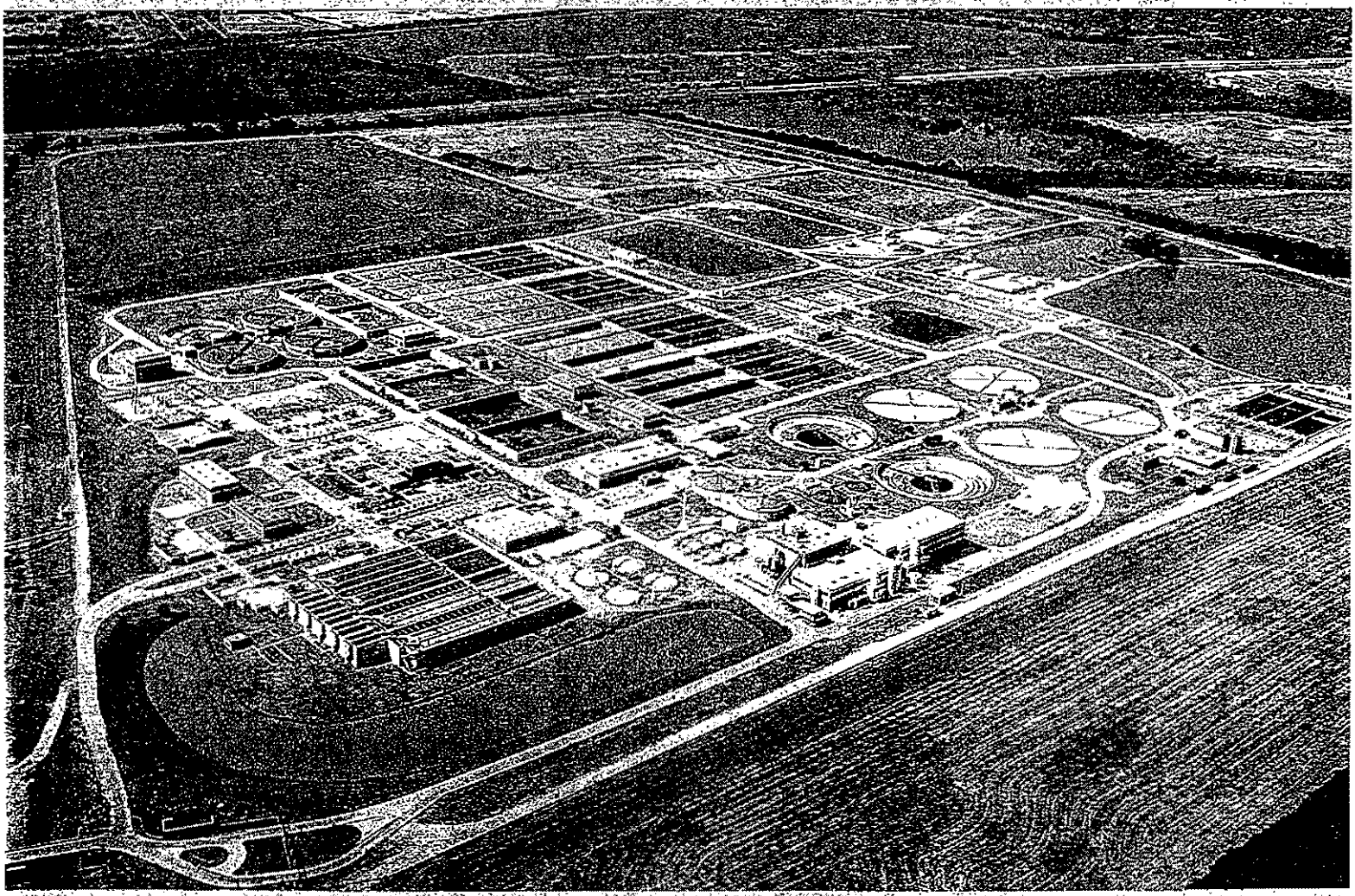


System Overview

The Trinity River Authority is a political subdivision of the state of Texas and encompasses all of five and parts of 12 counties located within the Trinity River Basin. Public services currently provided and/or being developed by the Authority include multiple regional wastewater treatment, water treatment, recreation, water supply and reservoir systems.

In 1957, the Trinity River Authority pioneered the concept of regional wastewater treatment by establishing the Central Regional Wastewater System. In December 1959, the Central Regional Treatment Plant was placed into operation to serve four member cities: Irving, Grand Prairie, Farmers Branch and a portion of western Dallas.

During the late 1960s and early 1970s, the Central Regional Wastewater System expanded its original 28 mile pipeline to approximately 140 miles that extended services to several other cities. More recently, expansion has extended the pipeline system (collection system) to over 200 miles serving all or part of 21 contracting parties with almost one million people being served.

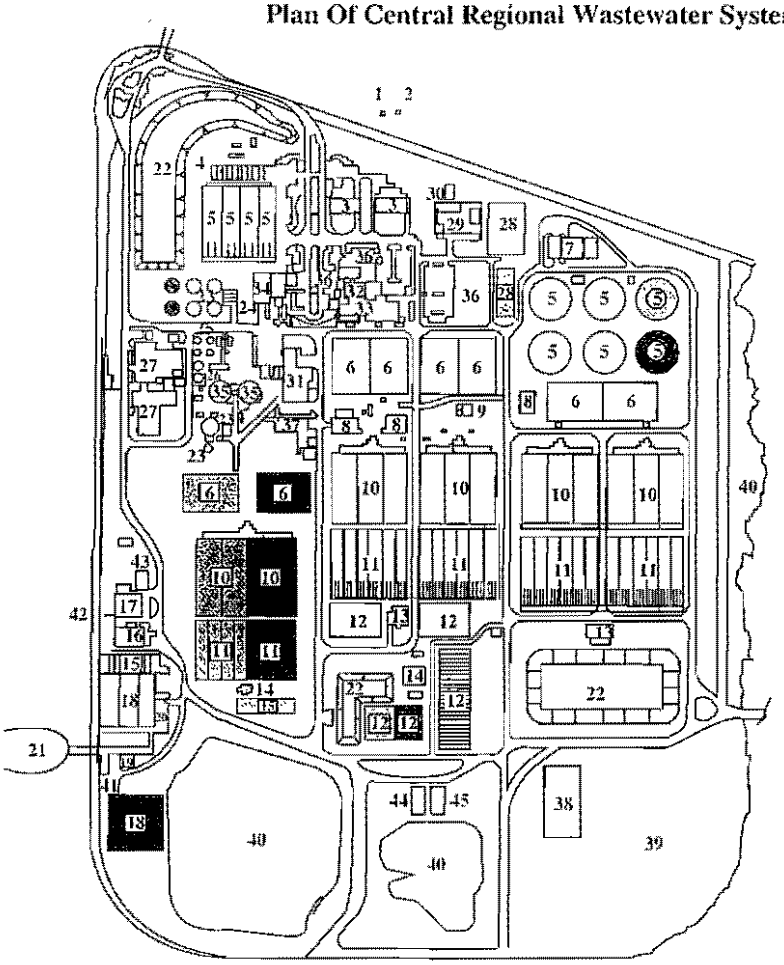
In 1972, the Federal Government passed the Federal Water Pollution Control Act that established much higher standards for wastewater treatment. To meet the new standards and to accommodate an ever expanding service area, the Central Regional Treatment Plant capacity was expanded to 100 million gallons per day (MGD). Secondary and tertiary treatment capabilities (activated sludge and filtration) were added to provide the more stringent level of treatment required.

