candidate for the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 5M

The City's expanded and upgraded 10 MGD activated sludge plant started operation in 1981. The plant expansion is an example of good utilization of and compatibility with pre-existing units.

The plant has operated well and is well maintained. Minor WDR violations are very infrequent. The City has won numerous awards from the CWPCA and from the EPA for excellent operation and maintenance. The City has an excellent staff, although the number of budgeted positions for operation and maintenance has been recently reduced. Two notable aspects about the plant's operation are its ability to avoid significant nitrification, even in the summer, and the natural dechlorination achieved in the plant's discharge channel. The plant operates with an MCRT of 3-4 days, a basin MLSS of only 600 mg/l, and a basin D.O. of 1 mg/l. The operations staff is able to delicately balance these parameters to achieve good BOD removal without significant nitrification. The City also has an excellent operation and maintenance program for the collection system.

The City is planning to expand the treatment plant to 20 MGD, with construction to start in 1993. The City may be interested in the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 5N

The wastewater treatment plant consists of an oxidation ditch, sedimentation basin, evaporation ponds and sludge drying beds. The effluent is usually disposed by irrigation or by evaporation. On an emergency basis, it can be discharged to a nearby creek. Plant is rated at 1.47 MGD, ADWF.

The plant is very well operated and maintained. The superintendent, who has been there for a long time, probably deserves most of the credit for good operation. The facility also appears to be adequately funded and supported by the Board of Directors.

The major problem at this facility may be effluent disposal. The treatment facility was designed for 1.47 MGD but the disposal area is large enough for only about 1 MGD. The plant's present flows average about 1 MGD. The Regional Board had required the District to install the chlorination system so that the effluent discharge to the creek can be chlorinated. The District has procrastinated on this project for several years. Instead, the District has been trying to secure a 20 year contract with local farmers to use the effluent for crop irrigation. It is also planning to install a chlorination system which would enable it to discharge to the nearby creek as needed.

With the exception of effluent disposal, the plant and the collection system will not need major expansion or upgrades for another 5-10 years. The District appears financially stable and has adequate reserves. The user fees are about $17/month.

The District is not interested in the SRF Loan Program.

WASTEWATER FACILITIES SURVEY 50

The City wastewater treatment plant is an oxidation ditch with effluent disposal to evaporation/ percolation ponds. It is rated at 1.0 MGD ADWF.

This plant is very poorly maintained. It runs pretty much by itself and generally meets the WDR. The main WDR violations observed were flow violations. Some of the equipment is either abandoned or unused, and the remainder in a marginal operating condition. The plant is understaffed and underfinanced.

The plant is presently at the design capacity but its major drawback is the lack of maintenance and financial support by the management and local politicians.

It appears that the sewer user fees of $8/month may be primarily subsidizing the city's water system.

Plant expansion is inevitable during the next couple years but the city may not be able to afford it with the existing management practices.

The city should take advantage of the SRF Loan Program unless it comes up with a source of grant funds for the proposed expansion.

WASTEWATER FACILITIES SURVEY 6A

The District operates two wastewater treatment plants and a wastewater collection system. One plant is a 1.8 MGD ADWF high rate trickling filter process, with effluent equalization and a belt filter press. The second plant has a 1.7 MGD ADWF activated sludge process, vacuum filter and an unused sludge incinerator. Undigested, thickened sludge from both plants is trucked to landfill for disposal. Effluent is disposed of on crop land.

O&M of both treatment plants and the collection system appear to be excellent. Staffing levels appear to be adequate. Maintenance management is computerized. Operators report occasional nitrification/ disinfection problems.

Major drawbacks of the District's system include inadequate effluent conveyance capacity for high seasonal or wet weather peak flows (a C&D has been issued for peak flows). Future sludge disposal options are uncertain. Nitrate/ground-water contamination problems occur at the disposal farm (a C&D has been issued). Collection system overflows occur occasionally. The trickling filter plant is very old, and has inadequate secondary clarifier capacity. Frequent power outages are a nuisance for the collection and treatment systems. Collection system as-builts are incomplete. The O&M Manual for the trickling filter plant is poor.

Wastewater from future growth will be directed to the new activated sludge plant. Some of the current load from the trickling filter plant will also be redirected.

The District is studying improvements to the outfall and flow reduction from the collection system. The nitrate problem with disposal is being studied. Options of different crop selection and purchase of additional land are being considered. Sludge disposal options will be evaluated based on a study by another nearby agency with similar problems.

The District might be interested in the SRF Loan Program. It appears that many of the District's needs are not directly or entirely growth related.

