UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT AND COMPLIANCE ASSURANCE

EPA-330/2-96-006

FACILITY EVALUATION
BLUE PLAINS WASTEWATER TREATMENT PLANT
WASHINGTON, D.C.

January 1996

Brian McKeown
Project Leader

NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
Diana A. Love, Director
Denver, Colorado

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT AND COMPLIANCE ASSURANCE

EPA-330/2-96-006

FACILITY EVALUATION
BLUE PLAINS WASTEWATER TREATMENT PLANT
WASHINGTON, D.C.

January 1996

Brian McKeown
Project Leader

NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
Diana A. Love, Director
Denver, Colorado

CONTENTS

CONTENTS (cont.)

FIGURES

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

INTRODUCTION

The EPA National Enforcement Investigations Center (NEIC), at the request of and in conjunction with EPA Region 3, conducted a joint inspection of the Blue Plains Wastewater Treatment Plant (Blue Plains) in Washington D.C., on November 15 through 17, 1995. The objectives were to: (1) provide a follow-up to the April 1995 NEIC inspection [NEIC report No. EPA-330/2-95-014] which included an evaluation of Blue Plains administration (budget, procurement, staffing), preventive maintenance program, and solids handling facilities; and (2) determine if there were critical financial and/or operation and maintenance issues needing immediate attention by EPA Region 3. This report, which summarizes the initial findings from the November inspection, is divided into two sections: (1) Budget and Finance, and (2) Operation and Maintenance. It should be noted that there are overlapping issues between the two sections because many of the budgetary problems facing the District are the basis for operation/maintenance problems at Blue Plains.

BUDGET AND FINANCE

- Revenue reserves, which have been generated from District of Columbia (District) and suburban water and sewer bills, are not available to provide for Blue Plains' needs. The accounting records of the District's Financial Management System (FMS) show that the District Water and Sewer Utility Administration (WASUA), which includes Blue Plains, has an operating budget reserve on paper in its Water and Sewer Fund (Fund 403) of $96,060,208 (as of November 1, 1995). However, all District revenues are maintained in a single cash management pool, and can be redirected for use by other areas of the District Government.

According to Blue Plains management, they are unable to access the Fund 403 reserves to address the operational problems at the treatment plant.

- Blue Plains' Controller has projected that the WASUA capital improvement budget (Fund 350), which provides funds for facility construction and long-term maintenance, and is primarily funded through EPA grants and bond sales, will run out of money by February 1996. A projected $20 million shortfall will need to be made-up in FY96 to account for the inability of the District (due to its poor credit rating) to sell general obligation bonds, or ongoing projects will need to be delayed or terminated. Any slowdown or cessation of the capital improvement projects could impair Blue Plains' ability to reliably treat current wastewater flows, prevent Blue Plains from complying with the July 1, 1996 deadline for increasing plant hydraulic capacity, and delay projects (such as the Biological Nitrogen Reduction Demonstration project) required by the June 26, 1995 Consent Decree.

- Lack of payment to chemical and equipment suppliers, compounded by a protracted and cumbersome procurement system, has impaired Blue Plains' ability to ensure an adequate inventory of essential treatment chemicals (ferric chloride, lime, and polymer) and quickly procure needed parts for getting treatment units back on line. The District must immediately address these problems, because they are seriously impacting current treatment capability and reliability at the Blue Plains plant.

- Lack of payment to on-site contractors and its subsequent impacts, such as work stoppages to ongoing maintenance and construction projects at Blue Plains, continue to be a problem. Many contractors are owed substantial sums of money. If the District continues to delay payments to contractors, further reductions in the work force or interruptions in services can be expected.

- The currently proposed WASUA operating budget, contained in the District of Columbia Appropriation Bill, may not provide for adequate plant staffing. The District FY96 budget request before Congress authorizes 1,024 FTEs for WASUA, 185 below currently filled positions. NEIC noted, in its July 1995 report, that there were a high number of vacancies, primarily due to a hiring freeze and an early retirement buy-out program. In response to an August 30, 1995 EPA Region 3 Administrative Order, the District committed in its short term compliance plan to direct a start-up contractor to recruit additional qualified personnel. The inability to fill vacancies, coupled with a potential reduction in force necessary because of the budget, will exacerbate existing plant operational problems and result in the District's failure to fully implement its short term compliance plan.

- A long term solution to the budget and finance problems of WASUA requires the formation of a separate Water and Sewer Authority, as proposed by the Council of the District of Columbia in Bill 11-102 [Water and Sewer Authority Establishment and Department of Public Works Reorganization Act of 1995]. With increased wastewater fees, and (partial or phased-in) return of WASUA reserves, the Authority will be able to raise capital for required plant improvements through the issuance of tax-exempt revenue bonds, an option not available under the current organizational structure. A separate budget, procurement and personnel system within the Authority should also eliminate the current problems (paying contractors, procuring parts and chemicals, etc.) plaguing Blue Plains. Therefore, the establishment of a separate

Authority should continue to be supported and its rapid implementation encouraged.

OPERATION AND MAINTENANCE

- Maintenance operations at Blue Plains continue to be in a reactive mode. The Bureau of Maintenance Services (BMS) staff and support contractors cannot keep up with the "emergency" work orders, and very little preventive maintenance is being conducted. The lack of preventive maintenance is decreasing the service life of facility equipment.

- BMS relies on contract personnel for many of the high-skill repairs required at Blue Plains and is dependent on the services of these contractors in order to operate. Unpaid bills threaten the continued ability to have this work force available to Blue Plains. Because BMS is highly dependent on the contractor work force, and with the maintenance work already in critical shape, this problem continues to threaten the ability of Blue Plains to reliably meet wastewater treatment needs.

- The inability to maintain adequate inventories of critical wastewater treatment chemicals continues to impact treatment operations at Blue Plains. Chemical shortages have resulted in permit violations, high solids inventories in aeration basins, and reduced solids dewatering capacity.

- At the request of EPA Region 3, NEIC has identified critical treatment processes (or specific process improvements) that are essential for Blue Plains' ability to reliably treat current wastewater flows in the near term. While many process equipment failures at a complex facility such as Blue Plains can potentially create treatment problems and Clean Water Act violations, NEIC believes that certain plant treatment process improvements at Blue Plains have considerable potential for minimizing treatment upsets/permit violations. These improvements include: (1) keeping an adequate number of nitrification sedimentation basins in service; (2) maintaining the vacuum filters in operational status as a supplement to the centrifuges until an alternative supplemental dewatering system is in place, and improving centrifuge performance (reducing outages) by providing sludge screening equipment; (3) completion of the multi-media filter rehabilitation; (4) maintaining the lime feed system (for nitrification) in operational status until rehabilitation/replacement can be conducted; and (5) improving primary treatment performance through chemical feed and pumping system improvements.

INVESTIGATION FINDINGS

INVESTIGATION FINDINGS

BUDGET AND FINANCE

Many of the operation and maintenance problems identified in NEIC's April 1995 inspection of the Blue Plains wastewater treatment plant [NEIC Report *330/2-95-014;* July 1995], were the result of budgetary issues. The Blue Plains wastewater treatment facility is part of the Washington D.C. (the District) Department of Public Works (DPW), as a major component of the Water and Sewer Utility Administration (WASUA). One of the objectives of the November inspection was to provide an update on WASUA budgetary issues. This section addresses the following topics: (1) WASUA budget, reserves, and staffing; (2) vendor and contractor payments; (3) proposed water and sewer rate increase; and (4) proposed Water and Sewer Authority.

WASUA Budget, Reserves, and Staffing

The activities at WASUA are funded primarily through direct user charges (water and sewer bills). In accordance with D.C. Codes, the revenues should be maintained and accounted for as an enterprise fund. However, as outlined in NEIC's July 1995 report, all revenues are maintained in a general District cash management pool. Although WASUA revenues are accounted for separately, WASUA funds may be redirected to other areas of the District government through an interfund borrowing transaction. No specific accounting of these redirected funds are maintained.

The WASUA funds obtained through direct user fees (water and sewer bills from District residents and a percentage of the suburban user bills) are maintained in Fund 403 [Water and Sewer Fund]. This fund supports the annual Blue Plains operation and maintenance costs (salaries, chemicals and parts, administrative overhead, etc.) At the end of FY94, WASUA had a cumulative reserve of $83,020,320. As of November 1, 1995 (the end of FY95), the WASUA reserves had increased to $96,060,208 [Appendix A], an increase in the reserve of approximately $13 million for FY95. While this reserve money exists on paper in the District's Financial Management System (FMS) accounting records, Blue Plains management has indicated that they cannot access their reserves. Fund 403 reserves are maintained in the general cash management pool, and may be redirected to other areas of the District Government.

The WASUA funds obtained through EPA grants, revenues from general obligation bond sales, and a percentage of suburban user fees, are maintained in Fund 350 [Water and Sewer Capital Projects]. This fund supports new construction projects and long-term maintenance/rehabilitation projects. While these funds are accounted for separately, they are also part of the District general cash management pool, and can also be redirected (This is of particular concern, because EPA construction grant money could potentially be spent on ineligible District activities). As of November 1, 1995, there was a reserve in Fund 350 of $17,316,743 [Appendix B]. Projected FY96 needs for wastewater capital projects is approximately $70 million. It was anticipated that additional grant funds and the sale of general obligation bonds would provide funding for the remaining FY96 needs for the capital program. The last sale of general obligation bonds by the District for wastewater improvements was in July 1994. The poor status of the District's bond rating ("junk bond" status) makes the sale of additional general obligation bonds very expensive, if not infeasible. Blue Plains' Controller stated that their current projections are that Fund 350 will run out of money by February 1996, and that a $20 million shortfall in FY96 will need to be made-up to account for the inability to sell general obligation bonds. Some projects could be delayed or payments deferred, to extend the time before this fund is depleted; however, if additional revenues cannot be obtained, projects would need to be suspended or terminated for convenience (demobilized) for all ongoing contract work. A slowdown or cessation of the capital improvement projects will impair Blue Plains' ability to reliably treat current wastewater flows, prevent Blue Plains from complying with the July 1, 1996 permit deadline for increasing the hydraulic capacity of the plant, and delay projects [such as the Biological Nutrient Reduction (BNR) Demonstration project] required by the June 26, 1995 Consent Decree. In order to continue the capital program, two potential funding mechanisms should be evaluated: (1) determine if any of the operating budget reserves from Fund 403 can be made available to support the capital fund; or (2) borrow money from the Treasury, as authorized by the District of Columbia Financial Responsibility and Management Assistance Act of 1995.

WASUA requested an FY96 budget of $250,374,000 with a staffing level of 1,709 FTEs, a net increase of $80,865,000, as compared to actual FY94 expenses. The Legislative Council, Committee on Public Works and the Environment, did not support the proposed budget, because the Executive office had not submitted an authorized water/sewer rate study or water/sewer rate increase request. Without this rate increase, the proposed budget would have resulted in significant deficit spending. The committee recommended that the budget request be conditioned on the approval of a water rate increase that would justify the proposed budget request. When this water rate increase was not submitted to the Legislature by the Executive office, the Legislative Committee of the Whole recommended a budget level based on anticipated revenues, and (based on the Mayor's recommendation) eliminated 8 positions and all currently vacant FTEs, for a total authorized FTE of 1,124. The number of vacancies must have been miscounted, because current information provided to NEIC indicates that WASUA has 1,209 currently filled positions, 85 filled positions above the authorized 1,124 FTEs (for a miscount of 77 positions, after accounting for the recommended 8 eliminated positions). This situation has been exacerbated by the Financial Control Board recommending a reduction of 704 FTEs for the District as a whole. The D. C. Council has allocated 100 of this 704-FTE reduction to WASUA. The current request before Congress has a proposed FY96 budget of $199,152,000 from general revenues with a total authorized FTE of 1,024 (185 below currently filled positions). At this time, it is unclear if the 77 positions, which were apparently eliminated by mistake, could be easily reauthorized. George Thomas, Blue Plains' Controller, indicated that the proposed budget before Congress would easily support these positions. Restoration of the additional 100 FTEs and increasing the budget to the original request would require passing a water/sewer rate increase. It was noted in NEIC's July 1995 report that high vacancies, particularly in supervisory positions, and lack of an adequate (and qualified/certified) staff were contributing to operational problems at Blue Plains. If layoffs are required, this problem will be exacerbated. Blue Plains had responded to the EPA Region 3 August 30, 1995 Administrative Order, that their short term compliance plan included a Start Up contractor developing a staffing plan, and retaining a recruiting firm to assist in attracting the necessary additional qualified personnel. Under the current budget limitations, Blue Plains will be unable to meet this aspect of their short term compliance plan.

<u>Vendor and Contractor Payments</u>

The District-wide fiscal problems have impaired Blue Plains ability to ensure an adequate inventory of essential treatment chemicals (ferric chloride, lime, and polymer). The primary fiscal problem is the inability of the District to pay vendor invoices in a timely manner. Blue Plains' current lime vendor (Tricon) supplies three types of lime to the facility: (1) pebble lime for the nitrification process, (2) hydrated lime for vacuum filtration (solids dewatering), and (3) granular lime used for post-liming centrifuge-dewatered sludge. Tricon's invoices were unpaid for months and was owed a few hundred thousand dollars at the time of the November inspection. Since the District is one of this company's primary customers, they are not in a position to be able to operate with this type of debt. Therefore, Tricon terminated lime deliveries to Blue Plains. Deliveries of ferric chloride were interrupted in August 1995 due to a failure to pay the vendor, requiring cutbacks in ferric feed at primary treatment, and ultimately resulting in a permit violation (monthly total phosphorus limit). This situation has been compounded by the current budget impasse. Because the District of Columbia FY96 Appropriation Bill has not been passed, additional restrictions have been placed on the issuance of purchase orders. In addition, Blue Plains does not have long-term contracts in place for all of the chemicals used at the facility. Blue Plains has reached an agreement with the Washington Suburban Sanitation Commission (WSSC), which contributes approximately 50% of Blue Plains' influent flow, to purchase necessary chemicals and subtract these expenditures from their quarterly payments (to pay for their share of the wastewater treatment costs) to the District. The purchase orders being issued by WSSC have been for 1-week increments and were intended as a short term (2 to 3 week) emergency measure. Because the purchase orders have only authorized 1 week of chemical supply needs, and it can take some time to issue the purchase order and arrange for chemical deliveries, Blue Plains staff are constantly spending time on this issue and short-term outages are not uncommon. As a short-term solution to eliminating chemical inventory outages, NEIC recommended that Blue Plains management request WSSC to issue longer term (2 to 3 month) purchase orders for chemical supplies. This would provide for uninterrupted chemical deliveries, and ensure that money collected from suburban users is dedicated to wastewater treatment needs and not redirected to other District activities. A near-term solution requires that the District award long-term contracts for all chemical supply needs at Blue Plains and maintain payments to these vendors.

The District's fiscal problems have also impaired Blue Plains' ability to rapidly repair treatment units that are out of service and need critical parts. High-turnover parts (pumps, bearings, etc.) have been depleted from available inventory and as outlined in NEIC's July 1995 report, the District's protracted and cumbersome procurement system is not able to respond quickly to these needs. Currently, Blue Plains does not have any Blanket Purchase Agreements that will be honored. On a number of occasions since the NEIC April 1995 inspection, Blue Plains has had all five lime slakers out of service due to mechanical problems. Nitrification sedimentation basins have had to be removed from service because replacement sludge return pumps or chains/flights/gear boxes (for the sludge collection equipment) were not available. Solids dewatering capacity has been reduced, on a number of occasions, because parts were needed to get lime mixing or sludge grinding equipment back on-line. As these examples demonstrate, financial problems are impairing wastewater treatment operations at Blue Plains. As an interim measure, WSSC could provide the same parts procurement relief (by procuring parts through its procurement system and subtracting these costs from its quarterly payment) that is currently being provided for chemical supply. A near-term solution requires that direct purchase order approval authority be delegated to Blue Plains' plant management in order to be able to respond to immediate repair needs at the facility.