In 1993, the CRWS Plant was expanded to process 135 MGD capacity with total secondary and tertiary treatment and the ability to treat a 2-hour peak of 335 MGD. Also, dechlorination facilities were added to meet new state and federal guidelines for the removal of chlorine to less than 0.1 mg/l.

The Central Regional Wastewater Treatment Plant was recognized by the Texas Natural Resource Conservation Commission as the best large plant in the state of Texas. The Environmental Protection Agency also recognized the Central Regional Wastewater Treatment Plant by rating it the best large-scale treatment plant in Region VI and one of the best seven in the nation. The Water Environment Federation designated TRA as a co-winner of the prestigious Outstanding Achievement in Water Quality Improvement Award. In addition, the Central Regional Wastewater Plant has received the gold award from the Association of Metropolitan Sewerage Agencies numerous times.

The Central Regional Wastewater System.....working for you to provide a clean environment.

Plan Of Central Regional Wastewater System Treatment Plant



1. Influent Valve Vault "D"
2. Influent Junction Box "C"
3. Influent Pump Stations #6 and #6A
4. Aerated Grit Basins
5. Primary Clarifiers
6. Equalization Basins
7. Screening/Grit Headworks Building
8. Blower Buildings
9. Pump Station #9
10. Aeration Basins (Activated Sludge)
11. Final Clarifiers
12. Gravity Sand Filters
13. Return Pump Stations #13 & 13A
14. Pump Stations #7 & #7A & #7B
15. Carbon Adsorption Basins
16. Carbon Regeneration Building
17. Chlorine Building
18. Chlorine Contact Basins
19. Dechlorination Building
20. Plant Water Pump Station #14
21. Plant Outfall
22. Storm Water Reservoir "C"
23. Gravity Thickeners
24. Gravity Thickener Pump Station #15
25. Dissolved Air Flotation Thickeners
26. Sludge Blend Tanks
27. Dewatering Buildings
28. Main Electrical Substation
29. Grounds/Field Maintenance Center
30. Meter Vault 1C
31. Maintenance Building
32. Administration Building
33. Laboratory/Field Services
34. Warehouse/Office Building
35. Digesters
36. Central Parking
37. Electrical/Electronics Building
38. Biosolids Stabilization
39. Onsite Landfill
40. Pond
41. Sulfur Dioxide Storage
42. Chlorine Storage
43. Dallas County Utility Reclamation District Pump Station
44. Landfill Operations
45. Warehouse

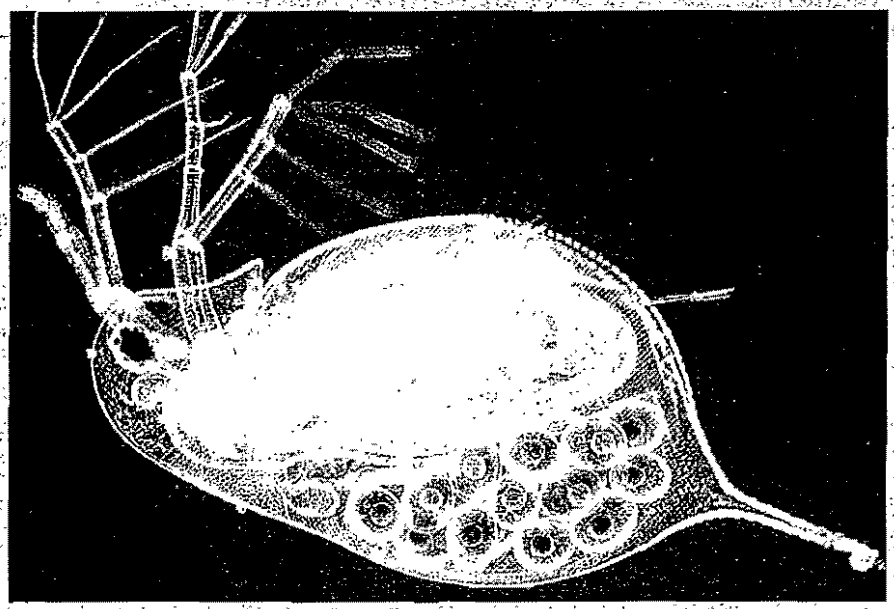
Previous Phase Improvements
Phase IV Improvements
Phase V Improvements

Making It Work With Technology, People And Programs

Technology

State-of-the-art technology makes the Trinity River Authority Central Regional Wastewater System efficient and economical. The Central System has a service area of over 450 square miles with a collection system extending more than 200 miles. The system uses current state-of-the-art technology in collection system telemetering, computer systems, operational control and maintenance management.

A process computer system receives all collection system meter stations and lift stations flows, and also controls and monitors various functions of the plant process. Additionally, the process computer system retrieves vital process information within seconds after it occurs. This is accomplished by strategically placed input and output points that the computer controls and monitors throughout the plant. The inventory control, purchasing, pretreatment, laboratory and maintenance management functions operate on computer systems with customized software programs providing information used in the decision-making process.



Biomonitoring—To pass regulatory requirements, the EPA designated organisms, *Ceriodaphnia dubia* and *Daphnia pulex*, must survive and reproduce in Central effluent.