WASTEWATER FACILITIES SURVEY 6B

City wastewater treatment facilities consist of a 1.6 MGD ADWF primary plant with oxidation/percolation ponds. Effluent is disposed on nearby pasture land. Sludge is anaerobically digested, air dried on conventional drying beds and is disposed in a landfill or is reused by the City or the public. The collection system is all gravity with the exception of one small pump station.

The City puts little effort into wastewater system O&M. Personnel have many other responsibilities (such as potable water system O&M and street maintenance) and can spend little time at the treatment plant. The treatment plant is run down. Working conditions and support facilities are poor. The major operational problems noted were the inability of the plant to meet its unfiltered BOD effluent limitation due to algae growth in the two "treatment" ponds which preceed the percolation ponds. Maintenance management, emergency response and operator training and resources are poor. Sludge processing equipment is inadequate, not working, and/or poorly designed.

The major drawback of the system is an apparent lack of interest by the City in providing adequate resources for wastewater treatment. Plant performance suffers from physical deterioration, poor design, lack of capacity and lack of operator attention. Plant staffing should be increased and/or the "other" duties of existing operators should be reduced.

If meeting discharge requirements is a concern for the City, they have to get serious. If present trends continue, a major wastewater system failure should be expected.

The City does plan to make various capital improvements ($500,000) to the plant. These plans need to be encouraged.

The City expressed some interest in the SRF Loan Program if it could be used for their needs.

WASTEWATER FACILITIES SURVEY 6C

The City wastewater treatment facility is a 3.12 MGD ADWF primary, oxidation pond, percolation pond, and evaporation pond plant. Effluent is, at times, chlorinated and used to irrigate a golf course. Sludge is anaerobically digested, air dried and stockpiled on site. The collection system is entirely gravity.

The City treatment system is relatively simple and requires little operator attention. This is fortunate, as the plant receives little attention. Operators have many non-wastewater duties. Much of the plant is old and some deferred maintenance is obvious. Maintenance and personnel facilities are inadequate. Maintenance management is "informal". Operators report occasional problems meeting permitted BOD limitations due to algae growth. There are few reported collection system spills.

The major drawback for the wastewater system is excessive wastewater flows and/or inadequate effluent disposal capacity. Groundwater mounding has occurred in the area of the perc ponds and reportedly has caused some flooding. Plant flows far exceed the original design capacity or the WDR permitted flow, although the City has hired consultants who feel the plant could be re-rated to accommodate existing wastewater volumes.

The City is growing rapidly. Existing treatment facilities cannot be stretched for more than a couple of years at current growth rates. Additional disposal options are needed.

The City is studying groundwater extraction, disposal at the old city wastewater treatment plant and increased reclamation, although there are no formal plans. Project costs could be in the $1 million range.

The City is reportedly interested in SRF Loan Program assistance for necessary disposal capacity upgrades and O&M facility projects.

WASTEWATER FACILITIES SURVEY 6D

District wastewater treatment facilities consist of a 0.85 MGD ADWF primary clarifier/aerated lagoon treatment plant with percolation ponds and irrigated pasture for effluent disposal. Primary sludge is anaerobically digested, air dried and trucked to a landfill for disposal. The collection system is relatively new and has only one small pump station.

Treatment plant and collection system O&M procedures are excellent. The District reports no capacity problems or difficulty with meeting WDR. Laboratory and maintenance records are good. The plant is very well kept and operators obviously are proud of their wastewater system.

There are no obvious drawbacks with District wastewater facilities, except that there is no stand-by lagoon lift station pump. Access to all pump stations is poor.

The area served by the District has little potential for growth. Some minor additional treatment capacity and operational flexibility may be needed to accommodate community buildout.

The District is planning to add a primary clarifier and make improvements to the pond system in the next few years, at an estimated cost of $250,000.

District staff expressed interest in the SRF Loan Program for future capacity needs.

WASTEWATER FACILITIES SURVEY 7A

District wastewater treatment facilities consist of two small extended aeration treatment plants. The largest is a 0.6 MGD ADWF plant with a 0.2 MGD package plant and two 0.2 MGD "race track" units. Effluent is disposed in percolation ponds. WAS is air dried on sand drying beds and is stockpiled on-site. The second plant is a 0.09 MGD ADWF plant with two "race tracks" and similar effluent and sludge disposal.

Both treatment plants are well operated and maintained. Collection system O&M is fair. The District has reported no problems meeting WDR limits. No current process control problems were noted.

No major drawbacks to the District system were noted. The collection system for the smaller plant reportedly was constructed (by a developer) poorly and requires a lot of attention. The influent meter at the smaller plant is located improperly and floods. The influent pump station at the larger plant is too small and has poor access. The larger plant has some minor earthquake related structural damage. There is occasional dumping of toxic materials into the collection system from an unknown source.