Lack of payment to on-site contractors and its subsequent impacts, such as work stoppages to ongoing maintenance and construction projects at Blue Plains, continues to be a problem. MCI, one of the capital improvement construction contractors (responsible for secondary treatment improvements, installation of addition filter influent pumps, and aeration channel improvements) reduced their staff to a skeleton crew, after the District fell behind in their payments by approximately $2 million. Danis Heavy Construction Company, working on the Biological Nitrogen Reduction pilot project, delayed shipment of storage tanks, inductors, and pumping equipment due to lack of payments. In the NEIC July 1995 report, it was noted that Jet Blast, a maintenance contractor, walked off the site in June when the District failed to pay them $300,000 in past due bills. Jones and Woods, a mechanical contractor, walked off the site for 5 months in FY95. Currently, Montgomery Mechanical, which maintains pipes/valves and heating and ventilation systems, and Pennsylvania Electric Coil, which rebuilds electric motors and drives, are currently not working due to lack of payment. A complete list of all maintenance contractors and the amount owed to them by the District was not available during the November NEIC inspection; however, the information that was provided demonstrates the seriousness of this problem. M. C. Dean, an electrical contractor that works on high voltage systems, is owed $357,000 (as of November 15, 1995). Heller, an electrical contractor that works on low voltage systems, is owed $303,000 (as of October 5, 1995). Ideal Electronic, another electrical contractor, is owed $460,000 (as of November 15, 1995). Jones & Woods, a mechanical contractor, is owed $160,000 (as of November 15, 1995). Johnson Controls, an instrumentation contractor, is owed $164,000 (as of November 15, 1995). Leeds and Northrup, and DynaTran, both maintenance contractors, are owed $590,000 (as of November 8, 1995) and $470,000 (as of November 14, 1995), respectively. Many other contractors are also owed substantial sums, and if the District does not improve its ability to pay its bills, further reductions in force or interruptions in services can be expected.

Proposed Water and Sewer Rate Increase

Black and Veatch, a consultant to WASUA, has prepared a proposed water and wastewater rate increase proposal. In the Black and Veatch report, it is noted that District utility rates for water and wastewater have not been increased since October 1, 1986. This report concluded that in order to meet projected total wastewater revenue requirements, a 78.7% increase in billings (to be implemented no later than March 1, 1996) is indicated. This report is currently at the Mayor's office awaiting action.

Water and Sewer Authority

The long term solution to the budget and finance problems of WASUA requires financing separate from the rest of the District through the formation of an independent Water and Sewer Authority, as proposed by the Council of the District of Columbia in District Bill 11-102 (Water and Sewer Authority Establishment and Department of Public Works Reorganization Act of 1995). This Bill has been through public hearings and markups, and was passed by the D.C. Council on January 4, 1996. It is expected that Mayor Barry will sign it. The Financial Control Board will have to approve the bill, then Congress will have 30 days to review, approve, and/or modify the Bill.

A separate Water and Sewer Authority should eliminate many of the problems plaguing Blue Plains by forming a separate entity which could establish a true enterprise fund, with separate authority for contracting, personnel and budgetary matters. With increased wastewater rates, and (partial or phased-in) return of WASUA reserves, the Authority will be able to raise capital for required plant improvements through the issuance of tax-exempt revenue bonds, an option not available under the current organizational structure. As this Bill has not yet been adopted, and it will take time to establish the requisite personnel, budget and procurement systems within the newly formed Authority, it is crucial to track the progress of this legislation. The longer the delays in the formation and establishment of a functioning Authority, the greater the potential for more operational problems at the Blue Plains facility. Therefore, the establishment of a separate Authority should continue to be supported and its rapid implementation encouraged.

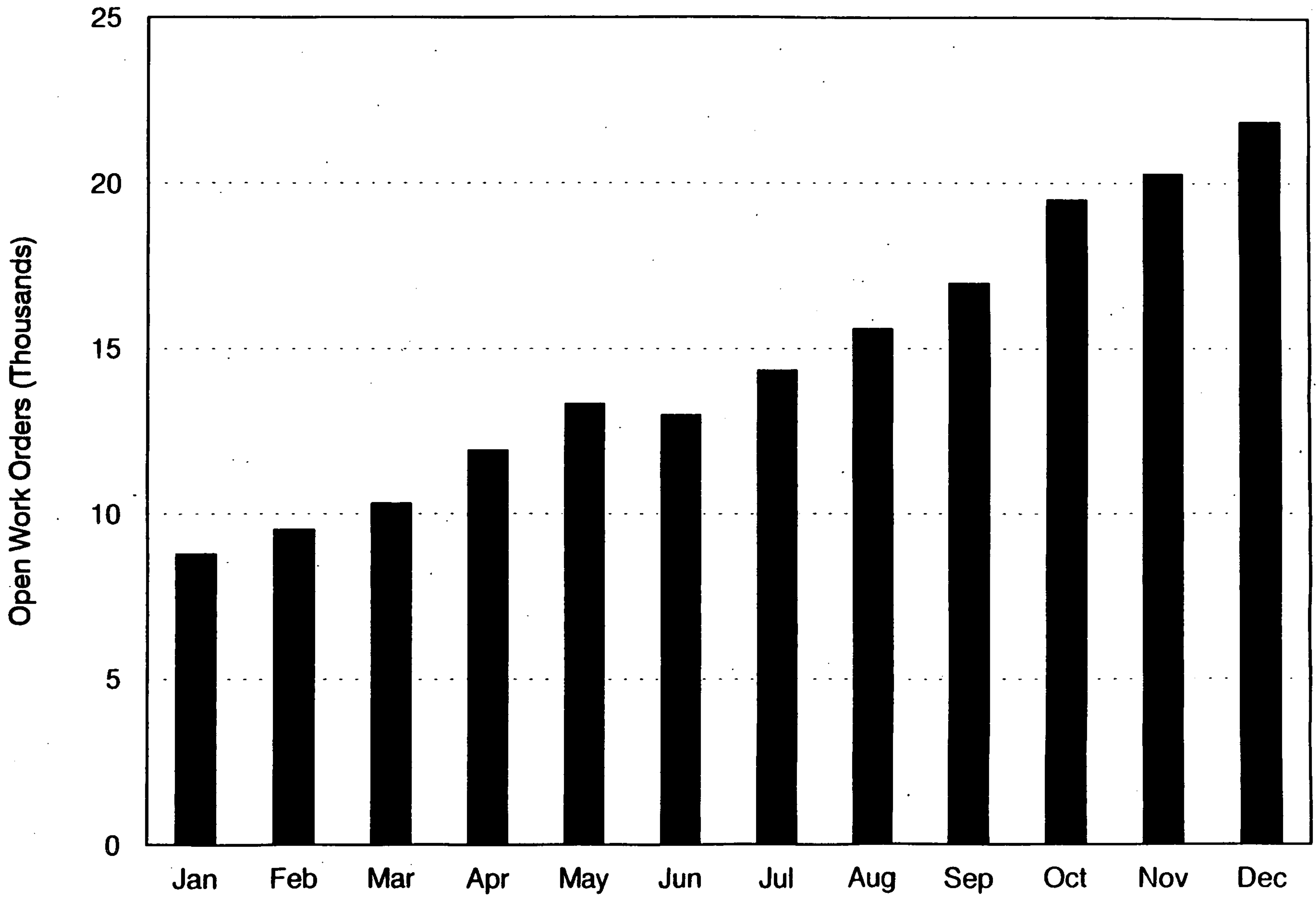
OPERATION AND MAINTENANCE

The review of operation and maintenance activities at Blue Plains focused on two items: (1) determining the current status of items addressed in NEIC's July 1995 report (have things improved/deteriorated), and (2) identifying critical plant treatment process improvements at Blue Plains that have considerable potential for minimizing treatment upsets/permit violations. Overall, conditions at the plant do not appear to have improved since the NEIC inspection in April 1995, with some areas clearly being in worse shape. This section addresses the following topics: (1) maintenance activities, (2) chemical inventories, and (3) critical plant treatment process improvements needed at Blue Plains.

Maintenance Activities

Maintenance activities at Blue Plains continue to be in a reactive mode. Maintenance staff are not able to keep up with the "emergency" work orders, and very little preventive maintenance is being completed. The number of open (uncompleted) work orders has increased from 8,773 on January 1, 1995 to 21,841, as of November 30, 1995. Figure 1 depicts the cumulative number of open (uncompleted) work orders for 1995. As the cycle of not conducting preventive maintenance continues, the number of equipment failures increases. The lack of preventive maintenance is decreasing the service life of facility equipment. The depletion of the high-turnover parts in Blue Plains' inventory and the problems of procuring parts (as outlined in NEIC's July 1995 report and discussed in the Finance and Budget Section of this report) is a significant factor in the Bureau of Maintenance Services (BMS) inability to keep up with required maintenance activities. The original WASUA FY96 budget request of $250 million allocated $46 million to BMS; however, the reduced WASUA budget only allocated $32 million to BMS (the approximate amount spent in

Figure 1
Open (Incomplete) Work Orders [1995]
Blue Plains WWTP, Washington, DC



the previous fiscal year). Therefore, without an increased budget, improvements in the maintenance area during the next fiscal year are unlikely.

BMS relies on contract personnel for many of the high-skill maintenance repairs that are required at Blue Plains and is dependent on the services of these contractors in order to maintain plant operational conditions. Unpaid bills, as outlined in the Budget and Finance section, threaten the continued ability to have this work force available to Blue Plains. It is not possible to predict which contractors may discontinue or reduce services and what the potential impacts to the plant will be. However, with BMS being highly dependent on the contractor work force and the maintenance work already in critical shape, the inability to pay contractors continues to threaten the ability of Blue Plains to reliably meet wastewater treatment needs.

During 1995, the number of nitrification sedimentation basins that have been off-line has steadily increased. The number of sedimentation basins on-line from April to December 1995 is contained in Appendix C. The average number of nitrification sedimentation basins off-line due to mechanical problems from April to November 1995 has been: April - 4, May - 5, June - 4, July - 6, August - 7, September - 7, October - 6, and November - 8. During November 1995, 10 of the 28 nitrification sedimentation basins were off-line due to mechanical problems on 7 days. The main problem responsible for out-of-service nitrification sedimentation basins is the need for a complete rehabilitation/replacement of the sludge collection system (flights, chains, gear boxes, etc.) Solids wasting and return pump outages have also contributed to basins being off-line, but the main concern is that the sludge collection equipment is at the end of its useful service life. The budgetary problems are also impacting repair of these units. In each nitrification sedimentation basin, there are four quadrants, each with separate sludge collection systems.

Instead of replacing equipment in all four quadrants at once, only the quadrant that failed is replaced/repaired when an outage occurs, thus increasing the likelihood of future outages (the complete basin must be taken out-of-service when any one quadrant of the sludge collection equipment fails). Since the equipment was all installed at the same time and is in need of replacement, it would be logical to replace equipment in all four quadrants at once. In addition, when the chains break, there is not always enough replacement chain available for the entire quadrant, so only the broken segment is replaced. Without complete replacement of the equipment, outages will continue. This ultimately results in more down time, because it takes time to dewater and clean a unit before work can be conducted. In order to reduce the impact of these outages on plant performance, operators have been dedicating more of the dual-purpose sedimentation basins to nitrification. (Dual purpose sedimentation basins have been dedicated exclusively to nitrification since August 10, 1995.) While this relieves some of the impact on solids settling for the nitrification basins, these outages clearly impact the reliability of the plant and the hydraulic capacity of the plant as a whole. Repairs of the nitrification basins are included in the capital maintenance budget [Fund 350], which is currently underfunded for this fiscal year. This critical rehabilitation project may need to be delayed or terminated if the Fund 350 budgetary shortfall problem is not resolved.

The reliability of the lime delivery system for nitrification has been addressed in previous NEIC evaluations of Blue Plains. There have been numerous occasions in 1995 where Blue Plains had only 1 or no lime slakers operational [Appendix D], due to both maintenance problems and shortages of pebble lime (which is the type of lime used at nitrification). In addition to being the cause of effluent pH violations at Outfall 002, reductions in lime delivery have the potential to impact the plant's nitrification capability. (The conversion of ammonia to nitrate releases hydrogen and requires adequate alkalinity to maintain optimal pH conditions for the nitrifying microorganisms). Plant personnel are reluctant to work in the lime building due to the potentially unsafe working conditions (fine lime dust in the air). The lime dust is also a major contributor to equipment failures, and until an improved dust collection system is installed or the entire lime delivery system is rehabilitated, conditions are not likely to improve.

Chemical Inventories

The inability to maintain adequate inventories of critical wastewater treatment chemicals continues to impact treatment operations at Blue Plains. As discussed in the Finance and Budget section, District fiscal problems have resulted in cessation of chemical deliveries of lime, ferric chloride, and polymer.

Pebble lime shortages, combined with equipment failures in the lime delivery system for nitrification as discussed above, have resulted in a number of pH permit violations since NEIC's April inspection. During May 1995, there were two pH violations (the effluent pH was below 6.0 for approximately 2 hours on May 4, and 6 hours on May 24). During June 1995, there was one pH violation (effluent pH was below 6.0 for approximately 10 hours on June 21). During July 1995, there were three pH violations (effluent pH was below 6.0 for approximately 7 hours on July 7, 20 hours on July 8, and 13 hours on July 9). During September 1995, there was one pH violation (effluent pH was below 6.0 for approximately 17 hours on September 30). During October 1995, there were 5 pH violations. The information submitted by the District on lime slaker outages [Appendix D] also indicated time periods where there were pebble lime outages or shortages during 1995: July 1 through 9, 27, 28 and 31; August 5, 6, 12, 13, 17, 20, 25, 26; September 5, 13 through 15, and 19; and October 3. However, this data does not appear to be complete. The pH violations cited above are not all included in these dates. NEIC was informed during our April inspection that there was a shortage of lime in early March; however, no pebble lime inventory problems were noted during this period. The lime delivery data submitted by the District is included in Appendix E. There were a number of consecutive days where there were no lime deliveries or there was only 1 truckload delivered (approximately 40,000 lbs), which is less than the average daily usage of 60,000 lbs; however, without a running daily inventory or usage amount, it is not possible to evaluate this data for other periods where shortages of pebble lime may have occurred.

Polymer bulk inventory data for dewatering raw (undigested) blended (combined primary/secondary) sludge in the centrifuges is included in Appendix F. The information supplied by Blue Plains show a large number of days where there was no bulk inventory of raw blend polymer (650 BC); however, they have provided additional information [Appendix G], explaining that during these periods: (1) polymer was available either in the bulk storage silos (and the totalizer reading was in error) or they were using the polymer in the day bins, (2) bagged supplies (which are not part of the bulk inventory number) were available and used, or (3) alternative polymers (not usually used for raw blended sludge) were available and used. Figure 2 presents a graph of the polymer inventory data versus blended sludge centrifuge production for January through September 1995. Because of the use of bagged and alternative polymers, the sludge production data does not always decrease during bulk polymer inventory shortages. However, this data does show that there were periods when polymer inventory shortages caused decreases in sludge dewatering production. In mid-February, blended sludge production decreased after the 13th (when the day bins and bag supplies were used), and did not increase until an alternative polymer (K260FL) was used. During the beginning of April, dewatering production did not cease; however, it was well below normal, as was the case during much of May 1995.