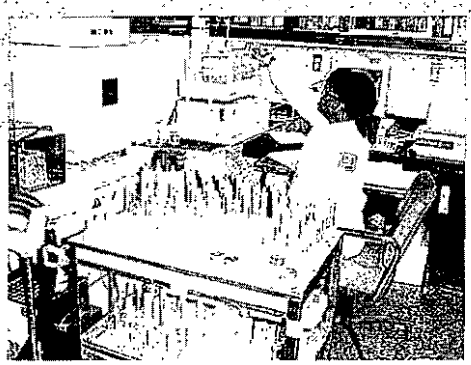
Odor Control

Odor control processes, constructed during capital improvement projects, include chemical addition using iron salts for treatment of sulfides in solution; modifications to the primary sections of the process to reduce the hydraulic free fall of wastewater that generates large amounts of hydrogen sulfide gas released to the atmosphere, and covering, collecting and scrubbing odorous compounds that are collected throughout the plant and distributed into the activated sludge process to biologically reduce odors to acceptable levels. Secondary activated sludge can also be returned to the front of the primary process to reduce high loadings of sulfide in the influent wastewater during odorous periods. The on-site monofill and biosolids staging facilities have extensive neutralization dispersing equipment, which is utilized to control odors at these areas. A sludge management pump station collects all residual sludge from the biosolids staging area and returns the side stream to the front of the plant.

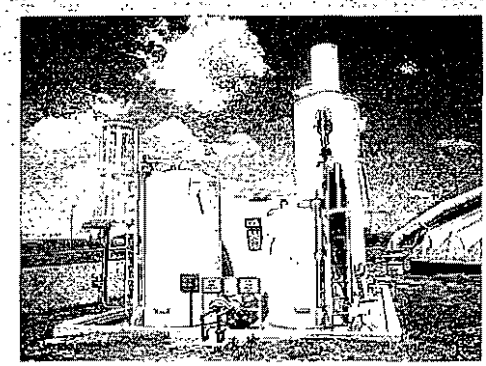
Toxicity Reduction

Both state and federal permitting agencies require whole effluent toxicity testing of the wastewater discharged to the Trinity River. The reduction of toxicity to extremely low levels is required to protect the aquatic organisms in the receiving stream and test species. Controlling toxicity begins at its source and an aggressive Pretreatment Program implemented by the Central Project for industrial discharges has been instrumental in minimizing toxic compounds in the influent wastewater.

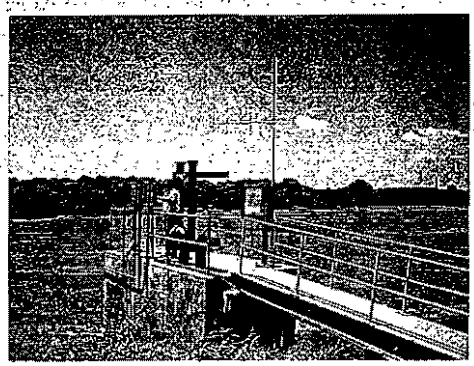
Also, optimizing process operations throughout the treatment train produces a secondary treated wastewater that consistently falls below acute and



Laboratory (Testing and Analysis)—Careful analytical monitoring of the treatment processes and industries discharging to the system by the laboratory assures a high quality discharge from the treatment plant.



Odor Control—Odor management has been an ongoing process with numerous facilities constructed to address the concern of both on-site and off-site odors.



Telemetry/SCADA System—A remote FM telemetry flow monitoring system is used to acquire up-to-date flow information from metering stations for billing purposes as well as monitoring operational status.

Making It Work With Technology, People And Programs

chronic toxicity levels for the specified test species. To insure wastewater toxicity is at an acceptable low level, the secondary wastewater is pumped through nine upflow carbon adsorption basins.

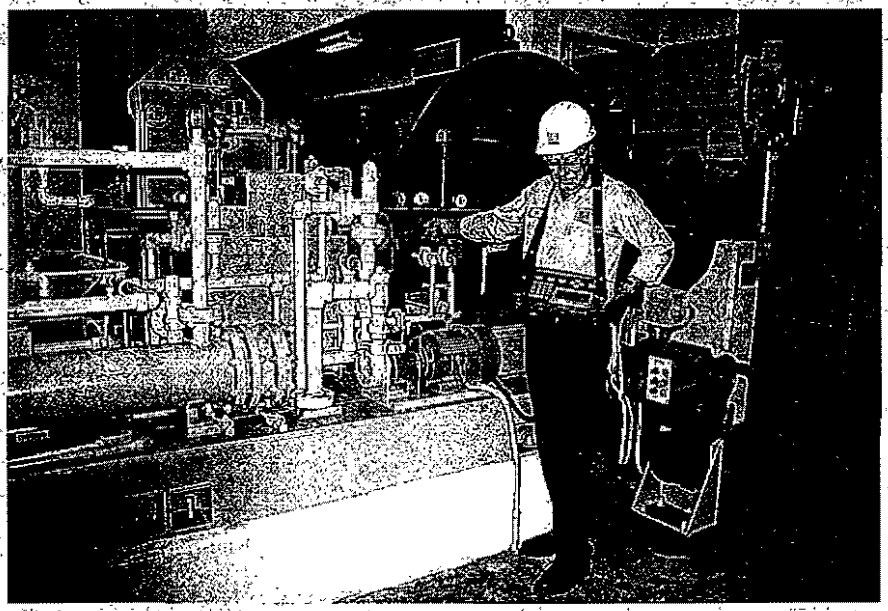
The carbon beds have been in operation since 1989 and are among the largest successful operating units in the United States. The carbon adsorption basins have clearly demonstrated throughout their operational history the ability to reduce toxicity to an acceptable level and meet the stringent permit requirements.

People

Technology is only as good as the people who are responsible for operating and maintaining the equipment. Central is staffed with professional, dedicated personnel that take pride in their work. The plant staff has an average length of service over six years, and includes a wide range of diversity in the varied skills required at the Central Facility.

The Central Regional Wastewater System is organized into three departments and their functions are as follows:

1.) *System Operation and Maintenance* - The Operation and Maintenance Department is responsible for the complete operation and maintenance of liquids and solids treatment process and equipment, lift stations, electrical and electronics, grounds and vehicles.



Cost and Efficiency Control—A reliability-based maintenance program insures that all major equipment is capable of maximum performanee when operated.

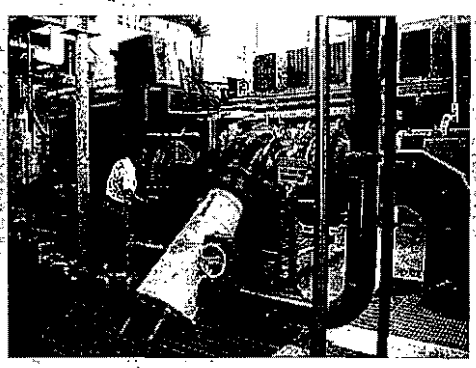
2.) *Administrative Services* - The Administrative Services Department is responsible for accounting, administrative support, vendor coordination, human resources, information systems, inventory control, purchasing and training.