Much of the community in the District service area is still on septic tanks. The area is growing rapidly and the District will need additional treatment capacity in the next few years.

The District has scheduled a 0.4 MGD capacity increase for 1992-93, at an estimated cost of $1 million.

The District may be interested in the SRF Loan Program if it is available.

WASTEWATER FACILITIES SURVEY 7B

The District operates and maintains six treatment plants and a collection system for a large resort oriented group of communities. This survey was limited to the largest of the treatment plants, a 10 MGD activated sludge plant consisting of parallel 2 MGD and 8 MGD plants. The plant has no primary clarifiers. Effluent disposal is by golf course irrigation and/or percolation ponds. Sludge is aerobically digested and thickened with DAF and belt filter press units. Sludge is trucked to agricultural re-use sites by a private contractor. The collection system is generally new. It includes 8 pump stations.

Collection system and treatment plant O&M are outstanding. It is difficult to imagine a more reliable treatment plant. Maintenance management appears to be good. The plant is spotless. No major O&M problems were reported. There is some periodic activated sludge process foaming. There are infrequent effluent BOD and SS violations.

Drawbacks of the District facilities include large daily and seasonal flow variations which requires close operator attention, and the odor sensitive location of the treatment plant. The District has a major odor control program. Seasonal flows approach or exceed WDR permitted flows.

District management is obviously very committed to providing the best possible wastewater system. The apparent willingness to commit resources where needed is impressive.

The District has plans for numerous major capacity expansions in the next few years. Costs could be in the $20 million to $30 million range. Seasonal flow treatment is a major consideration. The area is developing very rapidly.

The District would be interested in the SRF Loan Program if it would meet District time constraints (not slow up growth) and if capacity projects are eligible.

WASTEWATER FACILITIES SURVEY 7C

The City operates a 1.5 MGD ADWF trickling filter plant with effluent disposal to percolation ponds. Sludge is anaerobically digested, air dried and stockpiled on-site.

Plant operation and maintenance procedures are good. Operators have had difficulty meeting BOD and SS limits in the winter. This may be corrected by the recent replacement of the trickling filter media and trickling filter equipment. The trickling filter/secondary clarifier system has a number of design deficiencies relating to flow distribution which will continue to be a problem. The City recently added more perc ponds to meet disposal needs. Collection system O&M procedures are good. Several pump stations are nearing capacity. One pump station (the largest) is structurally unsafe and needs to be replaced.

Major drawbacks of the City facilities include the poor trickling filter process design, a poor plant layout for expansion, and a deteriorated major collection system pump station. In addition, City salaries are not competitive with a major new local employer and turnover has been high. The new employer also has created a high demand for housing, and wastewater flows are increasing rapidly. The industry plans to possibly double in size, so the situation could.get worse. A major wastewater system capacity increase is needed soon.

The collection system crew mentioned a continuous grease problem from a major restaurant. Line blockages occur at that site at least monthly. The City would benefit from a strong grease trap ordinance.

The City is planning to expand plant capacity to 2.5 MGD and do collection system rehabilitation to keep up with growth. Construction costs could be $3-4 million. They are in the process of selecting an engineer.

The City would be interested in the SRF Loan Program for expansion needs.

WASTEWATER FACILITY SURVEY 7D

The City provides wastewater treatment with a 1.9 MGD ADWF activated sludge process. Effluent is discharged to a nearby river. Disinfection is not required. Sludge is anaerobically digested, air dried and stockpiled near the river. The City collection system includes 8 pump stations. Approximately one mile of the collection system is a combined sewer.

Treatment plant operations and maintenance procedures are good. The plant has generally met discharge standards except for flow and occasional daily BOD and SS violations in the past year. The plant is treating its design flows.

Plant and collection system personnel have many other duties, including airport operations and potable water system O&M. Collection system maintenance is poorly staffed. There are occasional sewer overflows. The treatment plant is old and badly deteriorated. There are major structural problems with the single primary clarifier and the single anaerobic digester. The activated sludge process is poorly designed (shallow clarifiers) and has a poor aeration system. Maintenance facilities for the plant are poor. Personnel facilities are very poor. The plant outfall is undersized, leading to occasional flow backups and plant flooding when the river level is high. Emergency response procedures have not been formalized. The O&M Manual is very poor and needs to be revised. As-built drawings for the treatment plant have not been kept up-to-date.

The wastewater system, particularly treatment, has obviously been neglected. The City has not provided sufficient money for needed O&M and they have not kept ahead of growth in the past.

There will be a plant expansion (to 2.7 MGD) underway soon. The design is complete. The City has also completed a study of collection system needs. Major expansions will be needed to keep up with growth.