FIGURE 2 - Centrifuge Bulk Polymer Inventory and Blend Sludge Production

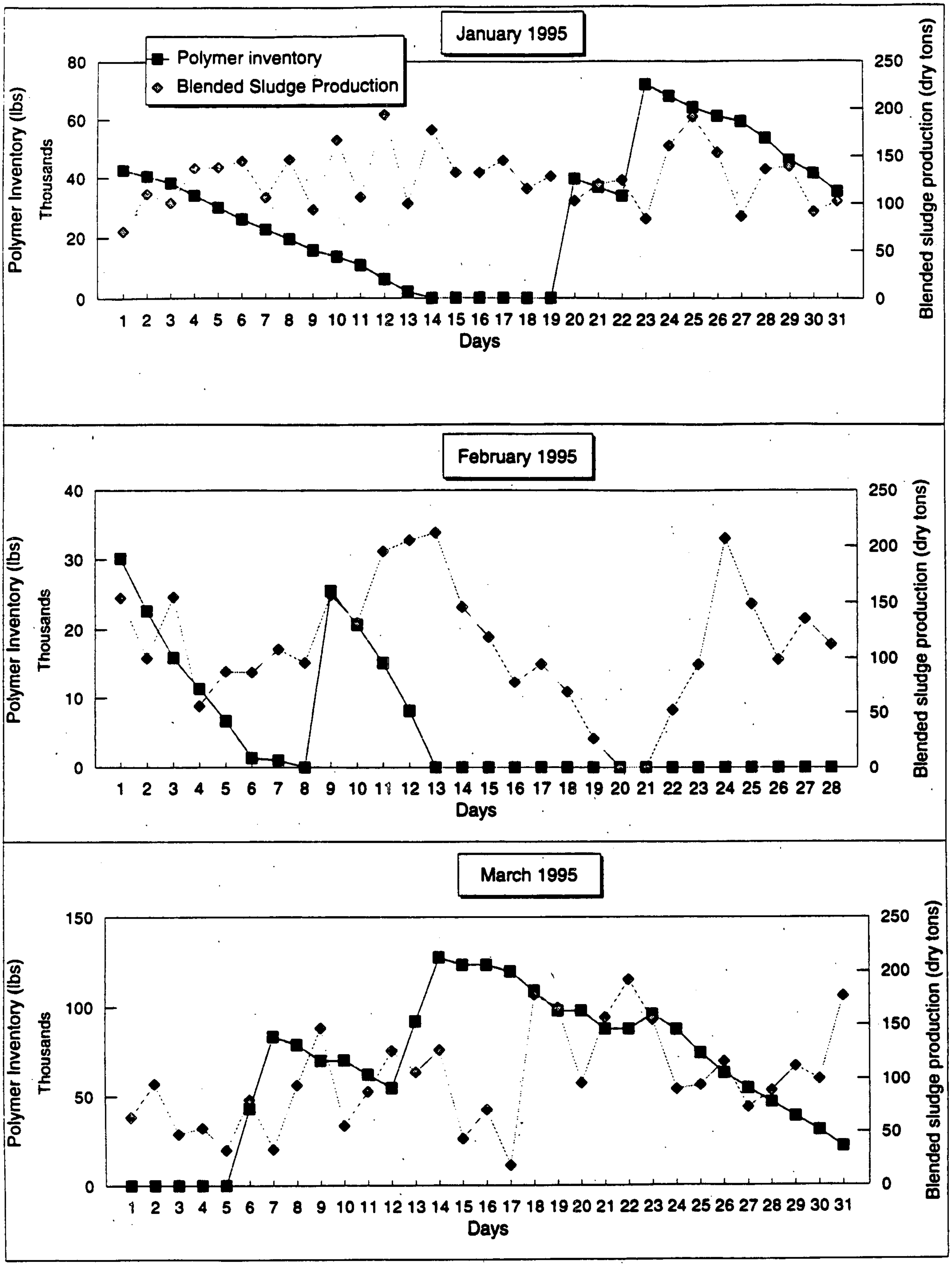


FIGURE 2 - Centrifuge Bulk Polymer Inventory and Blend Sludge Production (cont)

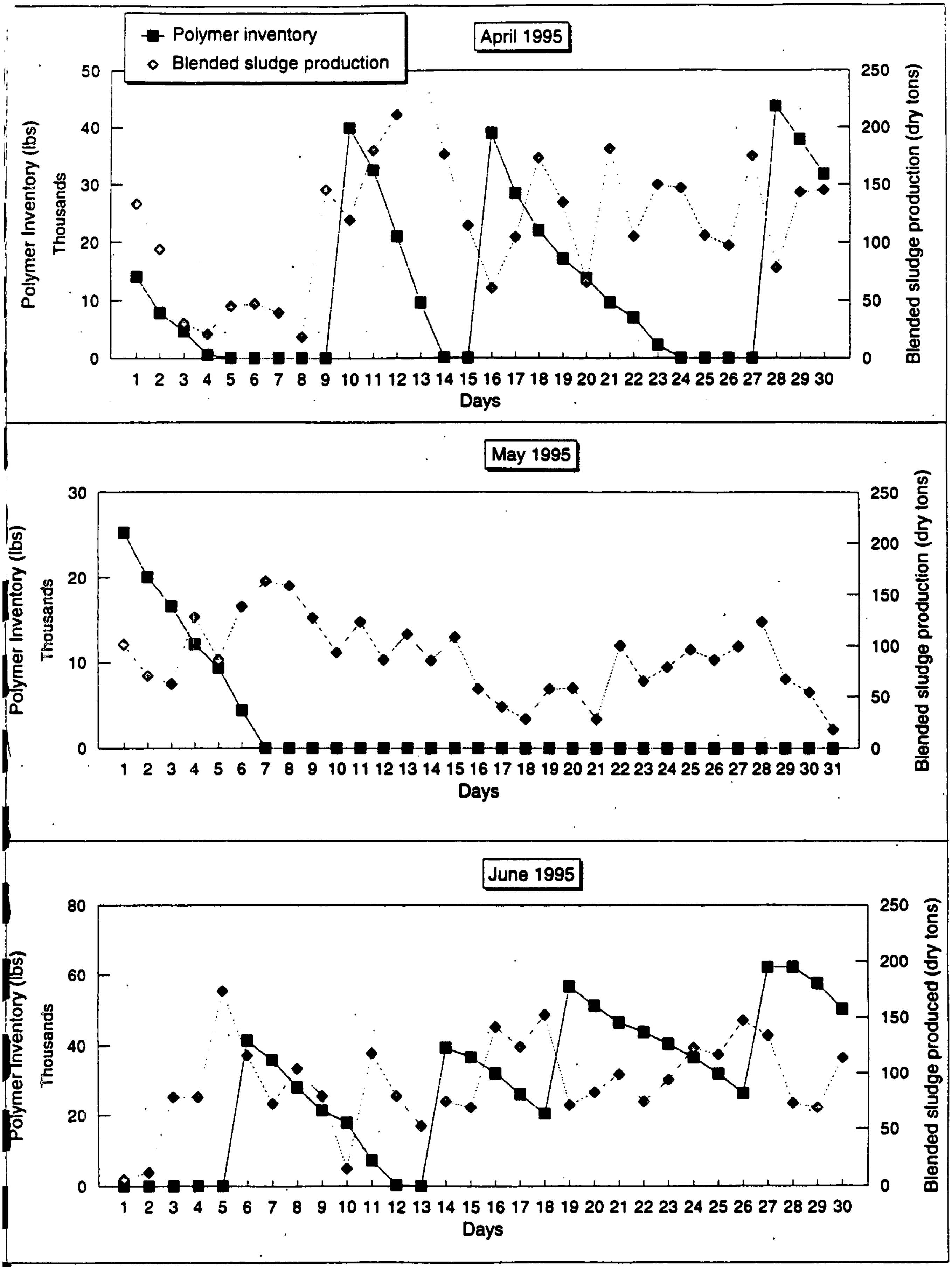
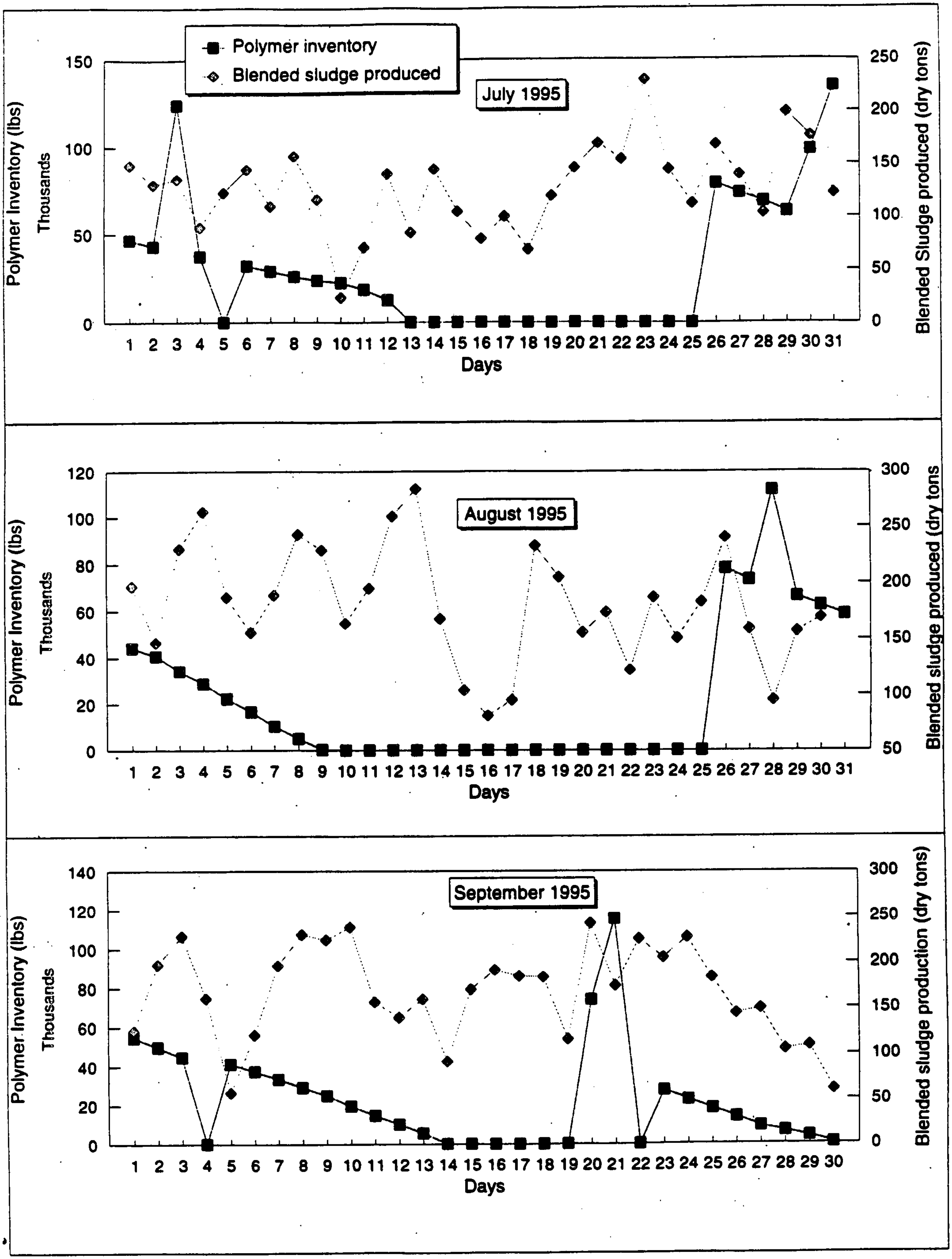


FIGURE 2 - Centrifuge Bulk Polymer Inventory and Blend Sludge Production (cont)



Information supplied by the District on the number of centrifuges and vacuum filters on line and operational during 1995 is presented in Appendix H. Notations on these documents indicate other chemical inventory shortages. Hydrated lime outages occurred during January 7; February 5, 6, and 11 through 14; March 19; July 23; September 4, 5, and 21 through 24; November 1 through 3, and 15 through 18; and December 19. There was no polymer for the dissolved air flotation units on March 16 and 17. Ferric chloride for the vacuum filters ran out August 20 through 23. Granular lime was depleted on November 1 and there were shortages on November 15, 26 and 27.

As a result of the solids dewatering problems (both chemical inventory and mechanical), Blue Plains continues to maintain higher solids inventories in their aeration reactors than targeted values. These increased solids inventories result in higher sludge production (impacting an already stressed solids dewatering system) and increasing the potential for solids washouts from the sedimentation basins. A frequency distribution analysis for mixed liquor suspended solids (MLSS) concentrations (for the time period of April through September 1995) in the east and west secondary and (the combined odd and even) nitrification basins is presented in Figures 3, 4 and 5, respectively. MLSS concentrations in the east secondary reactors are only at or below the target of 1600 mg/l for 23% of the time (as compared to 25% of the time for the previous 6 months). MLSS concentrations in the west secondary reactors are only at or below the target of 2850 mg/l for 39% of the time (as compared to 50% of the time for the previous 6-month period). MLSS concentrations in the nitrification reactors (both east and west) are only at or below the target of 2750 mg/l approximately 40% of the time (as compared to 35% of the time for the previous 6 months). Compared to the July 1995 NEIC report (which presented the same data for the time period of November 1994 through April 1995), solids inventories are higher (a decline in performance)

Figure 3
East Secondary MLSS Frequency Distribution Curve
Blue Plains WWTP
Washington D.C.

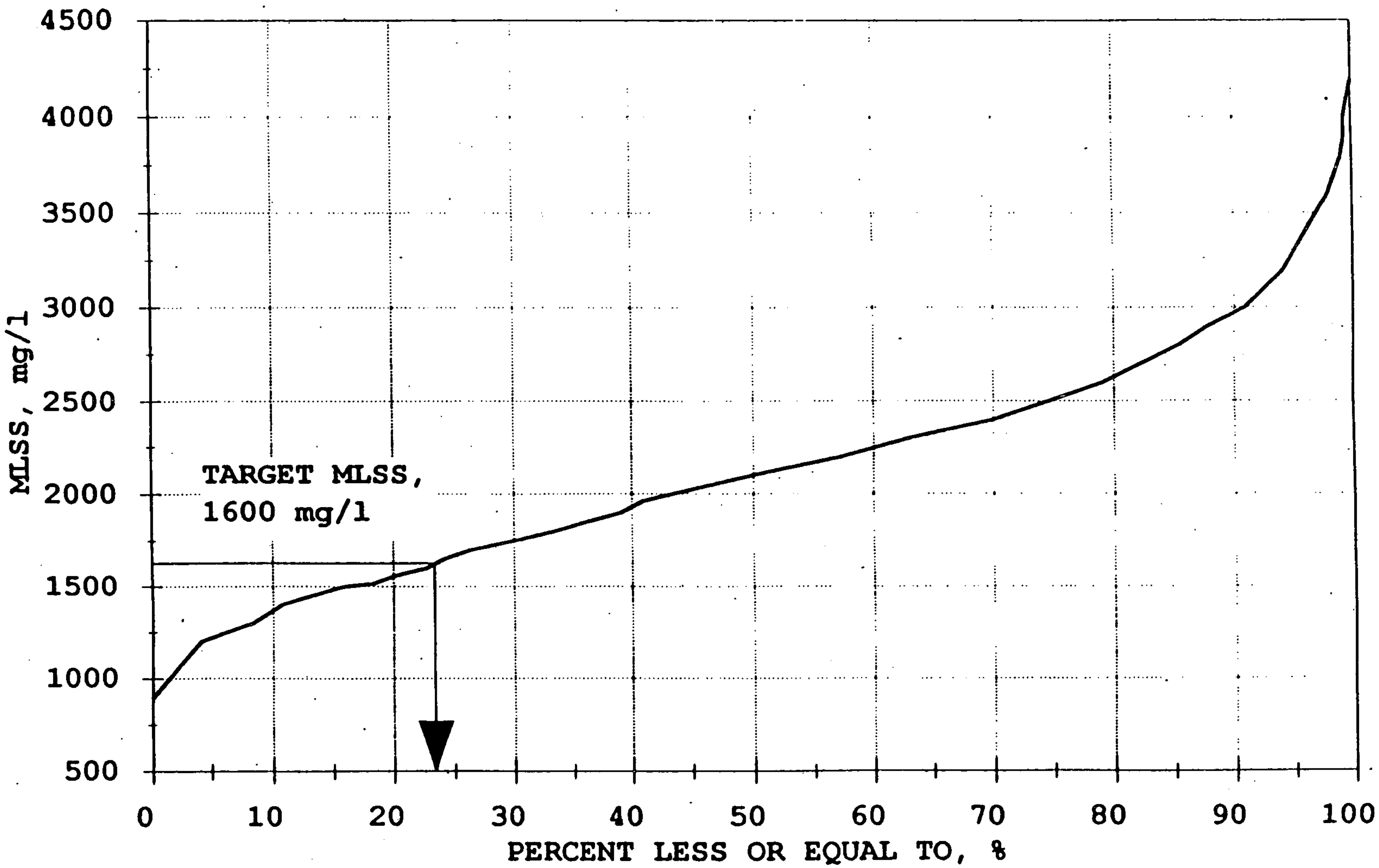


Figure 4
West Secondary MLSS Frequency Distribution Curve
Blue Plains WWTP
Washington D.C.