3.) *Technical Services* - The Technical Services Department is responsible for all process laboratory analysis and the interceptor pipeline system, engineering, metering, monitoring and industrial pretreatment coordination. In addition, the laboratory and pretreatment areas perform outside contract services for other TRA projects and contracting parties.

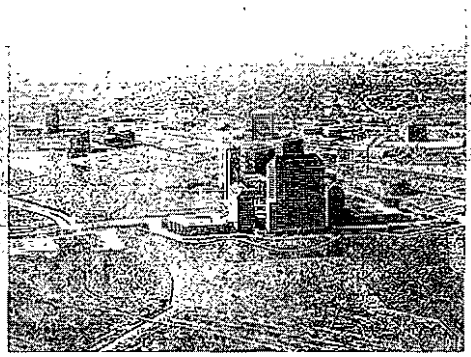
In summary, it requires the coordinated individual effort of dedicated employees having a wide range of skills to operate the system. These employees take great pride in providing a vital service to the communities that are members of the system.

Programs

To achieve and maintain cost effective operations, the Central System uses a program approach to achieving both long and short-term goals. Project wide employee participation in these programs insures success and an opportunity for personnel to develop

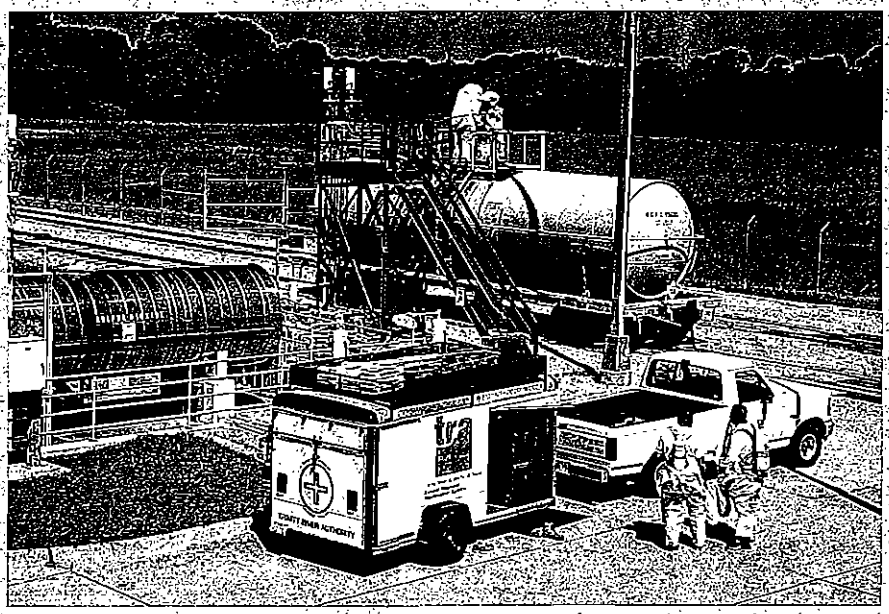


Gas Utilization—Methane gas produced in the sludge digestion proeess is connected to energy saving equipment that reduces annual operation and maintenance costs.



Water Reuse—the Las Colinas development in Irving uses effluent for maintaining lake levels and irrigation. This is the largest urban water reuse program in Texas.

Pretreatment—The pretreatment division provides field sample testing, industrial permitting, inspections, and technical support to the Central Plant, customer cities, state and federal agencies, and other TRA projects.



Safety—An aggressive safety program has been developed that utilizes employee participation in establishing a safe work environment for all employees.

and use skills. Typically, these programs transcend departmental boundaries and benefit the system as a whole in areas such as safety, cost reduction, emergency planning, plant appearance, etc.

The preventive maintenance program consists of planned maintenance activities that are scheduled by a computerized maintenance management system. This system directly interfaces with the maintenance work order system and tracks activities and associated cost. Predictive maintenance utilizes vibration-based machinery monitoring,infrared thermography and oil and lubrication analysis. Proactive maintenance is a management tool applied toward advanced investigative and corrective technology in solving the root cause of equipment failure. The goal of this program is to reduce equipment failures, extend its life and lower overall maintenance cost.

Various programs at Central to improve overall efficiency are recycling of freon, antifreeze, oil, paper, cans, glass and beneficial reuse of biosolids.

Dewatered sludges are processed at the biosolids staging area to produce a beneficial product that is applied at predetermined agronomic rates for the agriculture site. Dewatered sludge from the filter and belt press operations meet class "B" biosolids requirements and are 90 percent below the maximum ceiling limit established by both federal and state regulatory agencies for metals. Additional quicklime is utilized, if required, in the stabilization/pasteurization process to produce a class "A" biosolid.

Central's other two sludge options consist of an 80 acre on-site monofill and providing biosolids to several of its customer cities as an artificial soil for solid waste landfills.

Contracting Parties

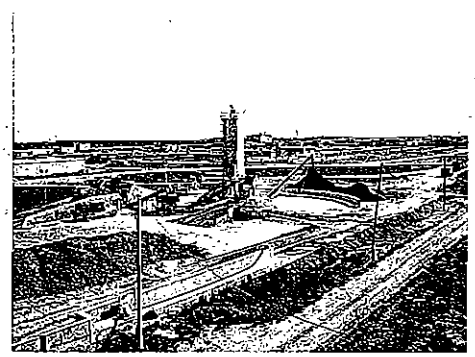
TRA management directs the planning, design, contruction and operational strategies with the advice and input of the Central System Advisory Committee. This committe is composed of one voting member from each of the System's 21 contracting parties. All decisions which affect service, operations, capital costs and the annual operating budgets are presented and dicussed with this committee before final action is taken by the TRA Board of Directors. This teamwork approach to problem solving produces a synergism in the decision-making process of this Project.

All contracting parties pay the same cost for wholesale wastewarer treatment, which is currently in the range of $1.10 per 1,000 gallons. Payments to TRA are based upon estimated costs and predicted allocations among the 21 parties. At the end of each fiscal year, an audited settle-up procedure returns all unspent funds to the 21 parties.

Emergency Respone

The Central Plant has a comprehensive Emergency Response Plan to protect employees and the general public. There are four response teams made up of eight members who are trained to contain chemical leaks at the Central Facility. These response teams use state-of-the-art emergency equipment when called into action. A safety trailer for responding to on-site emergencies is available to the emergency responders. The response team is also fully trained in all rescue techniques and confined space procedures.