The City has money for the current plant expansion. They may be interested in the SRF Loan Program for collection system expansion and treatment system reliability improvements.

WASTEWATER FACILITIES SURVEY 8A

The Agency treats wastewater with a 3.1 MGD ADWF (tourist season) oxidation ditch plant followed by flow equalization and effluent pumping to a disposal farm several miles away. Waste activated sludge is thickened with new DAF and belt filter press units and is trucked to a landfill for disposal. The agency recently added a DAF thickener, a belt press and a third clarifier. The wastewater collection system consists of four pump stations and interceptors from various resort communities served by the Agency.

No major O&M problems were reported since the new process equipment was added. Before the clarifier was added, solids would be lost during peak daily and peak seasonal flows. They have some problems with cold weather and freezing. The WDR has been met except for TDS. Historical odor complaints were resolved with the installation of a new odor scrubber.

No major drawbacks were noted with the Agency wastewater system. The plant has peripheral feed clarifiers and cannot remove floatables effectively. This has not created WDR problems. Portions of the collection systems maintained by the communities served by the Regional Agency are reportedly in poor condition. There is a lot a I/I. The Agency serves a rapidly growing resort area and has high seasonal and high peak daily flows. This situation requires close operator attention. Not all Agency pump stations have a stand-by pump at peak flow.

The significant wastewater improvements made by the Agency in recent years is impressive. An additional capacity expansion is expected by 1994 and additional local wastewater reclamation may be developed. Total project costs are estimated to be $1-3 million. Community local wastewater reclamation may be developed. No collection system needs exist.

The Agency is very skeptical of the SRF Loan Program due to problems experienced with the Clean Water Grant Program. They could be interested in the SRF Program if there are no restrictions on capacity, and no time delays.

WASTEWATER FACILITIES SURVEY 8B

The District operates four treatment plants and an extensive collection system in a rapidly urbanizing area. The survey was limited to one (the largest) District treatment and collection system. The treatment plant is a 10 MGD activated sludge plant with effluent disposal to farmland and percolation. Sludge is anaerobically digested, dewatered by belt filter presses, and stockpiled on-site. The plant is undergoing a 6 MGD expansion, which is adding nutrient removal facilities.

The plant is fairly new and has been undergoing continuous expansion/ modification for years. Plant capacity is inadequate. Periodic SS violations have occurred and process air supplies are inadequate at times. Operators have trouble keeping sludge SVI low. Process control could be improved. The plant appears to be well maintained, however, maintenance management practices are not well developed. Maintenance duties are shared by crews of people who rotate as needed to various District treatment plants or pumping stations. Collection system O&M appears to be excellent.

Rapid growth (13% a year) is a major problem for the District. Plant operations are constantly disrupted by new construction. Reclamation options for plant effluent are decreasing rapidly as housing replaces farmland. Nutrient removal and stream disposal will be necessary in the future. District plants are in a critical air basin as well, and may have air emissions standards in the future. At this time there is no long range sludge disposal solution. A C&D has been issued for plant flows which exceeded permitted and design treatment capacity. Collection system as-built drawings and reference documents should be updated. Not all District pump stations have a full standby pump. Approximately 10 collection system spills occur each year, mostly due to construction debris. There is a major hydraulic restriction in the collection system near the treatment plant.

District personnel are doing an excellent job, considering the rapid changes they have to deal with. Capacity expansions are occurring but do not lead District wastewater flow increases by much.

The District has extensive plans for adding capacity to the wastewater collection, and treatment system. Effluent and sludge disposal requirement changes will require major investments.

The District could be interested in the SRF Loan Program but they are very concerned about any possible construction delays.

WASTEWATER FACILITIES SURVEY 8C

The City wastewater system includes two activated sludge treatment plants and a collection system containing 8 pump stations. The larger treatment plant has a 5.5 MGD ADWF design capacity. Effluent is disposed in percolation ponds. Sludge is air dried, stockpiled and used by a local farmer for soil conditioning. The second plant has a capacity of 3.0 MGD ADWF. Sludge is not treated at this plant. Effluent is disposed in percolation ponds.

Both plants appear to be well operated and maintained. Both plants experience periodic filamentous organism problems which are controlled. There have been occasional BOD and SS violations. A few sewer system overflows occur each year, although collection system maintenance is excellent.

The major system drawback is lack of treatment capacity and a rapidly increasing wastewater flow. The larger plant operates at capacity now. The second plant has about 1.2 MGD of unused capacity at this time. The City has access to a large regional sewer if wastewater volumes increase faster than their treatment capacity.

Recently, major improvements have been made to the large plant. The only remaining problem is inefficient or uncontrollable flow splitting between various treatment basins.