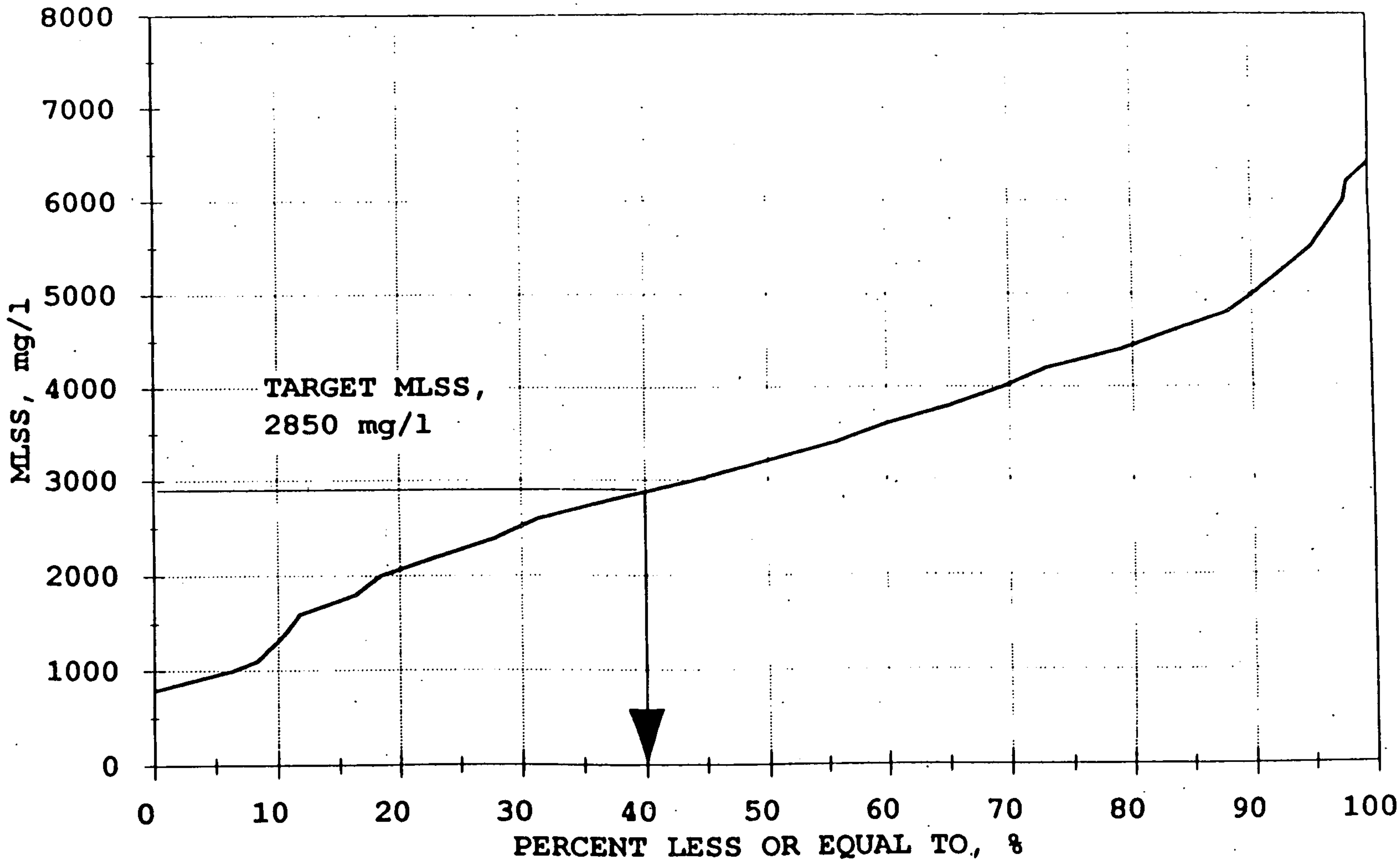
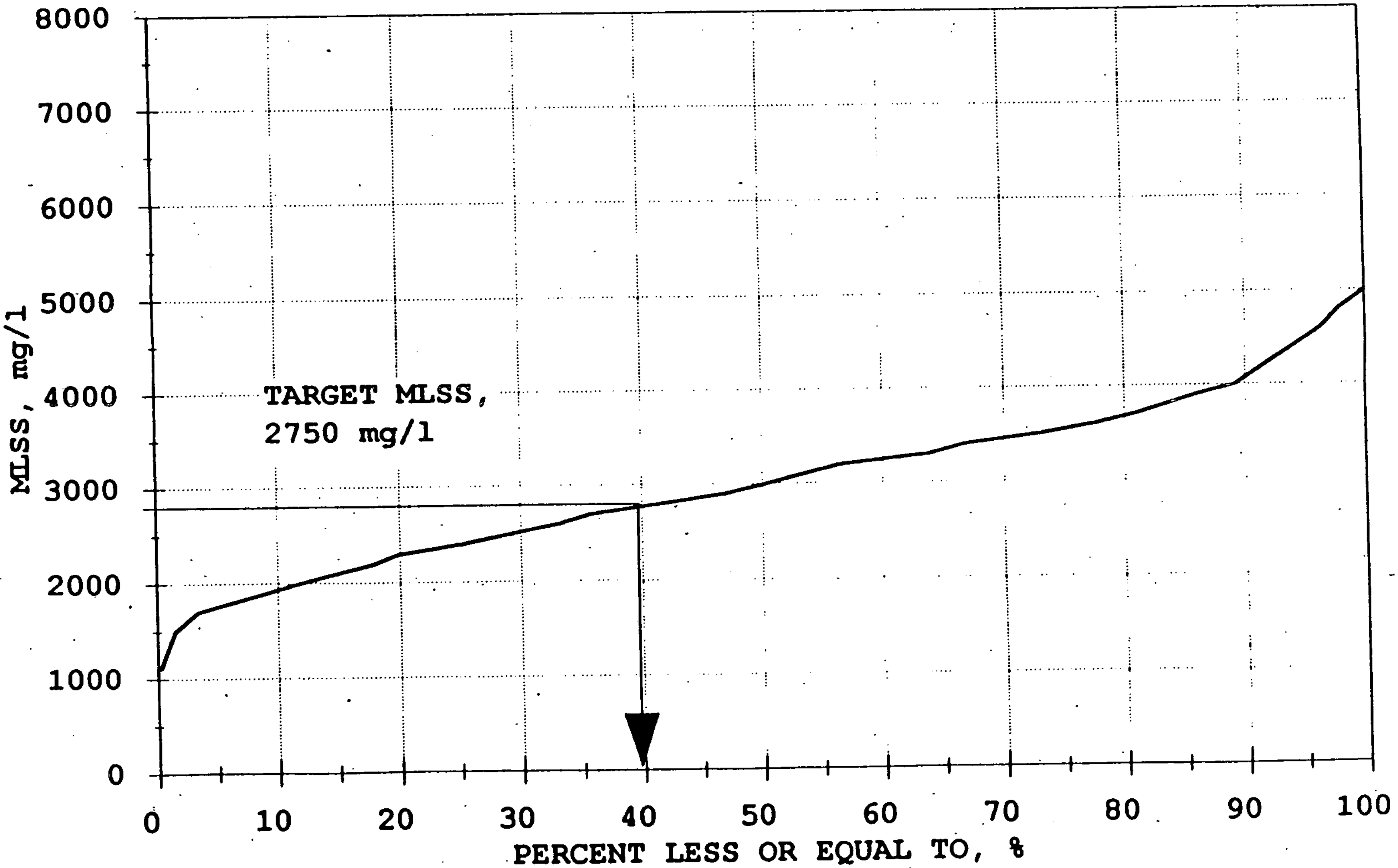


Figure 5
Nitrification (Combined Even and Odd) MLSS Frequency Distribution Curve
Blue Plains WWTP
Washington D.C.



for secondary aerators, particularly the west reactors, while there was some improvement for the nitrification reactors.

Critical Plant Treatment Process Improvements Needed at Blue Plains.

At the request of EPA Region 3, NEIC has identified critical treatment processes (or specific process improvements) that are essential for Blue Plains' ability to reliably treat current wastewater flows in the near term. While many process equipment failures at a complex facility, such as Blue Plains, can potentially create treatment problems and Clean Water Act violations, NEIC believes that certain plant treatment process improvements at Blue Plains have considerable potential for minimizing treatment upsets/permit violations. These improvements include: (1) keeping an adequate number of nitrification sedimentation basins in service; (2) maintaining the vacuum filters in operational status as a supplement to the centrifuges until an alternative supplemental dewatering system is in place, and improving centrifuge performance (reducing outages) by providing sludge screening equipment; (3) completing the multi-media filter rehabilitation; (4) maintaining the lime feed system (for nitrification) in operational status until it is rehabilitated/replaced; and (5) improving primary treatment performance through chemical feed and pumping system improvements.

As outlined in the Maintenance section, the number of nitrification sedimentation basins out of service has been steadily increasing since NEIC's April inspection. In order to provide adequate solids settling and maintain the necessary sludge age for nitrification, it is critical to keep the nitrification sedimentation basins in service. While Blue Plains has dedicated the dual purpose basins exclusively to nitrification since August, the overall number of sedimentation basins in service ultimately impacts the hydraulic capacity of the plant, and could result in additional discharges of primary treated wastewater through Outfall 001 during high flow events.

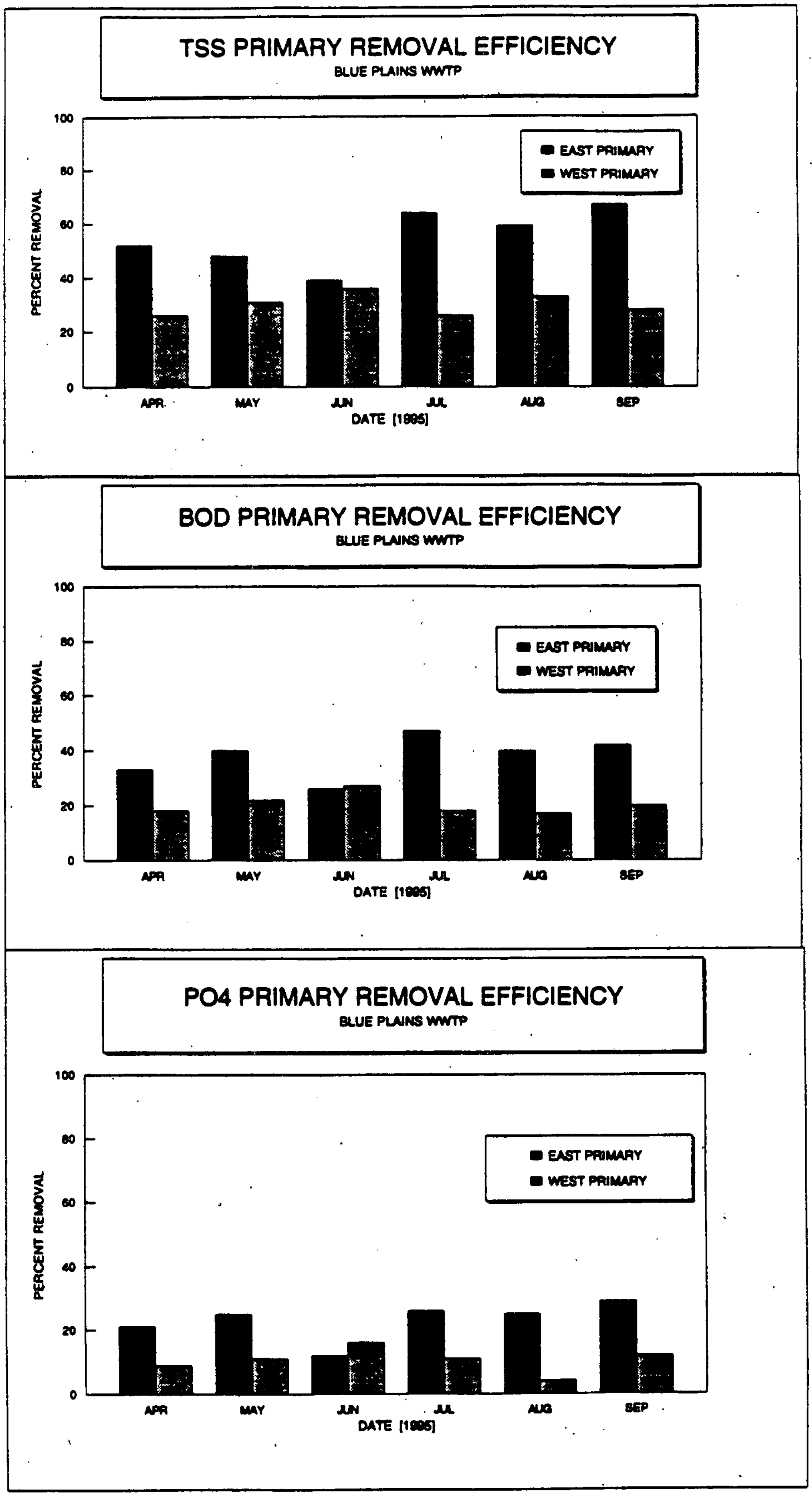
The solids processing system at Blue Plains was discussed in detail in NEIC's July 1995 report. The vacuum filters are critical equipment that need to be maintained in operational status in order to supplement the centrifuges, which have not been able to operate at predicted throughput design levels. During the November NEIC inspection, a maximum of 4 and a minimum of 2 (of 15 total) vacuum filters were in operational condition. (Due to a shortage of hydrated lime, the operational vacuum filters had to be taken off-line on November 15, 1995.) It is believed that the reliability and performance of the centrifuges would be improved by screening the primary sludge flow. Maintaining the vacuum filters and improving the reliability of the centrifuges (by installing primary sludge screens) are critical to maintaining an adequate solids processing capability until a supplemental system can be completed. Solids handling capacity is the primary reason that solids inventories are higher than target levels in the aeration basins. If the vacuum filters can not be maintained as a dependable supplement to the centrifuges, truck-mounted sludge dewatering equipment may need to be brought in to the plant.

The multi-media filters are the last treatment process for capturing solids and are critical for maintaining compliance with the strict permit conditions for both total suspended solids and phosphorus (assuming proper ferric addition/coagulation has occurred). The rehabilitation of the surface wash system for the filters is nearing completion (with the exception of replacing all surface wash pumps, which will be conducted as funds are available). Other phases of the filter rehabilitation (including replacing rate control valves, control instrumentation, etc.) have not been initiated. At least one filter is in need of a complete rebuild due to a bottom tile failure. Once rehabilitation work has been completed, filter support gravel and media will need to be replaced. There have been numerous bypasses of the multi-media filters [Appendix I], and the rehabilitation of these filters is necessary to eliminate/minimize these bypasses.