Infiltration/Inflow—An inflow and infiltration evaluation, hydraulic modeling program and field inspections have been completed for the purpose of developing an interceptor management plan that comprehensively addresses collection system needs.



Biosolids—The biosolids staging facility has a capacity of 250 plus dry tons per day. Biosolids can be prepared at this location as either a class "A" or "B" material depending on its ultimate applicatiou.

Process Overview

TRA's Central System is not only a very large collection and water reclamation unit capable of producing a very high quality effluent, but it is also a full service facility that possesses in-house capability to accommodate virtually all of its operations, maintenance, administration and technical service needs.

Complete treatment can be provided to monthly average flows of 135 MGD and daily maximum flows of 335 MGD. During the treatment process, biological oxygen demand, suspended solids and ammonia nitrogen are reduced by 99 percent. The Central Plant has the mechanical dewatering capability of processing 200 dry tons of sludge daily.

Unique features you will find within the Central System include:

-A fully integrated environmental laboratory provides complete analytical capabilities for plant process monitoring and control for liquids and solids operation around the clock.

-A full service industrial pretreatment division whose services include industrial permitting, inspecting and sampling, which when coupled with the analytical capabilities of the laboratory provide the Central System and its customer cities with the ability to comply with all state and federal pretreatment laws.

-It is one of the few treatment facilities with on-site biomonitoring facilities which provide a broad range of toxicity testing capabilities.

-It features one of the largest successful carbon adsorption processes in active use that consistently produces a non-toxic high quality effluent water.

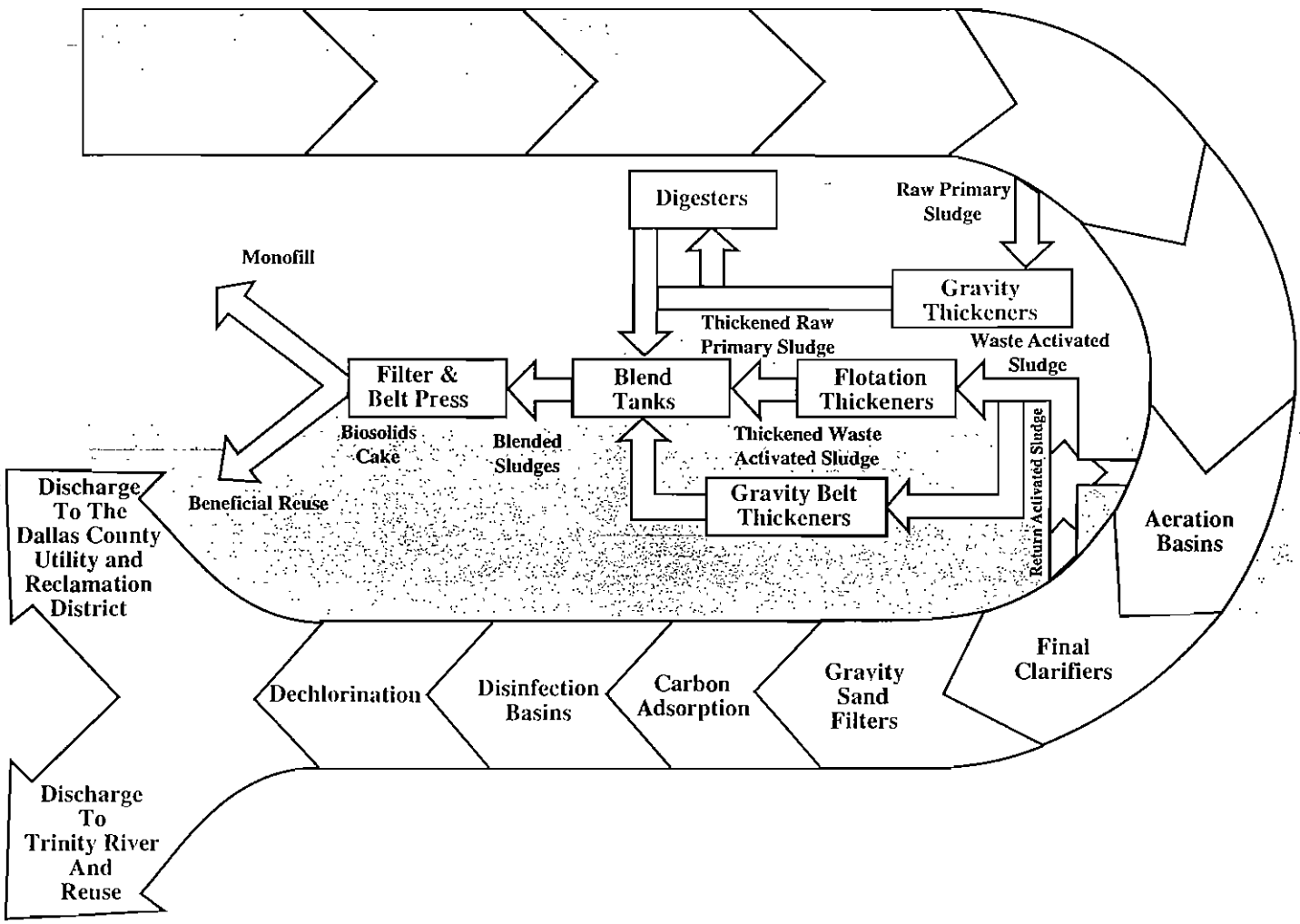
-The capability for in-house collection system monitoring and repair.

-The largest urban effluent reclamation and reuse program in Texas.

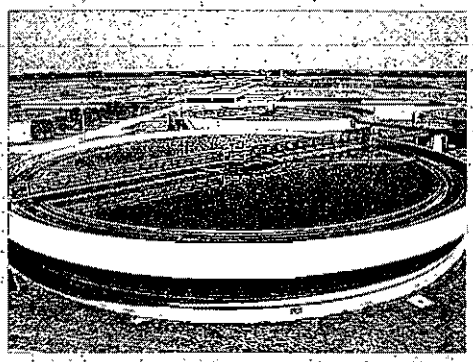
-Sludge dewatering using filter and belt presses produces a dry product which allows for the full array of disposal options.

-An innovative odor control program involving the collection, transportation and introduction of odorous gases into the activated sludge process as a primary method of odor reduction.