The City has major capacity related expansion plans for both plants. The City also has plans to build an entirely new third plant in a rapidly growing area of the City.

The City is skeptical that the SRF Loan Program would help them but they are interested.

WASTEWATER FACILITIES SURVEY 9A

The District wastewater treatment plant is a 0.04 MGD ADWF pond system which is preceded by a community septic tank. Effluent is disposed on a spray irrigated pasture. The plant serves a small mountain resort area. There are no collection system pump stations.

Wastewater system O&M procedures are very good. The County provides O&M services for a number of unincorporated communities. As such, the various districts have access to a large operations and maintenance organization, supplies and facilities, if needed. Except for two BOD violations, (due to algae) the District has met its WDR for the past year. Not all required testing appears to be done, however.

There are no major drawbacks with the plant. Reconnecting the old septic tank (for grease and solids removal) and other plant modifications have helped improve plant reliability.

Growth in the District is restricted due to lack of potable water. If this problem is resolved, the community would likely grow rapidly.

The County has no major plans for improving or expanding District wastewater facilities, except for the possible addition of a primary clarifier.

The County has major expansion plans for other districts and is interested in the SRF Program if their projects (capacity increases) would be fundable.

WASTEWATER FACILITIES SURVEY 9B

District wastewater treatment facilities include a 0.6 MGD ADWF extended aeration activated sludge plant with effluent disposal to pasture land and a 0.45 MGD advanced wastewater treatment plant (including R.O.) with disposal to avocado orchards. Sludge is air dried and disposed by landfilling. The collection system includes three pump stations.

Operations at both plant are good. Both plants meet their WDRs, except for occasional coliform violations at the secondary plant and turbidity and TDS violations at the advanced treatment plant. These violations are associated with peak flows. There are occasional sewer overflows, which violate the District WDRs.

Both plants have clarifiers that are too small and too shallow. This, combined with average and peak flows that equal or exceed design flows, makes operating the plant difficult. One of the plants has no standby power, although there are two days of storage ahead of the plant.

The communities served by the District are growing very rapidly, and major wastewater system capacity projects are needed immediately.

The District has plans for expansion of both plants (doubling capacity), expanded wastewater reclamation, and major collection system improvements. Projects are estimated to cost up to $16 million.

The District could be interested in the SRF Program, although they are concerned about funding limitations and time delays.

WASTEWATER FACILITIES SURVEY 9C

The City operates two activated sludge treatment plants rated at 5.5 MGD and 10.7 MGD, respectively. Both plants have anaerobic digestion and belt presses, and both dispose of sludge in a landfill. Plant effluents are discharged through a shared ocean outfall. The City operates and maintains an extensive collection system which includes thirty-one pump stations.

O&M procedures at both plants are excellent. Both plants meet WDRs. Maintenance management is good. Support facilities are good. Collection system O&M is very good. The City has an active industrial pretreatment program.

The City has made a considerable effort to improve both collection and treatment facilities. The smaller plant is old and has many unusual or poorly designed process elements. The activated sludge reactor design is unusual. One of the units is settling due to poor foundation design. Plant hydraulics, air distribution and waste sludge thickening are poorly designed. There is just one waste sludge thickening centrifuge. The larger plant is relatively new and has no major drawbacks. The collection system reportedly has a number of capacity related bottlenecks. There are few collection system overflows. Industrial wastes have created minor problems historically.

The City is experiencing very rapid growth. Major expansions and/or improvements of both plants will be necessary within 2-5 years.

The City has major plans to expand treatment and conveyance facilities.

Upgrades and improvements are estimated to cost $7 million. Capacity needs may cost $10-15 million.

The City could be interested in the SRF Loan Program, however, they are not happy with their grant program experience.

WASTEWATER FACILITIES SURVEY 9D

City wastewater facilities consist of a 16.5 MGD ADWF activated sludge plant and an extensive collection system which includes 12 pumps stations. Plant effluent is discharged to the ocean via a land and ocean outfall system. Sludge is anaerobically digested and dewatered with a plate and frame press.

O&M of the City wastewater treatment system is excellent in all respects. Maintenance management is good. Collection system O&M is good. Three monthly average BOD violations and occasional SS violations were noted. Collection system spills occur occasionally and are violations of plant WDRs. No wastewater facilities drawbacks were noted, except for the plant location (in a residential area) and the secondary clarifiers which are very shallow which leads to the WDR violations noted above. There are occasional odor complaints from one of the residents. Caustic dumping into the collection system from the service area has contributed to effluent violations. The plant and collection system are approaching design capacities. There is some collection system surcharging. Additional ocean outfall capacity will be needed soon.

Wastewater personnel obviously take great pride in their system.