Failures in the lime delivery system have been an ongoing problem and have resulted in pH permit violations during May, June, July, September, and October 1995. Reductions in lime delivery also have the potential to impact the plant's nitrification capability. At lower pH values, nitrification is inhibited and will increase ammonia discharge levels. An assessment needs to be prepared that outlines the short term needs to keep this facility operational, while a long-term plan for replacing this facility is developed. At a minimum, it is recommended that an emergency storage tank be installed for delivering caustic to the nitrification reactors for back-up emergency alkalinity addition/pH control during failures of the lime delivery equipment at Blue Plains. Additionally, critical parts for fixing the lime delivery equipment (slakers and conveyors) should be kept in inventory at the plant. This would prevent/minimize the potential for effluent pH violations and impacts to the nitrification process.

Poor performance in primary treatment is increasing the organic loading to the secondary reactors, increasing sludge production rates in downstream aeration processes, and impacting sludge dewatering performance (dewatering of blended primary/secondary sludge is less efficient when the percentage of primary solids in the blend is below 50%). Six months of performance data for primary treatment [Appendix J] is presented graphically (as monthly average removal efficiencies) in Figure 6. Averaging this data over the 6 month period, the following average removal efficiencies were calculated: (1) TSS - 55% for east and 30% for west primary, (2) BOD - 38% for east and 20% for west, and (3) PO_4 - 23% for east and 11% for west. [It should be noted that for data indicating negative removal efficiencies, zero percent removal was

FIGURE 6 - PRIMARY TREATMENT REMOVAL EFFICIENCIES



assumed.] These removal efficiencies are much lower than expected for primary treatment. Improved performance should be possible for both the east and west primary basins, with particularly significant improvements for the west basins. The performance of the west side is significantly worse than the east side in large part because waste pickle liquor is added to the aerated grit chambers instead of $FeCl_3$, which is supplied on the east units. Waste pickle liquor contains iron, but it is in the ferrous state (+2 valence) and is ineffective until it is oxidized to the ferric state (+3 valence) in the secondary aeration basins. Ferric chloride should be utilized for both east and west primary units. Feed rate dosages should be optimized, and the use of anionic polymers considered to further improve performance. A pilot study conducted last year by a Blue Plains' consultant demonstrated that primary treatment could be further optimized by improving sludge pumping controls (minimizing flow fluctuations). As winter approaches (and the use of sand/gravel on roadways occurs), grit removal could become critical. During the winter of 1993-1994, high grit loads caused failures of primary sludge collection rakes and impacted downstream pumping equipment. With the grit removal crane inoperable on the east side grit basins, preventing grit build-up with the current vacuum truck removal system is essential. Therefore, improvements to the primary treatment process, including installation of ferric chloride addition equipment and a new primary sludge pumping control system, are needed to improve the overall treatment reliability of the plant.

LIST OF APPENDICES

APPENDIX A

WASUA Fund 403 Reserve FMS Printout

RUN DATE: 11/01/88
FUND: 405 WATER AND SEWER FUND

SUMMARY TRIAL BALANCE
THROUGH *MONTH* 13, 1985

SAMPLE INQUIRY DEVELOPED BY USER LIAISON

B/S CAT	B/S CL	B/S ACCOUNT	SUB-BALANCE SHEET ACCOUNT	CURRENT MONTH POSTINGS	OPENING BALANCE	CURRENT YEAR POSTINGS	CLOSING BALANCE
10	11 001	POOLED CASH-DC TREASURY CONTRL		519,798.84	144,541,904.34-	101,296,034.14-	245,837,938.48-
			01 CU0554380000094		2,337.88		2,337.88
			17 LB0006670045571	1,786.76-	15,147,518.50	7,072,228.99	22,219,747.49
			31 ES91BC001926101			467,099.18-	467,099.18-
			33 CU0554386420569			4,980.00	4,980.00
			36 DI0555180108467		133,065,952.33-	59,422,520.77-	192,488,473.10-
			40 DI0300035590135		1,813,281.17-	2,322,279.91-	4,135,561.08-
			44 CUST 80107436	118.83	28,160,438.49	155,390,881.86	183,551,320.35
			69 DI0101208682691		207,221,658.96-		207,221,658.96-
			77 LB0030003499243		8,992,299.71		8,992,299.71
			80 DI0101208695986		3,712,009.62-		3,712,009.62-
			97 CU0100017055884		521,072,531.80	14,079,731.19	535,152,262.99
**ACCOUNT TOTAL				518,130.91	83,020,319.96	13,039,888.04	96,060,208.00
10	11 030	CASHIER OVERAGES/SHORTAGES			.05		.05
10	11 691	PAYROLL CLEARING ACCOUNT		2,139,034.68			
	**CLASS	CASH**************************		2,657,165.59	83,020,320.01	13,039,888.04	96,060,208.05
	CATEGORY: CASH AND INVESTMENT******			2,657,165.59	83,020,320.01	13,039,888.04	96,060,208.05
11	14 031	ACCOUNTS RECEIVABLE-BILLED		9,981,075.57	44,367,055.18	1,840,864.87-	42,526,190.31
11	14 032	ALLOWANCE FOR UNCOL ACCT REC	LA AL FR UNC-AR-LA		28,629,700.00-		28,629,700.00-
11	14 033	ACCOUNTS RECEIVABLE-UNBILLED		81,961.73	13,067,485.60	81,961.73	13,149,447.33
11	14 051	DUE FROM OTHER GOVERNMENTS		35,404.65	3,310,571.93	1,695,418.40-	1,615,153.53
11	14 052	ADVANCE TO WASHINGTON AQUEDUCT		2,264,893.31-	2,502,513.80-	5,716,135.05	3,213,621.25
	**CLASS	ACCOUNTS RECEIVABLE, NET******		7,833,548.64	29,612,898.91	2,261,813.51	31,874,712.42
	CATEGORY: DUE FROM OTHERS, NET*****			7,833,548.64	29,612,898.91	2,261,813.51	31,874,712.42
12	16 060	FED GRANTS RECEIVABLES BILLED			136,316.37	13.15	136,329.52

RRPFN020

APPENDIX B

WASUA Fund 350 Reserve FMS Printout

B/S CAT	B/S CL	B/S ACCOUNT	SUB-BALANCE SHEET ACCOUNT	CURRENT MONTH POSTINGS	OPENING BALANCE	CURRENT YEAR POSTINGS	CLOSING BALANCE
10	11 001	POOLED CASH-DC TREASURY CONTRL		984,207.81-	162,889,461.06	1,717,755.89-	161,171,705.17
			01 CU0554380000094		1,504.48-		1,504.48-
			36 DI0555180108467		92,408,332.96-	33,749,600.74-	126,157,933.70-
			40 DI0300035590135		1,838,212.66-	17,991.83-	1,856,204.49-
			44 CUST 80107436		10,027,232.20	28,564,307.63	38,591,539.83
			69 DI0101208682691		177,537,252.75-		177,537,252.75-
			80 DI0101208695986		4,570,090.80-		4,570,090.80-
			97 CU0100017055884		127,676,484.57		127,676,484.57
**ACCOUNT TOTAL				984,207.81-	24,237,784.18	6,921,040.83-	17,316,743.35
	**CLASS	CASH**************************		984,207.81-	24,237,784.18	6,921,040.83-	17,316,743.35
	**CATEGORY:	CASH AND INVESTMENT********		984,207.81-	24,237,784.18	6,921,040.83-	17,316,743.35
11	14 033	ACCOUNTS RECEIVABLE-UNBILLED			6,819,378.99	6,819,378.99-	
11	14 051	DUE FROM OTHER GOVERNMENTS			6,901,101.37	6,000,506.34-	900,595.03
11	14 052	ADVANCE TO WASHINGTON AQUEDUCT			4,061,984.48	3,820,539.02-	241,445.46
	**CLASS	ACCOUNTS RECEIVABLE, NET******			17,782,464.84	16,640,424.35-	1,142,040.49
	**CATEGORY:	DUE FROM OTHERS, NET*******			17,782,464.84	16,640,424.35-	1,142,040.49
12	16 060	FED GRANTS RECEIVABLES BILLED		100.00	1,572,756.50	771,808.85	2,344,565.35
12	16 062	FED GRANTS RECEIVABLE UNBILLED			3,374,188.10	3,374,188.10-	
	**CLASS	FEDERAL GRANTS RECEIVABLE*****		100.00	4,946,944.60	2,602,379.25-	2,344,565.35
	**CATEGORY:	DUE FROM FEDERAL GOVT******		100.00	4,946,944.60	2,602,379.25-	2,344,565.35
41	41 401	VOUCHERS PAYABLE		31,086.61-	65,428.94-	34,342.33	31,086.61-
41	41 409	BALANCE SHEET VOUCHERS PAYABLE				500,000.00-	500,000.00-
41	41 521	CONTRACT VOUCHERS PAYABLE		1,091,224.62-	2,357,569.04-	6,155,052.33-	8,512,621.37-

RRPFN020

APPENDIX C

Number of Sedimentation Basins On-line

BUREAU OF WASTEWATER TREATMENT
TRIFICATION/DUAL PURPOSE TANKS IN SERVICE (AVAILABLE FOR USE)
RIL

DATE	TOTAL NUMBER OF BASINS	# NITRIFICATION BASINS	#DUAL PURPOSE BASINS*
1	31	26	5
2	31	26	5
3	30	25	5
4	30	25	5
5	28	24	4
6	29	25	4
7	28	24	4
8	28	24	4
9	28	24	4
10	28	24	4
11	28	23	5
12	28	23	5
13	29	24	5
14	30	24	6
15	32	26	6
16	31	25	6
17	31	25	6
18	31	25	6
19	31	25	6
20	30	24	6
21	30	24	6
22	30	24	6
23	30	24	6
24	28	22	6
25	28	22	6
26	28	22	6
27	28	22	6
28	28	22	6
29	26	20	6
30	25	19	6
ERAGE	29.2	23.9	5.3

THE NUMBER OF DUAL PURPOSE TANKS AVAILABLE FOR USE FOR NITRIFICATION

BUREAU OF WASTEWATER TREATMENT
NITRIFICATION/DUAL PURPOSE TANKS IN SERVICE (AVAILABLE FOR USE)
MAY 1995

DATE	TOTAL NUMBER OF BASINS	# NITRIFICATION BASINS	#DUAL PURPOSE BASINS
1	25	19	6
2	28	22	6
3	30	22	8
4	28	23	5
5	28	22	6
6	28	22	6
7	28	22	6
8	29	23	6
9	29	23	6
10	29	23	6
11	29	23	6
12	29	23	6
13	29	23	6
14	29	23	6
15	29	23	6
16	28	22	6
17	30	24	6
18	30	24	6
19	28	22	6
20	29	23	6
21	29	23	6
22	29	23	6
23	29	23	6
24	29	23	6
25	29	23	6
26	28	24	4
27	27	23	4
28	27	23	4
29	25	21	4
30	25	21	4
31	25	21	4
AVERAGE	28.4	22.7	5.8

BUREAU OF WASTEWATER TREATMENT
TRIFICATION/DUAL PURPOSE TANKS IN SERVICE (AVAILABLE FOR USE)
NE

DATE	TOTAL NUMBER OF BASINS	# NITRIFICATION BASINS	#DUAL PURPOSE BASINS
1	27	23	4
2	27	23	4
3	27	23	4
4	28	24	4
5	27	23	4
6	27	23	4
7	27	23	4
8	27	23	4
9	28	24	4
10	28	24	4
11	28	24	4
12	28	24	4
13	28	24	4
14	28	24	4
15	29	25	4
16	29	25	4
17	29	25	4
18	29	25	4
19	28	24	4
20	28	24	4
21	29	25	4
22	28	24	4
23	29	25	4
24	29	25	4
25	29	25	4
26	30	24	6
27	30	24	6
28	30	24	6
29	30	24	6
30	30	24	6
VERAGE	28.3	24.0	4.3

BUREAU OF WASTEWATER TREATMENT
NITRIFICATION/DUAL PURPOSE TANKS IN SERVICE (AVAILABLE FOR USE)
JULY 1995

DATE	TOTAL NUMBER OF BASINS	# NITRIFICATION BASINS	#DUAL PURPOSE BASINS
1	28	22	6
2	28	22	6
3	27	21	6
4	27	21	6
5	26	20	6
6	26	20	6
7	26	20	6
8	29	23	6
9	29	23	6
10	29	23	6
11	28	22	6
12	27	21	6
13	27	21	6
14	28	22	6
15	30	24	6
16	30	24	6
17	29	23	6
18	29	23	6
19	32	26	6
20	30	24	6
21	30	24	6
22	28	22	6
23	28	22	6
24	29	22	7
25	30	24	6
26	29	23	6
27	29	23	6
28	29	23	6
29	29	23	6
30	29	23	6
31	29	23	6
AVERAGE	28.5	22.4	6.0

UREAU OF WASTEWATER TREATMENT
TRIFICATION/DUAL PURPOSE TANKS IN SERVICE (AVAILABLE FOR USE)
GUST 1995

DATE	TOTAL NUMBER OF BASINS	# NITRIFICATION BASINS	#DUAL PURPOSE BASINS
1	27	21	6
2	29	23	6
3	29	23	6
4	29	23	6
5	29	23	6
6	29	23	6
7	27	21	6
8	27	21	6
9	24	21	3
10	26	19	7
11	25	18	7
12	25	18	7
13	25	18	7
14	27	19	8
15	27	19	8
16	27	19	8
17	25	18	7
18	28	21	7
19	28	21	7
20	26	19	7
21	29	21	8
22	29	21	8
23	29	22	7
24	28	21	7
25	30	22	8
26	30	22	8
27	30	22	8
28	30	22	8
29	31	23	8
30	29	21	8
31	30	22	8
ERAGE	27.8	20.8	6.9

BUREAU OF WASTEWATER TREATMENT
NITRIFICATION/DUAL PURPOSE TANKS IN SERVICE (AVAILABLE FOR USE)
SEPTEMBER

DATE	TOTAL NUMBER OF BASINS	# NITRIFICATION BASINS	#DUAL PURPOSE BASINS
1	29	21	8
2	29	21	8
3	29	21	8
4	29	21	8
5	29	21	8
6	28	20	8
7	27	19	8
8	25	16	9
9	25	17	8
10	30	22	8
11	27	19	8
12	30	22	8
13	28	20	8
14	28	21	7
15	28	21	7
16	28	21	7
17	29	22	7
18	30	23	7
19	28	21	7
20	29	22	7
21	28	21	7
22	28	21	7
23	28	21	7
24	28	21	7
25	31	24	7
26	30	24	6
27	30	24	6
28	29	23	6
29	31	25	6
30	30	24	6
AVERAGE	28.6	21.2	7.3

BUREAU OF WASTEWATER TREATMENT
OPERATIONAL CAPABILITY REVIEW
SEDIMENTATION BASINS AVAILABLE FOR NITRIFICATION (10/1/95 - 12/31/95)