How Central Works

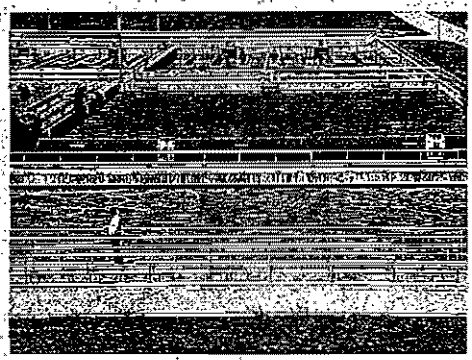


Primary / Secondary Treatment



Primary Treatment—The primary process consists of three steps. First, foreign objects are screened out of the wastewater to prevent damage to downstream equipment. Second, the screened wastewater is pumped to the aerated grit basins or pista grit systems where small particles, such as sand, gravel and other abrasive materials, are removed and disposed. Third, wastewater flows to the primary clarifiers, where the flow is slowed to allow gravity separation of solids.

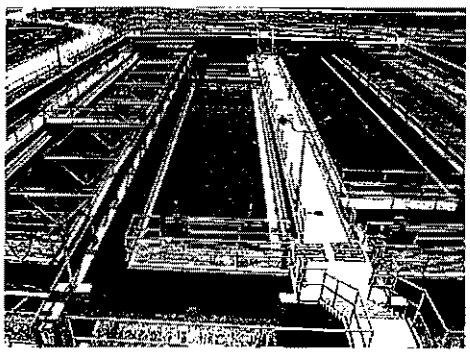
Solids that settle or float are separated and removed from the wastewater stream. Solids remaining in the wastewater are either suspended or dissolved solids.



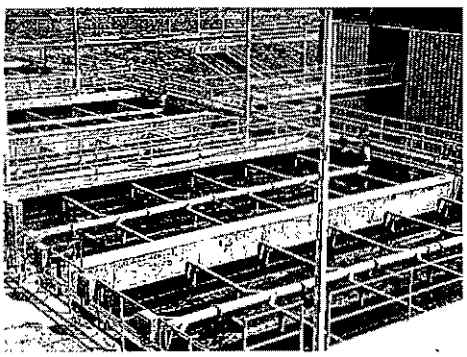
Secondary Treatment—Primary treated wastewater is evenly distributed into the aeration basins which utilize the activated sludge process. At the bottom of the basins, a network of air distribution pipes and fine bubble diffusers release minute air bubbles to provide mixing and oxygen for billions of microorganisms within this process. The microorganisms consume most of the organic contaminants in the wastewater.

Final clarifiers allow the microorganisms to separate from the water and settle on the basin floor to form a sludge blanket, ultimately producing clean effluent water. The sludge blanket is removed from the basin floor by floating bridges that return the sludge to the front of the aeration basin, which sustains the activated sludge process. The microorganism population is controlled by removing a small percentage to solids thickening.

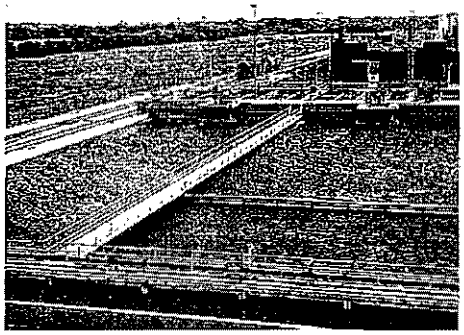
Advanced Treatment



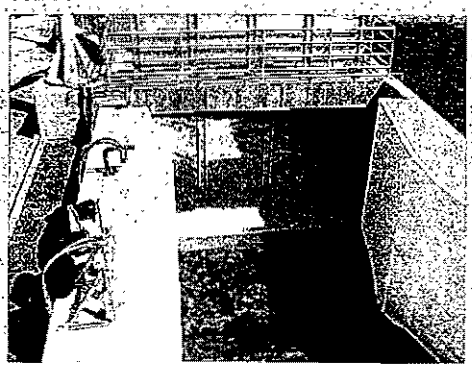
FILTRATION—Effluent water from the final clarifiers flows into continuous backwash gravity sand filters where solids are further removed.



CARBON—A majority of the effluent water filters through the carbon adsorption basin for reduction in toxicity. This provides a final polishing of the effluent.



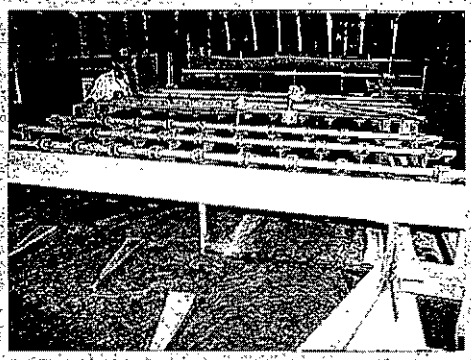
CHLORINATION—Effluent from the carbon basins flows to the chlorine contact basins, where the water is chlorinated for disinfection.



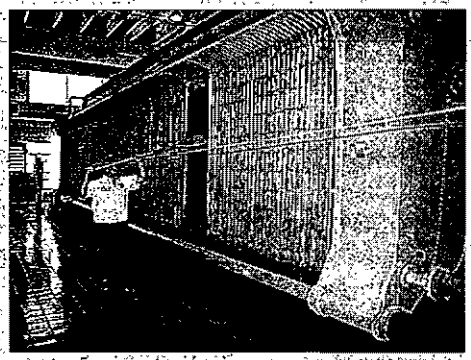
DECHLORINATION—Effluent from the chlorine contact basins flows to the dechlorination channel where sulfur dioxide is added to remove residual chlorine to less than 0.1 mg/l.

SYSTEMS CONTROL—The control center is staffed 24 hours a day by operations personnel who monitor and control operational processes.

Solids Handling



THICKENING—Primary sludge consists of the solids that were separated by gravity settling in primary treatment. The activated sludge process produces excess microorganisms (i.e. waste activated sludge), commonly called secondary sludge. Primary and secondary sludge are thickened in gravity thickeners, dissolved air flotation thickeners or gravity belt thickeners. This reduces the volume of sludge to be handled in the dewatering process.