The City is growing rapidly and there are major collection and treatment system expansion plans. The plant will be expanded to 19 MGD in the near future, at an estimated cost of $5-10 million. A collection system master plan is being developed.

The City may be interested in the SRF Loan Program if it is available to them.

State Water Resources Control Board
WATER QUALITY CONTROL INSTITUTE
810 W. Los Vallecitos, Suite A
San Marcos, CA 92069-1496
(619) 744-4150

July 11, 1990

US Environmental Protection Agency
Region IX
1235 Mission Street
San Francisco, CA 94103

Attn: Elizabeth Borowiec

104(g) OUTREACH GRANT, SUMMARY REPORT THROUGH SEPTEMBER 1989

Dear Elizabeth:

The attached pages are a brief summary report of OUTREACH (i.e. 104-g) activities covering the period between October 1, 1988 and September 30, 1989.

Section A on page 2 is a listing of all wastewater utilities contacted in connection with the OUTREACH Project year. Those marked by an asterisk (*) received something more than a simple visit and inquiry about possible problems where OUTREACH assistance might be of benefit.

Section B, starting on page 3, briefly indicates the services provided to utilities that received more than a brief visit and diagnostic inquiry about problems.

If you have any questions regarding this report or the activities for this Project Year, please do not hesitate to call me at (619) 744-4150.

Sincerely yours,

Donald E. Proctor

Donald E. Proctor, Ph.D.
Director

Enclosures

Copies to: James Giannopoulos
OUTREACH files

\WP\DEP\OUTREACH.89

SECTION A

In all, twenty four different wastewater utilities were visited at least once during the project year. Those utilities were:

Sausalito-Marin County Sewer District
Tiberon-Marin County Sewer District #5
City of South San Francisco
*City of Benicia
Port Costa Sewer District
*City of Richmond
San Mateo County Parks (Pascadaro)
City of Pacifica
City of San Leandro
*City of Petaluma
*City of Mt. Shasta
Del Ray CSD
McCloud CSD
*City of Porterville
*City of Exeter
City of Reedley
*City of Hanford
City of Firebaugh
Caruthers CSD
Riverdale CSD
City of Laton
Mariposa
City of Dos Palos
City of Sanger

SECTION B

CITY OF BENICIA

An initial visit was made to the City of Benicia in early February, 1989 to discuss any needs the City's Wastewater Utility might have for assistance. The single indicated area of need was in regard to revising their rate structure for utility services.

A joint summary presentation of a computer based system for relating all budgeted expenditures to parameters of service rendered to customers was made to representatives of the City of Benicia and the City of Petaluma in May 1989. The City of Benicia was not certain at that time whether or not they would desire more assistance with the rate setting program.

The suggested system was not a "canned" computer program but was a procedure that could readily be adapted to the budget style and needs of a specific utility. A print out and floppy disk copy of the example of the system was left with the City for further consideration. The City staff was invited to use the system and to call for further help if it was needed.

It was later determined that the City elected to utilize their regular consultant services to revise and up-date their wastewater utility rate structure.

CITY OF PETALUMA

A visit was made to the City of Petaluma in mid-March following a recommendation by the Regional Water Quality Control Board. The initial visit involved both the City staff and the staff of the firm who provides treatment plant Operations & Maintenance under contract. One possible area of assistance discussed was training in fundamental laboratory test procedures. The City staff was also quite interested in receiving more detail on a computer based system that they could use and up-date annually for setting fair, equitable and adequate utility rates.

The City of Petaluma was invited to attend a summary presentation of how the computer based rate setting process could work, along with the City of Benicia, in May 1989.
The City of Petaluma was provided with a print out and floppy disk copy of an example of the rate setting system. The City staff was invited to use the system and to call for further help if it was needed.

The City Public Works office did request a return visit to Petaluma to further consider using the computer based system to allocate all budgeted expenditures to parameters of utility service and then subsequently to generate utility rates for all classes of customers. After this second session, in late May, 1989, they felt they would be able to customize the system to their local situation and establish rates that could be easily

revised on an annual basis.

Three employees of the City's O&M contractor staff each attended four full days of training in laboratory procedures at the Petaluma Treatment Plant in July 1989.

CITY OF RICHMOND

The initial visit to the Wastewater Treatment Plant of the City of Richmond in early February, 1989, was also made upon the recommendation of the Regional Water Quality Control Board. During this initial visit, it was learned that some of the technical problems at the treatment plant were being addressed by a planned schedule of improvement projects.

One major concern was that the level of staffing approved for the treatment plant was inadequate. A second and related concern was that the overall level of revenue was not sufficient to operate and maintain the Utility.