DAY	NITRIFICATION	DUAL PURPOSE	EQUIVALENT NITRIFICATION
01-Oct	21	8	31.4
02-Oct	21	8	31.4
03-Oct	22	8	32.4
04-Oct	22	8	32.4
05-Oct	19	8	29.4
06-Oct	20	8	30.4
07-Oct	19	8	29.4
08-Oct	22	8	32.4
09-Oct	22	8	32.4
10-Oct	22	8	32.4
11-Oct	24	8	34.4
12-Oct	22	8	32.4
13-Oct	21	8	31.4
14-Oct	23	8	33.4
15-Oct	23	8	33.4
16-Oct	22	8	32.4
17-Oct	22	8	32.4
18-Oct	23	8	33.4
19-Oct	23	8	33.4
20-Oct	23	8	33.4
21-Oct	23	8	33.4
22-Oct	23	8	33.4
23-Oct	23	8	33.4
24-Oct	23	8	33.4
25-Oct	22	8	32.4
26-Oct	23	8	33.4
27-Oct	22	8	32.4
28-Oct	22	8	32.4
29-Oct	22	8	32.4
30-Oct	22	8	32.4
31-Oct	22	8	32.4
01-Nov	19	8	29.4
02-Nov	18	8	28.4
03-Nov	18	8	28.4
04-Nov	18	8	28.4
05-Nov	18	8	28.4
06-Nov	21	8	31.4
07-Nov	20	8	30.4
08-Nov	21	8	31.4
09-Nov	22	8	32.4
10-Nov	22	8	32.4
11-Nov	22	8	32.4
12-Nov	20	8	30.4
13-Nov	18	7	27.1
14-Nov	19	8	29.4
15-Nov	18	8	28.4
16-Nov	18	8	28.4
17-Nov	19	8	29.4
18-Nov	19	8	29.4
19-Nov	19	8	29.4

DOCUMENT #10

20-Nov	22	8	32.4
21-Nov	23	8	33.4
22-Nov	23	7	32.1
23-Nov	22	7	31.1
24-Nov	22	7	31.1
25-Nov	19	7	28.1
26-Nov	19	7	28.1
27-Nov	19	7	28.1
28-Nov	19	7	28.1
29-Nov	20	7	29.1
30-Nov	22	8	32.4
01-Dec	23	8	33.4
02-Dec	23	8	33.4
03-Dec	24	8	34.4
04-Dec	24	8	34.4
05-Dec	25	8	35.4
06-Dec	25	8	35.4
07-Dec	26	8	36.4
08-Dec	26	8	36.4
09-Dec	26	8	36.4
10-Dec	26	8	36.4
11-Dec	26	8	36.4
12-Dec	25	8	35.4
13-Dec	23	8	33.4
14-Dec	23	8	33.4
15-Dec	24	8	34.4
16-Dec	23	8	33.4
17-Dec	24	8	34.4
18-Dec	24	8	34.4
19-Dec	24	8	34.4
20-Dec	24	8	34.4
21-Dec	24	8	34.4
22-Dec	24	8	34.4
23-Dec	24	8	34.4
24-Dec	23	8	33.4
25-Dec	24	7	33.1
26-Dec	24	7	33.1
27-Dec	24	7	33.1
28-Dec	25	7	34.1
29-Dec	25	7	34.1
30-Dec	25	7	34.1
31-Dec	23	7	32.1
AVERAGE	22.1	7.8	32.3

APPENDIX D

Time Periods with Less Than 2 Lime Slakers On-line

BLUE PLAINS WASTE WATER TREATMENT PLANT
NITRIFICATION LIME SLAKER SERVICE RECORD FOR 1995

Date	Hours Running on One Slaker	Hours Running with No Slaker
1/16		8
2/10		4
2/13		4
2/17		8
2/20		2
3/28	6	
5/7		2
5/8	2	2
5/14		8
5/15	6	18
6/30	14	
7/1	24 ✓	
7/2	24 ✓	
7/3	18 ✓	
7/4	24 ✓	
7/5	24 ✓	
7/6	24 ✓	
7/7	20 ✓	4 ✓
7/8	18 ✓	
7/9	8 ✓	
7/27		8 ✓
7/28	6	12 ✓
7/31	6	2 ✓
8/5		2 ✓
8/6	2	22 ✓
8/12		6 ✓
8/13		20 ✓
8/17	4 ✓	
8/18		6
8/20		6 ✓
8/24	8	
8/25	6	8 ✓
8/26	6	18 ✓
8/27	20	
8/30	16	

✓ NO/LOW LIME INVENTORY (based on operators log and lime delivery records)

8/31	24	
9/1	12	
9/5	8	16 ✓
9/6	2	12
9/7	18	6
9/8	8	
9/12	8	
9/13	10	14 ✓
9/14		24 ✓
9/15		14 ✓
9/16	6	
9/17	14	
9/18	12	
9/19	14	8 ✓
10/1	12	
10/3	4	8 ✓
10/4		4
10/17	2	10
10/18	2	16
10/24	2	2
10/28		8
11/11		4
11/14	4	
12/4	16	
12/5	5	
12/23	14	
12/27		2
12/28	10	
12/29	8	

✓ NO/LOW LIME INVENTORY
(based on operator log and lime delivery records)

APPENDIX E

Pebble Lime Deliveries

[redacted]e Plains Liquid Processes
[redacted]RIFICATION PEBBLE LIME   Thu JAN 11, 1996
ta for 31 days beginning JAN 1, 1995

te	LIME DELIVERED LBS	LIME USED LBS
1	0.0	
[redacted]	0.0	
	39240	
4	90740	
5	32420	
[redacted]	0.0	
	0.0	
3	0.0	
[redacted]	0.0	
	0.0	
1	0.0	
[redacted]	0.0	
	0.0	
	0.0	
5	0.0	
[redacted]	0.0	
	0.0	
3	0.0	
[redacted]	38880	
	164420	
l	82120	
[redacted]	0.0	
	0.0	
	78840	
5	227820	
[redacted]	244820	
	239840	
3	76980	
[redacted]		

1.32E+06
0.0
244820
47004

Blue Plains Liquid Processes
NITRIFICATION PEBBLE LIME
Data for 28 days beginning FEB 1, 1995

Thu JAN 11, 1996

Date	LIME DELIVERED LBS	LIME USED LBS
1	115140	
2	125880	
3	77300	
4	0.0	
5	38500	
6	81860	
7	106300	
8	123700	
9	111740	
10	129240	
11	62640	
12	0.0	
13	118000	
14	123080	
15	90420	
16	115240	
17	42860	
18	120640	
19	43860	
20	31420	
21	77960	
22	80780	
23	121860	
24	80900	
25	0.0	
26	0.0	
27	45560	
28	0.0	
TOTAL	2.06E+06	
MIN	0.0	
MAX	129240	
AVER	73746	

Blue Plains Liquid Processes
NITRIFICATION PEBBLE LIME
Data for 31 days beginning MAR 1, 1995

Fri JAN 26, 1996

Date	LIME DELIVERED LBS
1	0.0
2	185000
3	44760
4	0.0
5	0.0
6	0.0
7	99460
8	249040
9	232520
10	229380
11	213180
12	98220
13	224180
14	49280
15	0.0
16	133660
17	91800
18	43120
19	88360
20	46740
21	91280
22	231020
23	94200
24	44400
25	85580
26	0.0
27	86640
28	47020
29	89100
30	43280
31	43420
TOTAL	2.88E+06
MIN	0.0
MAX	249040
AVER	93053

Blue Plains Liquid Processes
NITRIFICATION PEBBLE LIME
Data for 30 days beginning APR 1, 1995

Thu JAN 11, 1996

Date	LIME DELIVERED LBS	LIME USED LBS
1	42840	
2	0.0	
3	43800	
4	85180	
5	41820	
6	43420	
7	0.0	
8	87500	
9	44100	
10	45760	
11	45820	
12	43360	
13	137260	
14	47140	
15	45480	
16	0.0	
17	48660	
18	41320	
19	75340	
20	0.0	
21	0.0	
22	0.0	
23	0.0	
24	0.0	
25	0.0	
26	0.0	
27	0.0	
28	192320	
29	97000	
30	0.0	
TOTAL	1.21E+06	
MIN	0.0	
MAX	192320	
AVER	40271	

lue Plains Liquid Processes
ITRIFICATION PEBBLE LIME
ata for 31 days beginning MAY 1, 1995

Thu JAN 11, 1996

ite	LIME DELIVERED LBS	LIME USED LBS
1	100600	
2	98200	
3	191520	
4	49080	
5	195040	
6	0.0	
7	0.0	
8	96800	
9	98540	
0	98060	
1	99200	
2	0.0	
3	0.0	
4	0.0	
5	0.0	
6	142580	
7	95680	
8	146640	
9	100880	
0	0.0	
1	0.0	
2	0.0	
3	97600	
4	97820	
5	94100	
6	49240	
7	100860	
8	0.0	
9	0.0	
0	0.0	
1	98420	
TAL	2.05E+06	
N	0.0	
X	195040	
ER	66157	

Blue Plains Liquid Processes
NITRIFICATION PEBBLE LIME
Data for 30 days beginning JUN 1, 1995

Thu JAN 11, 1996

Date	LIME DELIVERED LBS	LIME USED LBS
1	50340	
2	97060	
3	0.0	
4	0.0	
5	50600	
6	50900	
7	48800	
8	49060	
9	47800	
10	0.0	
11	0.0	
12	48460	
13	48360	
14	48700	
15	47200	
16	48500	
17	0.0	
18	0.0	
19	47460	
20	0.0	
21	97200	
22	49080	
23	49740	
24	0.0	
25	0.0	
26	49100	
27	49260	
28	51200	
29	146280	
30	94140	
TOTAL	1.27E+06	
MIN	0.0	
MAX	146280	
AVER	42308	

lue Plains Liquid Processes
ITRIFICATION PEBBLE LIME
ata for 31 days beginning JUL 1, 1995

Thu JAN 11, 1996

ate	LIME DELIVERED LBS	LIME USED LBS
1	0.0	
2	0.0	
3	0.0	
4	0.0	
5	0.0	
6	0.0	
7	0.0	
8	0.0	
9	0.0	
10	0.0	
11	0.0	
12	0.0	
.3	0.0	
.4	0.0	
.5	0.0	
.6	0.0	
.7	0.0	
.8	0.0	
.9	0.0	
0	0.0	
1	0.0	
2	0.0	
3	0.0	
4	0.0	
5	0.0	
6	0.0	
7	40640	
8	128320	
9	0.0	
0	80880	
1	38560	
TAL	288400	
N	0.0	
X	128320	
ER	9303	

Blue Plains Liquid Processes
NITRIFICATION PEBBLE LIME
Data for 31 days beginning AUG 1, 1995

Thu JAN 11, 1996

Date	LIME DELIVERED LBS	LIME USED LBS
1	161280	
2	45240	
3	133160	
4	89000	
5	0.0	
6	0.0	
7	173460	
8	128600	
9	87200	
10	41880	
11	169240	
12	0.0	
13	46760	
14	95100	
15	132960	
16	43300	
17	128280	
18	129580	
19	0.0	
20	40420	
21	94840	
22	96020	
23	88680	
24	87680	
25	91760	
26	0.0	
27	46020	
28	129600	
29	83160	
30	168440	
31	85420	
TOTAL	2.62E+06	
MIN	0.0	
MAX	173460	
AVER	84422	

lue Plains Liquid Processes
ITRIFICATION PEBBLE LIME
ata for 30 days beginning SEP 1, 1995

Thu JAN 11, 1996

ate	LIME DELIVERED LBS	LIME USED LBS
1	44840	
2	0.0	
3	0.0	
4	0.0	
5	0.0	
6	0.0	
7	150440	
8	50900	
9	90060	
.0	92500	
.1	45560	
.2	0.0	
3	0.0	
4	0.0	
5	0.0	
6	0.0	
7	46420	
8	96180	
9	94860	
0	96600	
1	0.0	
2	0.0	
3	141720	
4	49060	
5	48000	
6	0.0	
7	101580	
8	97120	
9	91540	
0	92920	
TAL	1.43E+06	
N	0.0	
X	150440	
ER	47677	

Blue Plains Liquid Processes
NITRIFICATION PEBBLE LIME
Data for 31 days beginning OCT 1, 1995

Thu JAN 11, 1996

Date	LIME DELIVERED LBS	LIME USED LBS
1	95120	
2	98300	
3	95980	
4	193100	
5	95320	
6	94600	
7	98480	
8	98180	
9	144500	
10	0.0	
11	96900	
12	50160	
13	0.0	
14	95860	
15	95800	
16	95120	
17	0.0	
18	0.0	
19	0.0	
20	143280	
21	189360	
22	0.0	
23	0.0	
24	0.0	
25	0.0	
26	0.0	
27	97520	
28	87800	
29	48080	
30	143740	
31	146400	
TOTAL	2.30E+06	1094
MIN	0.0	1094
MAX	193100	1094
AVER	74310	1094

Blue Plains Liquid Processes
NITRIFICATION PEBBLE LIME
Data for 30 days beginning NOV 1, 1995

Fri JAN 26, 1996

Date	LIME DELIVERED LBS
1	194460
2	141660
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	99120
14	93000
15	95780
16	142580
17	49800
18	0.0
19	0.0
20	139680
21	146600
22	142760
23	0.0
24	142620
25	0.0
26	0.0
27	144180
28	139160
29	144140
30	144960
TOTAL	1.96E+06
MIN	0.0
MAX	194460
AVER	98025

Blue Plains Liquid Processes
NITRIFICATION PEBBLE LIME
Data for 31 days beginning DEC 1, 1995

Fri JAN 26, 1996

Date	LIME DELIVERED LBS
1	141000
2	0.0
3	0.0
4	94700
5	145780
6	142020
7	141420
8	143620
9	0.0
10	0.0
11	145220
12	184660
13	97740
14	145020
15	143400
16	0.0
17	46620
18	95240
19	137040
20	136180
21	137820
22	95100
23	48300
24	0.0
25	0.0
26	141040
27	136860
28	238320
29	49300
30	0.0
31	0.0
TOTAL	2.79E+06
MIN	0.0
MAX	238320
AVER	89884

APPENDIX F

Bulk Polymer Inventory Data

Chemical Building
Chemical Inventory

month JAN. 1995

Date	Silo #1 polymer	Silo #2 polymer	Total inventory	9 P.L	Silo #7 P.L	Silo #8 P.L.	Total inventory
1	42,803			66,000	66,000	66,000	198,000
2	40,850	0		68,000	68,000	68,000	204,000
3	38,485	0		66,000	66,000	66,000	198,000
4	34,229	0		61,000	61,000	61,000	183,000
5	30,229	0		46,000	46,000	46,000	138,000
6	26,229	0		44,000	44,000	44,000	132,000
7	22,819	0		30,600	30000	30,000	90,000
8	19,464	0		37,000	37,000	37,000	111,000
9	15,760	0		35,000	35,000	35,000	105,000
10	13,683	0		34,000	34,000	34,000	102,000
11	10,993	0		34,000	34000	34,000	102,000
12	6,265	0		38,000	38,000	38,000	114,000
13	2,106	0		50,000	50,000	50,000	150,000
14	0	0		43,000	43,000	43,000	128,000
15	0	0		30,000	30,000	30,000	90,000
16	0	0		40,000	40000	40,000	120,000
17	0	0		48,000	48,000	48,000	144,000
18	0	0		60,000	60,000	60,000	180000
19	0	0		70,000	70,000	70000	210,000
41,280 → 20	40,280	0		80,000	80000	80000	240,000
21	37,361	0		82,000	82,000	82,000	246,000
22	34,339	0		62,000	62,000	62,000	186,000
41460 → 23	72,219	0		72,000	72,000	72,000	216,000
24	68,187	0		95,000	95,000	95,000	285,000
25	64,547	0		92,000	92,000	92,000	276,000
26	61,568	0		89,000	89,000	89,000	267,000
27	59,236	0		80,000	80,000	80,000	240,000
28	54,015	0		73,000	73,000	73,000	219,000
29	46,135	0		64,000	64,000	64,000	192,000
30	42,166	0		55,000	55,000	55,000	165,000
31	38,958	0		57,000	57000	57,000	171,000