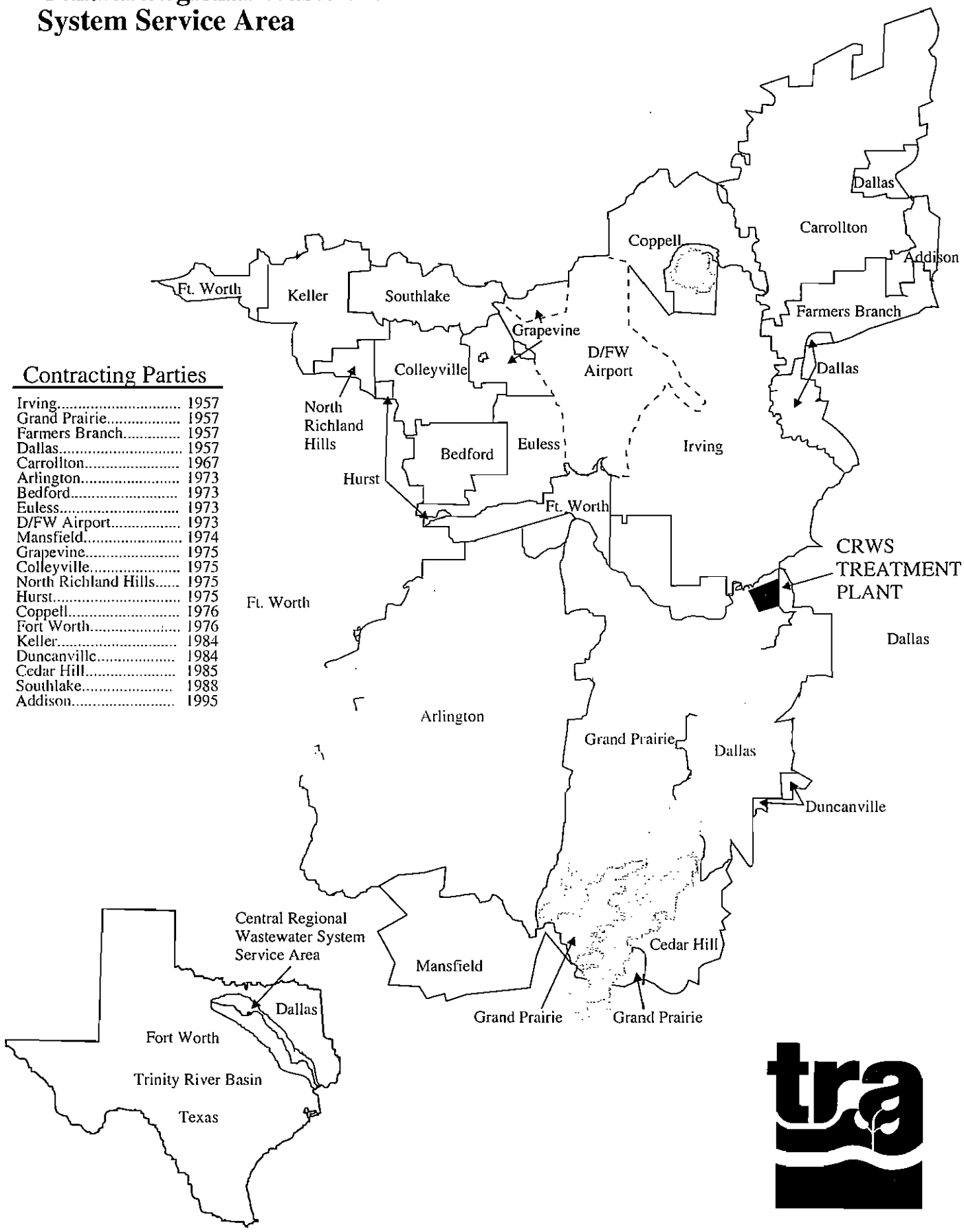
DEWATERING—Sludge from both the gravity and dissolved air flotation thickeners are blended and conditioned with lime and ferric chloride before being pumped under pressure into one of the three filter presses in the sludge dewatering process. The sludge is dewatered to a cake with an approximate dryness of 34 percent. Additionally, anaerobically digested sludge is mixed with primary and secondary sludges. A portion of the sludge is dewatered using a single two meter belt press to a 20 percent dryness.

DISPOSAL—Sludge product from the dewatering process is transported to the on-site monofill for final disposal options. The sludge is mixed with additional lime spread out in small lifts, and compacted by heavy equipment until the desired monofill elevation is achieved.

Class "A" biosolids from the Central Regional Wastewater System are used as an artificial soil amendment in customer cities landfills.

Class "B" biosolids are applied on farmlands at agronomic loading rates which increase crop yield and lower the farmer's production costs.