A subsequent meeting was scheduled and attended by the additional staff from the City of Richmond Public Works office, the City's consultant, The Regional Water Quality Control Board, Region IX of EPA and WQCI. The plan and schedule for capital improvements was discussed in some detail. Suggestions were made to recover all costs of operation of the Industrial Waste Inspection and Pre-Treatment Monitoring from the responsible industries so such costs need not be borne by regular revenue from utility billings.

A subsequent visit was made to Richmond in June. Some improvement in staffing level was noted but further staff development and training was still needed.

CITY OF MT. SHASTA

An inspector for the Redding office of the Regional Water Quality Control Board suggested that the City of Mt. Shasta would benefit from an OUTREACH visitation. Arrangements were made to visit the treatment facilities on June 14, 1989.

Wastewater is treated in aerated lagoons followed by settling lagoons. Following this aerobic treatment, the effluent was filtered through open sand filter beds, chlorinated, dechlorinated and discharged to the Sacramento River during the winter months. During the summer, the aerobic lagoon effluent was filtered and chlorinated before being pumped to a soil adsorption system well above the level of the treatment plant. The soil adsorption system was reported to be 20,000 lineal feet of 4-inch diameter perforated pipe buried in 10-foot deep by 2-foot wide trenches with backfill that included 4 to 6 feet of coarse trap rock.

The single most serious problem faced by the City was a matter of economics. The major economic factor, reported to equal about one-half of the total public works budget, was the maintenance cost of removing, washing and replacing all of the sand in the large sand beds each year. The cost of chlorine was a second, but less serious, cost factor.

The first recommendation made was that they could greatly reduce the cost of operation and maintenance simply by not using the sand filters at all during all of the summer months, when the recreational population was highest and wastewater flow was greatest. There seemed to be no significant benefit to filtering the effluent prior to sub-surface disposal. It also seemed to be questionable whether it was actually necessary to totally haul out, wash and re-install all of the filter sand each year, even when they were filtering on a year-around basis. By eliminating the filtration step during the summer, it seem logical that the filters would need such drastic maintenance no more frequently than once every five to ten years, instead of annually.

It was also suggested that chlorination of the aerobic lagoon effluent that was to be disposed of in the soil adsorption system (i.e. during the six summer months) be discontinued. This would further reduce O&M costs for the utility.

The combination of two recommendations was expected to reduce wastewater treatment/disposal costs to something less than 25% of what they had been.

CITY OF PORTERVILLE

Several visits and telephone contacts were made to consider appropriate adjustments to wastewater utility rates for the City of Porterville. A preliminary or trial computer based system of calculations was developed to distribute and assign all budgeted costs to such service parameters as hundreds of cubic feet of flow, pounds of BOD, pounds of suspended solids, truckloads of septage, industrial waste samplings or compliance inspections made, sewage backups investigated, etc. Unit parameter costs for such costs were then used to set fair and equitable rates for customers in multi-family, single-family, commercial, high-strength commercial, institutional and industrial classes.

A three-day rate-setting follow-up workshop on utility rate setting was conducted jointly for the City of Porterville and the City of Hanford but that workshop fell in the subsequent 104-g Project Year.

Also at the City of Porterville, the treatment plant staff requested assistance in achieving better process control and effluent quality.

The treatment plant is an activated sludge plant of approximately 4.5 MGD capacity. Facilities include four raw sewage pumps; parallel aerated grit chambers with flight collectors and bucket grit elevators; a single mechanically cleaned bar screen; two parallel but independent trains (one old, one new) each having a primary clarifier, coarse bubble aeration basins and a secondary clarifier; parallel chlorine contact basins; two DAF activated sludge thickeners; and three stages of anaerobic digestion followed by supernatant decanting lagoons and paved evaporative sludge drying beds. All aeration blowers are driven only by engines that are fueled either by digester gas or natural gas. Heat from the engine coolant stream is transferred through heat exchangers for sludge/digester heating.

Final effluent is pumped approximately five miles to be utilized on irrigated hay land or alternatively sent another three miles to percolation ponds.

For several years prior to March of 1989, the treatment plant had been operated under O&M contract provisions by a private firm. The City elected to resume operations with its own staff. The post-transition operating staff were all new to this plant except for the lab analyst.

In the older (pre-1979) parallel clarifier-aerator-clarifier train, the aeration basins consist of eight separate sequential basins wrapped around a central primary clarifier with a complex system of interconnecting gates that would allow either step feed or plug flow progression. The first basin can only be utilized for RAS re-aeration in either mode of operation. The gate for routing primary effluent into the second aeration basin will not handle all flow during heavy plant loading so a minor amount of step-feeding is always necessary. In the newer parallel treatment train (added in 1979), gates would allow aeration in (a) eight successive step feed steps, (b) eight sequential basins of plug flow in one sequence, or (c) two parallel plug flow trains of four basins each.