Chemical Building
Chemical Inventory

month Feb. 1995

Date	Silo #1 polymer	Silo #2 polymer	Total inventory	#9 P.L.	Silo #7 P.L	Silo #8 P.L.	Total inventory
1	30,140	0	30,140	59,000	59,000	59,000	177,000
2	22,594	0	22,554	69,000	69,000	69,000	207,000
3	15,988	0	15,988	80,000	80,000	80,000	240,000
4	11,339	0	11,339	70,000	70,000	70,000	210,000
5	6,675	0	6,675	53,000	53,000	53,000	159,000
6	1339	0	1339	54,000	54,000	54,000	161,000
7	1000 est	0	1000 est	75,000	75,000	75,000	225,000
8	0	0	0	85,000	85,000	85,000	255,000
Rec. 28649 → 9	25,485	0	25,485	86,000	86,000	86,000	242,000
10	20,662	0	20,662	78,000	78,000	78,000	234,000
11	15,179	0	15,179	85,000	85,000	85,000	255,000
12	8,170	0	8,170	77,000	77,000	77,000	231,000
13	0	0	0	76,000	76,000	76,000	228,000
14	0	0	0	80,000	80,000	80,000	240,000
15	0	0	0	83,000	83,000	83,000	249,000
16	0	0	0	88,000	88,000	88,000	264,000
17	0	0	0	88,000	88,000	88,000	264,000
18	0	0	0	92,000	92,000	92,000	276,000
19	0	0	0	85,000	85,000	85,000	255,000
20	0	0	0	70,000	70,000	70,000	210,000
21	0	0	0	67,000	67,000	67,000	201,000
22	0	0	0	73,000	73,000	73,000	219,000
23	0	0	0	85,000	85,000	85,000	255,000
24	0	0	0	94,000	94,000	94,000	282,000
25	0	0	0	86,000	86,000	86,000	258,000
26	0	0	0	61,000	61,000	61,000	183,000
27	0	0	0	65,000	65,000	65,000	195,000
28	0	0	0	78,000	78,000	78,000	234,000
29							
30							
31							

Chemical Building
Chemical Inventory

month ~~March~~ 1995

	Date	Silo #1 polymer	Silo #2 polymer	Total inventory	1-2-3-9 P.L	Silo #7 P.L	Silo #8 P.L.	Total inventory
	1	-0-	-0-	-0-	92,000	92,000	92,000	276,000
	2	-0-	-0-	-0-	80,000	80,000	80,000	240,000
	3	-0-	-0-	-0-	192,000	76,000	42,000	310,000
	4	-0-	-0-	-0-	260,000	76,000	29,000	365,000
	5	-0-	-0-	-0-	279,000	92,000	2,000	372,000
43,123 →	6	43123	-0-	43,123	226,000	92,000	6,000	318,000
43,323 →	7	83,437	-0-	83,437	166,000	91,000	4,000	261,000
	8	78,982	-0-	78,982	186,000	63,000	63,000	312,000
	9	70,041	-0-	70,041	180,000	46,000	46,000	272,000
	10	70,407	-0-	70,407	180,000	43,000	43,000	266,000
	11	62,523	-0-	62,523	183,000	41,000	41,000	265,000
	12	54804	-0-	54804	171,000	23,000	23,000	217,000
44310 →	13	~~47,864~~	44310	~~97,864~~	255,000	6,000	6,000	267,000
43,230 →	14	39,722	87,540	127,262	273,000	18,000	3,000	298,000
	15	35,942	87,540	123,482	225,000	83,000	3,000	311,000
	16	35,942	87,540	123,482	222,000	43,000	40,000	305,000
	17	32,076	87,540	119,616	207,000	43,000	40,000	290,000
	18	21,394	87,540	108,934	237,000	43,000	41,000	321,000
	19	10,398	87,540	97,938	174,000	53,000	40,000	267,000
	20	10,398	87,540	97,938	135,000	90,000	40,000	285,000
	21	-0-	87,540	87,540	155,000	90,000	40,000	285,000
	22	-0-	87,540	82,540	188,000	30,000	68,000	286,000
	23	8433	87540	~~88,898~~	158,000	4,000	88,000	250,000
	24	4000 EST	87,285	87285	140,000	6,000	84,000	230,000
	25	-0-	74,473	74,473	191,000	58,000	42,000	291,000
	26	-0-	63,256	63,256	157,000	86,000	46,000	289,000
	27	-0-	54,580	54,580	116,000	86,000	94,000	296,000
	28	-0-	46,843	46,843	121,000	92,000	94,000	307,000
	29	-0-	38,793	38,793	107,000	9400	94,000	295,000
	30	-0-	31,008	31,008	149,000	92,000	94,000	335,000
	31	-0-	21,782	21,782	146,000	92,000	94,000	332,000

DATE	#1 Silo Inventory	#2 Silo Inventory	TOTAL Inventory		650 BC	Received Bags		Received K260	
1		14,031							
2		7,881							
3		4,727							
4		471							
5									
6									
7						20,980			
8									
9									
10	39,950				40,180				
11	32,494								
12	20,984								
13	9,487								
14	14								
15									
16		38,960 33,386			38900				
17		28,386							
18		21,973							
19		17,178							
20		13,738							
21		9641							
22		7,022							
23		2,295							
24									
25									
26									
27						16,973			
28		43,640			43780				
29		37,835							
30		31,757							
31									

	#1 Silo Inventory	#2 Silo Inventory	TOTAL Inventory	650 DC	Silo #3		Received Bags		Received K260
E									40,421
		25,221							
		20,063							21,024
		16,618							
		12,173							
		9,349							
		4,404							
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
0				41,340	32,900				
1					~~[illegible]~~				
2					27,988				
3					27,987				
4					20,974				
5					15,453				
6					11,722				
7					8,887				
8					2,609				
9									
0									
1									

DATE	#1 Silo Inventory	#2 Silo Inventory	TOTAL Inventory		Received 650BC	Received Bags		Received K260	
1									
2									
3									
4									
5									
6	41,420				41,500				
7	35,808								
8	28,026								
9	21,520								
10	17,899								
11	7,142								
12	331								
13								39827	
14	41680 39337				41740				
15	36,701								
16	31,883								
17	26,137								
18	20,605								
19	41,740 62,345				41,820				
19	56,643								
20	51,262								
21	46,430								
22	43,803								
23	40,400								
24	36,578								
25	31,759								
26	26,231								
28	67711				41,220			41,220	
27	62,261								
28	58,890								
29 30	57,684 56,273	41,810	92,083		41,840				

[illegible]E	#1 Silo Inventory	#2 Silo Inventory	Total Inventory	#3 Silo	Received 650 DC	Received Bags		Received 1445 K260	
1	46,418								
2	42,923								
3	38,945	85,140	124,085		43,380				
4	36,925								
5	33760								
6	31742							43810	
7	28,575								
8	25,562								
9	23,390								
10	22,183								
11	18,330								
12	12,339		[illegible]	28729					
13				27808					
14				21585					
15				17483					
16				14467					
17									
18									
19									
20									
21									
22									
23									
24									
25									
26		78,385							
27		73,167							
28		68,464						19914	
29		62,479							
30	41,882	56,091	97,973		4,600				
31	[illegible]	50,302	134,064		41,620			24,890	

DATE	#1 Silo Inventory	#2 Silo Inventory	TOTAL Inventory	Silo #3	Received 650 DC	Received Tag		Received K260	1995
1	83762	44,243		8013					
2		40,792							
3		34,284							
4		28,731							
5		22,234							
6		16,578							
7		10,435				12,500			
8		4,891							
9		228							
10	83762			8013					
11				7210					
12				Empty					
13									
14								43,230	
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26	78111								
27	73,260								
28	70,359	41,400	111,759		41370			41,220	
29	66,124								
30	62,406							44270	
31	58,550							44030	

1995

	#1 Silo Inventory	#2 Silo Inventory	Total Inventory		Received 650 DC	Received Bags		Received K460	
	54,577								
	50,000								
	44,938								
	41,392								
	37,524								
	33,730								
	29,278								
	25,164								
0	19,525								
1	14,710								
2	10,135								
3	5560								
4	50								
5									
6									
7									
8									
9									
0	41,540				41380				
0	37,122	36,820	73,942						
1	83,002	32,363	115,365		45540				
3		27,614							
4		22,848							
5		18,152							
6		13,782							
7		8,993							
8		6,461							
9		3,925							
0		513							
1									

DATE	#1 Silo Inventory	#2 Silo Inventory	TOTAL Inventory		Received 650 BC	Received Jugs		1995 Received R960	
1									
2	75,528								
3	76,064								
4	69,742								
5	69,742								
6	67,356								
7	62,228								
8	59,123								
9	55,728								
10	50,931								
11	46,488								
12	42,111								
13	38,041								
14	33,374								
15	28,720								
16	25,122								
17	20,512								
18	16,416	48,230	64,646		48020				
19	14,847								
20	10,448								
21	3,399								
22									
23									
24									
25									
26									
27		91,960			43640				
28									
29									
30		85,636							
31		82,146							

DATE	#1 Silo Inventory	#2 Silo Inventory	Total Inventory		Receive 650 DC	Receive 3 ogp		Received 699- 1260	
1		77,812							
2		70,793							
3		65,421							
4		59,874							
5		56,936							
6		51,702							
7		44,990							
8		39,337							
9		34,786							
10		30,071							
11		25,838							
12		21,248							
13		Empty							
14									
15									
16	42,710				43260				
17	37,928							43330	
18	33,563								
19	27,640								
20	20848								
21	17015								
22	12792								
23	8712								
24	4438	42840							
25	Empty	41378							
26		39452							
27	35480	36372							
28	79450	31342							
29		26984							
30		63164							
31									

Chemical Building
Chemical Inventory

month *December 1995*

	Date	Silo #1 polymer	Silo #2 polymer	Total inventory	#9 FeCl3	Silo #7 P.L	Silo #8 P.L.	Total inventory
	1	79450	58097		72,000	66,000	95,000	161,000
	2		52452		80,000	56,000	95,000	151,000
	3		48515		65,000	59,000	95,000	154,000
	4		43511		65,000	64,000	95,000	159,000
	5		39532		65,000	25,000	95,000	120,000
	6		36613		65,000	42,000	95,000	137,000
	7		32272		77,000	57,000	95,000	150,000
	8		27453		81,000	54,000	95,000	149,000
	9		21909		81,000	57,000	95,000	145,000
	10		16849		81,000	57,000	95,000	152,000
	11		12668		88,000	68,000	95,000	163,000
	12		7848		88,000	74,000	95,000	169,000
	13		2678		93,000	52,000	95,000	149,000
Rec 40651 →	14	79450	Empty		93,000	27,000	95,000	122,000
	15		35651		93,000	33,000	63,000	96,000
	16		30651		93,000	90,000	22,000	112,000
	17		28651		93,000	95,000	16,000	111,000
Rec 35840	18		24164		85,000	63,000	49,000	112,000
	19	74108	60004		85,000	20,000	92,000	112,000
	20	68841			88,000	50,000	53,000	103,000
	21	65587			88,000	54,000	20,000	74,000
	22	65587	55537		72,000	54,000	31,000	85,000
	23	58736			98,000	54,000	43,000	97,000
	24	51747			98,000	54,000	22,000	76,000
	25	46209			98,000	40,000	11,000	51,000
	26	40687	55537		98,000	9,000	49,000	58,000
	27		50062		98,000	27,000	54,000	81,000
	28		44681		98,000	27,000	62,000	89,000
Rec 39600 →	29	80287	40371		85,000	27,000	61,000	88,000
	30		34987		85,000	27,000	58,000	85,000
	31		29567		85,000	27,000	44,000	71,000

APPENDIX G

Explanation Of Bulk Polymer Inventory Outages

EXPLANATION OF POLYMER INVENTORY GAPS FROM THE CHEMICAL BUILDING
FOR 1995

JANUARY 14-16, USING UP POLYMER IN DAY BINS. (TOTALIZER ERRORS.)
JANUARY 17-19, USING CITI-CHEM POLYMER MIXED IN THE SPB.
FEBRUARY 8, USING UP POLYMER IN DAY BINS. (TOTALIZER ERRORS.)
FEBRUARY 13-16, USING UP POLYMER IN DAY BINS. (TOTALIZER ERRORS.)
FEBRUARY 17-21, USING 50 LB. BAGS MIXED IN THE CHEMCIAL BUILDING.
FEBRURAY 22-28, USING K260FL MIXED IN THE CHEMICAL BUILDING.
MARCH 1-5, USING K260FL MIXED IN THE CHEMICAL BUILDING.
APRIL 5-9, USING UP POLYMER FROM SILO #2. (TOTALIZER ERRORS.)
APRIL 24-27, USING UP POLYMER FROM SILO #2. (TOTALIZER ERRORS.)
MAY 7-13, USING UP POLYMER FROM SILO #2. (TOTALIZER ERRORS.)
MAY 14-19, USING K260FL MIXED IN THE CHEMICAL BUILDING.
MAY 29-31, USING UP POLYMER FROM SILO #5. (TOTALIZER ERRORS.)
JUNE 1-5, USING UP POLYMER FROM SILO #4. (TOTALIZER ERRORS.)
JUNE 13, USING UP POLYMER IN DAY BINS. (TOTALIZER ERRORS.)
JULY 13-16, USING UP POLYMER IN SILO #3. (TOTALIZER ERRORS.)
JULY 17-26, USING UP POLYMER IN SILO #1. (TOTALIZER ERRORS.)
AUGUST 10-12, USING UP POLYMER IN SILO #3. (TOTALIZER ERRORS.)
AUGUST 13-25, USING UP POLYMER IN SILO #2. (TOTALIZER ERRORS.)
SEPTEMBER 15-20 USING UP POLYMER IN SILO #1. (TOTALIZER ERRORS.)
OCTOBER 22-29, USING UP POLYMER IN SILO #1. (TOTALIZER ERRORS.)
NOVEMBER 13-15, USING UP POLYMER IN SILO #2 AND DAY BIN #4.