Central Regional Wastewater System Service Area



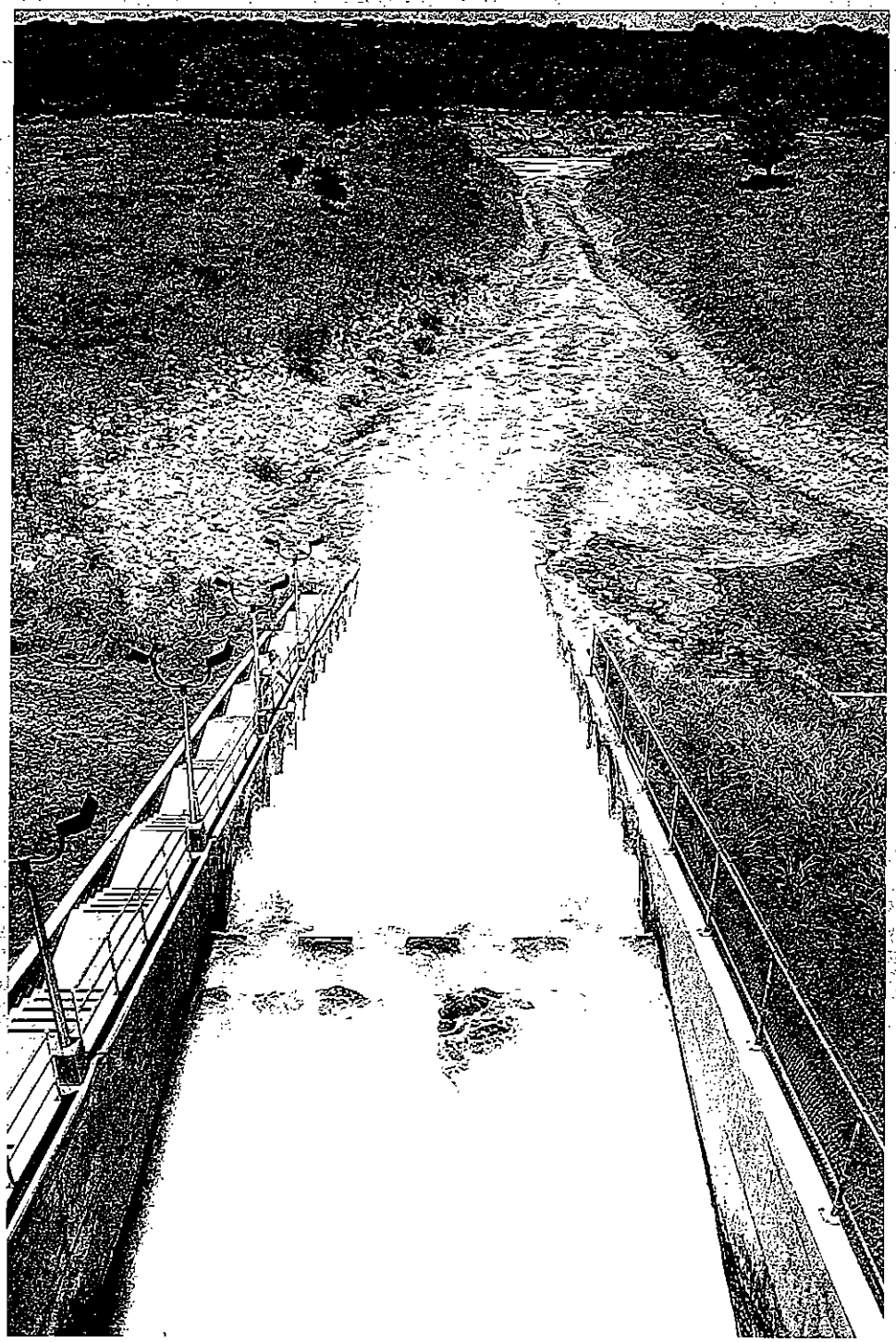
Contracting Parties

Irving	1957
Grand Prairie	1957
Farmers Branch	1957
Dallas	1957
Carrollton	1967
Arlington	1973
Bedford	1973
Euless	1973
D/FW Airport	1973
Mansfield	1974
Grapevine	1975
Colleyville	1975
North Richland Hills	1975
Hurst	1975
Coppell	1976
Fort Worth	1976
Keller	1984
Duncanville	1984
Cedar Hill	1985
Southlake	1988
Addison	1995

A Cleaner Trinity

The Trinity River basin lies in eastern Texas and has a total length of 360 miles. The total area drained by the Trinity River and its tributaries is 17,969 square miles, or approximately six percent of the state's land area.

Dallas and Fort Worth, which were founded on the banks of the Trinity River in the mid-1800s, totally dominate the upper portion of the Trinity River basin. The Dallas/Fort Worth metroplex is the largest inland population center in the United States and has always had a profound impact on water quality. In 1925, a State Health Department report stated, "The flow below Dallas for many miles does not impress one as being that of a river. The stench from its inky surface (is) putrescent with the oxidizing processes to which the shadows of overarching trees add stygian blackness and the suggestion of some mythological river of death. With this burden of filth the purifying agencies of the stream are prostrated. It lodges against obstructions in the stream and rots, becoming hatcheries of mosquitoes and malaria. A thing of beauty is thus transformed into one of hideous danger."

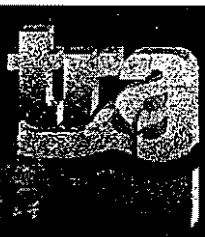


In the early years of the Dallas /Fort Worth metropolitan area's development, it was not uncommon for major tributaries of the Trinity River to run dry. Today, because of the major lakes in the upper watershed and wastewater plant discharges, the Trinity River flows with more volume every year. In dry weather, it is not at all uncommon for the base flow of the Trinity River to be 95 percent treated wastewater. The Trinity River remains vulnerable and provides very little dilution. Because of these considerations, wastewater treatment plant operators process influents to the highest advanced treatment standards in the nation.

Approximately three and one-half million people are served by eight major regional wastewater treatment plants operated by the Trinity River Authority, Dallas, Fort Worth, Garland and the North Texas Municipal Water District. Wastewater facilities operated by these entities release more than 500 million gallons per day of treated wastewater that has 98 percent of all conventional contaminants removed. As a result of our combined efforts, the Trinity River is no longer anyone's version of a "mythological river of death."

Trinity River Authority of Texas
Central Regional Wastewater System
6500 West Singleton Blvd.
Dallas, Texas 75212
-or-
P.O. Box 531196
Grand Prairie, Texas 75053-1196
(972) 263-6078
Fax: (972) 264-1382

Trinity River Authority of Texas



Central Regional Wastewater System

2001 Five-Year Plan Update and Summary of Proposed Capital Improvements

January 2001

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS - DESIGNERS - SCIENTISTS

Trinity River Authority of Texas

Northern Region Office

DATE: January 16, 2001

FILE: 3110.102

TO: MEMBERS, Advisory Committee
Central Regional Wastewater System

REMINDER NOTICE – Wednesday, January 24, 2001, 10:30 a.m.
MEETING PLACE - Central Regional Wastewater Treatment Plant
6500 West Singleton Blvd., Grand Prairie, Texas

THIS IS A REMINDER notice for the meeting of the Central Regional Wastewater System Advisory Committee scheduled for 10:30 a.m., Wednesday, January 24, 2001 at the ***Central Regional Wastewater Treatment Plant in Grand Prairie, at 6500 West Singleton Blvd., Grand Prairie, Texas***. You are invited to lunch immediately following the meeting. Please RSVP to Cheryl Abbott at 817-439-5100 or abbottc@trinityra.org.

The primary purpose of this meeting will be the Series 2001 Bonds. Enclosed for your review are an agenda; minutes of the September 12, 2000 meeting; a Planning, Design & Construction Status Report; and a memo concerning the issuance of the Series 2001 Bonds.

Due to the importance of this meeting, please plan to send a representative. If you have questions prior to the meeting, please contact this office at 817-493-5100.

Warren N. Brewer/cea

WARREN N. BREWER
Regional Manager
Northern Region

/cea

c: Danny F. Vance, General Manager
Patricia M. Cleveland, Manager, Operations
Bill L. Tatum, Manager, CRWS

GET ANY FINANCIAL INFORMATION REGARDING BOND SALE TO R. MORAVEC SO THAT HE CAN PROJECT NECESSARY BUDGET NUMBERS. ALSO COPY ROY & CHRIS.

AS A RESULT OF THE BOND SALE RATES WILL GO UP FROM $1.04 TO $1.10 / REFER TO 2001 PROJECTIONS.

P.O. Box 240
Arlington, Texas 76004-0240
(817) 493-5100

Legislature is looking at recodification of TRA statute.

Dan Vance will be contacting member cities if necessary

Senate Bill 724
TML website & refer to city Related Bill
House Bill 1822 or 1812.

Keep Eye on Bills relating to water resource Development

TNRCC wastewater overflow reporting.