One major design deficiency of the treatment plant is that neither of the two parallel clarifier-aerator-clarifier trains has enough capacity to handle the total plant flow except during the low flow period between about 11:00 PM and 6:00 AM. This makes it exceedingly difficult to take any unit out of operation long enough to dewater any unit for inspection or maintenance.

Several problems related to activated sludge process control were identified: In the older clarifier-aerator-clarifier train, inter-basin gates had been set for step-feed aeration but one gate was improperly set which allowed very significant process short circuiting. In the newer train, a gate was not properly placed which also was allowing short circuiting of mixed liquor. In both trains, an improper procedure for determining total biomass was yielding erroneous data for Food/Microorganism calculations for process control.

The plant initially had two automatic composite samplers: one to sample raw wastewater from the wet well of the influent pump station and the other to sample effluent leaving the chlorine contact chamber. Neither sampler was working reliably and it appeared that the raw wastewater sampler had always been severely hampered by rag fouling.

It was recommended that new samplers be obtained and that the raw sampler be installed to sample after the aerated grit basin and the mechanical bar screen. This would make it possible to obtain more reliable information on loading for activated sludge process control.

It was recommended that both plant trains be returned to plug flow aeration followed by test periods at F/M ratios in the vicinity of 0.3 to 0.4 lbs of BOD/day per pound of MLVSS in each individual treatment train. It was suggested that only by prolonged evaluation would it be possible to determine the optimum F/M ratio for each plant train and that the optimum F/M could well be different in winter and summer.

CITY OF EXETER

The first OUTREACH visit was made to the Wastewater Treatment Plant of the City of Exeter in late-May, 1989. The individual who had operated the facility for many years resigned in mid-May. A new individual had then transferred from the Water Department to operate the wastewater treatment plant. Plant performance and effluent quality were marginal at best at that time.

This is an 0.7 MGD oxidation ditch facility without primary clarification and with parallel secondary clarifiers. Waste activated sludge goes to un-drained evaporative drying beds. Final effluent can go either to percolation ponds or to an intermittent stream bed (Outfall Creek).

It was estimated that none of the effluent percolation ponds had been percolated to dryness, rested, or tilled during the past year. No monitoring of DO level in either the oxidation ditch or the plant effluent was being done. The operator was reasonably sure that there was a DO meter for the plant but it had not been used for several years. The rate of flow of return activated sludge from the two secondary clarifiers was quite low, apparently to keep the hydraulic loading on the oxidation ditch at a low level. The RAS appeared to be quite dark and anoxic if not actually septic because of long retention in the clarifier slurry pool.

It was suggested that the RAS flow be significantly increased to avoid prolonged residence of the biomass without oxygen supply in the bottom of the secondary clarifiers.

A second visit was made to the facility on June 8. Though somewhat improved, the effluent was still turbid with activated sludge solids flowing over the clarifier weirs. The operator had found not one but two DO meters. It was possible to get one functioning and the other was returned to the factory for repairs. The pH meter was repaired but it was recommended that a new probe be obtained for reliable usage.

It was recommended that the DO level be increased and maintained in the oxidation ditch. A controlled program and schedule for wasting excess activated sludge to drying beds was established. Improved procedures for BOD dilution water preparation were suggested and implemented.

The operator was invited to attended (and did attend) two four-day classes within commuting distance of the City - Introduction to Wastewater Treatment and Activated Sludge Process Control.

Another visit was made to the facility on September 26th. The visit was most gratifying. The final effluent was sparkling! DO levels were being monitored. All percolation ponds had been dewatered, dried and thoroughly tilled. Dried sludge had been removed from all drying beds. The plant equipment, structures and grounds appeared to be well maintained and neat. All effluent was being discharged to Outfall Creek so that the capacity of all percolation ponds could be retained for winter usage as might be necessary. Both the operator, Mr. Gutierrez, and the City of Exeter can be justifiably proud of a well-run treatment plant.

The treatment facility of the City of Exeter was in compliance with all requirements and there appeared to be no need of further OUTREACH assistance.

CITY OF HANFORD

A first visit to the City of Hanford was made in May, 1989. There were no technical problems for which assistance was needed. There was some interest in possible assistance in setting up an in-house computer based system for utility rate structures.

A brief discussion was presented on the rate-setting procedure developed by WQCI. A print out and floppy disk copy of the example of the system was left with the City for further consideration. A three-day rate-setting follow-up workshop on utility rate setting was conducted jointly for the City of Hanford and the City of Porterville but that workshop fell in the subsequent 104-g Project Year.