APPENDIX H

Number Of Vacuum Filters And Centrifuges On-line

MONTH: January

# cent. on line	# cent. on line & s/b	or shutdown operation because		# vacuum filters on line	vacuum filters on line & s/b	or shutdown operation because		
4	4			6	6			
4	6			6	6			
6	6			5	5			
6	6			5	5			
6	6			5	5			
5	5			6	6			
5	5			5	5	out of line 8.0 hrs.	✓	
5	5			5	6			
5	5			5	6			
5	5			5	5			
4	4			6	6			
6	6			6	6			
6	6			3	4			
6	6			4	4			
5	6			4	4			
5	6			4	5			
4	5	Low on Polymer		4	5			
5	6			5	5			
4	7			5	5			
4	6			5	5			
4	6			5	5			
4	6			5	5			
4	6			4	5			
5	5			4	4			
5	5			4	4			
5	5			4	4			
5	5			5	5			
6	6			5	5			
5	6			4	4			
5	6			4	4			
5	6			4	4			

MONTH: February (1995)

DATE	# cent. on line	# cent. on line & s/b	or shutdown operation because		# vacuum filters on line	vacuum filters on line & s/b	or shutdown operation because		
1	5	5			4	4			
2	5	5			4	4			
3	5	7			4	4			
4	4	7			4	4			
5	4	7			4	4	out of line 30 hr		
6	5	7			5	5	out of line 120 hr.		
7	5	7			6	6			
8	5	7			7	7			
9	4	6			5	7			
10	5	7			5	8			
11	6	7			0	8	out of line		
12	7	7			0	8	Out of line		
13	7	7			0	8	out of line		
14	6	7			7	8	out of line 9.5 hr.		
15	7	7	low on Polymer		7	7			
16	4	7	low on Polymer		7	7			
17	4	7	low on Polymer		6	6			
18	4	7	low on Polymer		6	6			
19	4	7	low on Polymer		6	6			
20	2	7	low on Polymer		6	6			
21	2	7	low on Polymer		9	9			
22	2	7	low on Polymer		8	8			
23	5	7			8	8			
24	6	7			6	8			
25	4	4			6	7			
26	5	6			6	6			
27	6	6			6	6			
28	6	6			5	5			
29									
30									
31									

MONTH: March

# cent. on line	# cent. on line & s/b	reduced or shutdown operation because		# vacuum filters on line	vacuum filters on line & s/b	or shutdown operation because		
3	6			8	10			
5	5			7	7			
4	4			9	9			
4	4			7	8			
4	4			7	7			
4	4			8	8			
4	4			7	10			
5	5			7	7			
5	5			6	7			
5	5			6	7			
5	5			6	6			
5	5			6	6			
5	5			6	6			
5	6			7	7			
4	6			9	9			
0	6	no DAF Polymer		7	8			
2	6	no DAF Polymer		6	6			
7	7			8	8			
7	7			6	6		out of line 16 hrs	
7	7			6	6			
6	7			6	6			
5	6			6	6			
5	6			7	7			
6	7			6	6			
5	6			5	5			
5	6			6	6			
5	6			6	6			
5	6			5	6			
5	6			7	7			
5	7			5	7			
6	7			5	5			

YEAR 1995 (APRIL)

DATE	# cent. on line	cent. on line & s/b		vacuum filters on line	filters on line & s/b				
1	5	6		5	9				
2	4	6		5	9				
3	2	6		4	9				
4	2	6		5	10				
5	3	7		4	9				
6	3	7		0	9				
7	4	7		5	5				
8	3	7		6	6				
9	4	7		6	6				
10	6	7		7	11				
11	6	7		6	7				
12	7	7		6	12				
13	7	7		7	10				
14	6	7		7	8				
15	5	7		6	7				
16	3	7		6	7				
17	5	7		5	5				
18	7	7		0	5				
19	5	7		5	8				
20	5	6		5	11				
21	5	7		6	10				
22	5	7		8	9				
23	6	6		6	6				
24	7	7		5	5				
25	6	7		5	5				
26	6	6		5	5				
27	6	6		7	7				
28	5	6		6	7				
29	6	6		0	7				
30	6	6		0	7				
31									

YEAR 1995 (MAY)

# cent. on line	cent. on line & s/b		vacuum filters on line	filters on line & s/b				
6	6		6	7				
4	6		6	7				
5	6		5	7				
5	6		5	5				
5	7		6	6				
6	6		0	6				
6	6		0	6				
7	7		0	6				
5	6		5	6				
6	6		4	5				
4	6		4	5				
4	6		6	6				
6	6		6	6				
6	6		5	5				
5	5		6	6				
4	6		5	5				
4	6		8	8				
5	6		6	6				
4	6		4	4				
4	7		4	4				
2	7		5	5				
5	7		6	6				
5	7		8	8				
5	7		6	8				
4	6		8	8				
4	6		8	8				
3	6		8	8				
4	4		8	8				
4	4		7	7				
2	6		7	10				
2	5		7	7				

YEAR 1995

DATE	# cent. on line	cent. on line & s/b		vacuum filters on line	filters on line & s/b				
1	2	5		5	5				
2	4	5		8	8				
3	4	5		7	7				
4	5	5		5	5				
5	5	5		6	6				
6	5	6		5	5				
7	4	6		5	5				
8	6	6		6	8				
9	5	7		8	9				
10	4	7		5	5				
11	5	5		5	5				
12	5	6		4	4				
13	4	7		7	7				
14	5	6		7	7				
15	5	6		0	7	ø			
16	4	6		0	7	ø			
17	6	6		0	7	ø			
18	6	6		0	7	ø			
19	5	5		4	4				
20	4	5		4	4				
21	4	5		4	4				
22	5	6		4	4				
23	5	6		4	4				
24	6	6		0	4				
25	6	6		0	4	ø			
26	6	6		6	8				
27	6	6		5	9				
28	6	6		4	4	ø			
29	6	6		6	8				
30	7	7		0	0	ø			
31									

YEAR 1995 (July)

# cent. on line	cent. on line & s/b		vacuum filters on line	filters on line & s/b				
7	7		0	4				
6	6		4	4				
6	6		3	3				
4	6		4	4				
5	6		4	4				
6	6		5	5				
6	6		0	6				
6	6		0	6				
4	6		0	6				
3	7		5	7				
6	6		6	6				
6	6		0	7				
6	6		0	8				
6	6		0	8				
5	5		0	8				
5	5		6	6				
5	5		5	9				
5	5		5	10				
5	5		5	10				
5	5		7	11				
6	6		0	13				
6	6		5	7				
6	6		0	7	out of line			
5	5		0	9				
5	5		4	7				
5	5		4	6				
5	5		4	7				
5	5		3	6				
5	5		6	6				
5	5		4	8				
5	5		7	7				

YEAR 1995 (1/10602

	# cent. on line	cent. on line & s/b		vacuum filters on line	filters on line & s/b				
	6	6		7	8				
2	6	6		7	7				
3	5	6		0	6				
4	5	6		5	5				
5	6	6		6	6				
6	6	6		4	4				
7	6	6		4	4				
8	6	6		5	5				
9	6	6		6	6				
10	6	6		6	6				
11	6	6		5	7				
12	6	6		8	8				
13	6	6		7	7				
14	6	6		5	11				
	6	6		5	7				
16	6	6		5	6				
17	6	6		6	6				
18	6	6		6	6				
19	6	6		6	6				
20	6	6		0	6	[illegible] stopped up			
21	6	6		0	6	out of FeCl3			
22	6	6		0	8	out of FeCl3			
23	6	6		0	8	out of FeCl3			
24	6	6		4	8				
25	6	6		6	7				
26	6	6		0	6				
27	6	6		0	6				
	4	4		5	5				
29	4	4		5	5				
30	4	4		5	5				
31	4	4		0	5				

YEAR 1995 (September)

# cent. on line	cent. on line & s/b		vacuum filters on line	filters on line & s/b				
5	6		0	6				
5	6		6	6				
5	6		4	4				
5	5		4	4	Out of line 3.0 hrs.			
5	6		0	5	Out of line 17.0 hrs.			
6	6		5	5				
6	6		4	4				
6	6		0	8				
5	5		4	4				
5	5		4	4				
6	6		3	3				
6	6		4	9				
6	6		4	9				
6	6		4	5				
6	6		4	9				
6	6		5	5				
5	5		5	8				
5	5		5	8				
6	6		4	8				
5	5		4	8				
5	5		4	9	Out of line 3.0 hours			
5	5		0	6	Out of line 24.0 hours.			
4	4		0	9	Out of line 24.0 hours.			
5	5		0	10				
5	5		5	9				
5	5		5	9				
4	5		5	8				
5	5		5	6				
3	3		0	3				
4	4		0	3				

						YEAR	1995 (OCTOBER)		
DATE	# cent. on line	cent. on line & s/b		vacuum filters on line	filters on line & s/b				
1	4	4		0	4				
2	5	5		3	3				
3	5	5		3	3				
4	6	6		6	6				
5	5	5		6	6				
6	6	6		6	9				
7	6	6		0	9				
8	6	6		0	9				
9	6	6		0	9				
10	6	6		0	10				
11	6	6		5	5				
12	6	6		4	7				
13	5	5		4	4				
14	6	6		0	4				
15	6	6		0	4				
16	6	6		2	2				
17	4	4		0	5				
18	6	6		5	10				
19	5	5	1 out for [illegible]	5	12				
20	6	6		5	5				
21	6	6		5	5				
22	6	6		0	5				
23	6	6		5	5				
24	5	6		4	6				
25	5	5	1 out for Muffin Monster	4	5				
26	5	6		4	7				
27	5	6		0	7				
28	5	6		5	5				
29	5	5	1 out for Muffin Monster	6	6				
30	6	6		6	6				
31	6	6		5	6				

YEAR 1995

(November)

# cent. on line	cent. on line & s/b		vacuum filters on line	filters on line & s/b	
6	6	Out of Line 10.5 hours.	0	5	Out of Line 24.0
6	6		0	7	Out of Line 24.0
6	6		0	5	Out of Line 24.0
6	6		4	4	
4	6	Raw Bunkers Full.	3	3	
5	5		4	4	
5	5		4	17	
5	5		4	10	
5	5		5	8	
5	5		5	7	
4	4	[illegible]	0	7	
4	4		4	4	
5	5		3	3	
5	5		2	2	
2	5	Low on Poly & Lime	4	4	Out of Line 3.0
4	4	Low on Polymer	0	4	OUT OF Line 24.0
5	5		0	4	Out of Line 24.0
6	6		0	4	Out of Line 24.0
6	6		7	7	
6	6		6	6	
7	7		6	6	
7	7		5	5	
5	5		5	5	
5	5		5	5	
6	7		5	5	
2	7	Low on Lime	4	4	
7	7	Low on Lime	4	4	
6	7		4	4	
7	7		4	4	
6	6		5	5	

MONTH: Decemb (199

DATE	# cent. on line	# cent. on line & s/b	reduced or shutdown operation because		# vacuum filters on line	vacuum filters on line & s/b	or shutdown operation because		
					4	4			
1	6	6			4	4			
2	6	6			4	4			
3	5	5			4	4			
4	5	5			4	4			
5	5	5			4	4			
6	5	5			4	4			
7	5	5			3	3			
8	6	6			0	3			
9	6	6			0	3			
10	6	6			3	3			
11	6	6			4	4			
12	6	6			5	5			
13	6	6			4	4			
[illegible]	6	6			3	3			
15	7	7			0	3			
16	7	7			4	4			
17	6	6			5	5			
18	6	7			4	4	Out of line 15.5 hours		
19	7	7			4	4			
20	6	7			3	3			
21	6	7			3	3			
22	7	7			0	3			
23	7	7			0	3			
24	7	7			0	3			
25	7	7			4	4			
26	7	7			4	4			
27	7	7			3	3			
[illegible]	7	7			3	3			
29	6	6			3	3			
30	6	6			0	3			
31	6	6							

APPENDIX I

Multi-media Filtration Bypass Events

MMFF- Drop shaft info: for Akile Testye - 1/19/96

SG-78-A B - ODD
SG-78-C D - EVEN

1995

JAN:	1 -	ODD -	50%	1 hr.
	2 -	ODD -	40%	4 hrs.
	7 -	ODD		2 hrs.
		EVEN -		9 hrs.
	9 -	EVEN -		13 hrs.
	10 -	EVEN -		16 hrs.
	11 -	EVEN -		8 hrs.
	12 -	EVEN -		13 hrs.
	13 -	EVEN -		10 hrs.
	20 -	ODD -		19 hrs.
	23 -	ODD -		2 hrs.
	26 -	ODD -		1 hr.
	27 -	ODD -	50%	5 hrs.
	28 -	ODD -		2 hrs.
FEB:	8 -	ODD -	78-A - 100% 78-B - 25%	5 hrs.
	10 -	ODD -		12 hrs.
	11 -	ODD -		4 hrs.
MAY:	2 -	ODD -		2 hrs.
	11 -	ODD -		2 hrs.
AUG:	8 -	ODD -		5 hrs.
		EVEN -		3 hrs.
	9 -	ODD -		3 hrs.
		EVEN -		3 hrs.
OCT:	5 -	ODD -		7 hrs.
	6 -	ODD -		7 hrs.
	14 -	ODD -		6.5 hrs.
	15 -	ODD -		7 hrs.
	21 -	ODD -		8 hrs.
NOV:	23 -	ODD -		3 hrs.
	24 -	ODD -		4 hrs.
	29 -	ODD -		13 hrs.
		EVEN -		8 hrs.
DEC:	17 -	ODD -		15 hrs.
		EVEN -		15 hrs.

DOCUMENT #14

APPENDIX J

Primary Treatment Performance Data

WASTEWATER DIVISION
PRIMARY TREATMENT BRANCH
DATA FROM APRIL 1, 1995

Wed NOV 15, 1995

PROCESS PERFORMANCE

TSS REMOVAL EFFICIENCY

(KILOPOUNDS)

DATE	INFLOW East	INFLOW West	INFLOW Comb	OUTFLOW East	OUTFLOW West	OUTFLOW Comb	REMOVALS (%) East	REMOVALS (%) West	REMOVALS (%) Comb
1	216	107	323	75	93	167	65	13	48
2	168	33	200	78	70	149	53	~~%-115~~ 0	26
3	261	90	351	119	95	214	54	-5	39
4	322	108	431	105	83	187	68	24	56
5	270	168	437	105	184	290	61	~~-10~~ 0	34
6	261	161	422	98	130	228	62	19	46
7	280	134	414	125	111	236	55	17	43
8	190	67	257	145	59	204	24	11	21
9	246	170	416	142	83	225	42	51	46
10	343	94	437	134	76	209	61	20	52
11	273	82	355	108	79	187	60	3	47
12	333	95	428	166	59	225	50	38	47
13	390	109	499	133	61	195	66	44	61
14	285	100	384	105	51	156	63	49	59
15	175	73	248	86	46	132	51	37	47
16	216	46	262	101	39	139	54	16	47
17	266			113			57		
18	248	114	362	88	59	147	65	48	59
19	422	158	579	117	78	195	72	50	66
20	144	176	320	93	97	191	35	45	40
21	190	130	320	80	93	173	58	29	46
22	319	107	426	147	65	211	54	39	50
23	192	105	297	66	106	173	65	~~-1~~ 0	42
24	174	191	365	131	91	221	25	52	39
25	151	146	297	126	99	226	17	32	24
26	204	59	264	87	66	153	57	~~-11~~ 0	42
27	216	148	364	88	84	171	59	44	53
28	243	107	350	134	67	201	45	38	43
29	280	61	341	180	56	236	36	8	31
30	248	97	345	162	86	249	35	11	28
OTAL	7525	3235	10495	3437	2366	5690			
INIMUM	144	33	200	66	39	132	17	%-115	21
AXIMUM	422	191	579	180	184	290	72	52	66
VERAGE	251	112	362	115	82	196	52	~~21~~ 26	44

PROCESS PERFORMANCE

BOD REMOVAL EFFICIENCY

(KILOPOUNDS)

DATE	INFLOW East	INFLOW West	INFLOW Comb	OUTFLOW East	OUTFLOW West	OUTFLOW Comb	REMOVALS (%) East	REMOVALS (%) West	REMOVALS (%) Comb
1	235	123	358	135	113	248	43	8	31
2	235	64	299	123	98	221	48	~~-54~~ 0	26
3	269	118	387	166	117	284	38	1	27
4	242	107	349	147	96	243	39	11	30
5	247	174	421	156	185	341	37	~~-6~~ 0	19
6	246	185	431	135	165	300	45	11	30
7	279	153	432	188	108	296	33	29	31
8	227	88	314	207	81	288	9	8	8
9	261	109	370	204	91	295	22	16	20
10	293	112	406	161	99	260	45	12	36
11	258	93	350	143	95	238	45	~~-2~~ 0	32
12	313	121	434	206	80	287	34	34	34
13	229	89	317	152	66	218	34	26	31
14	225	106	330	157	57	215	30	46	35
15	265	127	391	179	94	273	32	26	30
16	218	62	280	151	54	205	31	13	27
17	301			182			39		
18	269	112	381	157	93	250	42	17	34
19	288	169	457	140	101	241	51	40	47
20	185	196	381	138	123	261	25	37	32
21	159	135	294	118	117	235	26	13	20
22	295	137	432	147	85	232	50	38	46
23	253	172	426	135	181	316	47	~~-5~~ 0	26
24	162	177	339	170	129	299	~~-5~~ 0	27	12
25	129	195	323	132	134	266	~~-3~~ 0	31	18
26	236	99	335	140	77	218	41	21	35
27	200	150	350	125	108	234	37	28	33
28	240	116	356	153	83	236	36	28	34
29	247	75	322	214	153	367	13	~~%-105~~ 0	-14
30	294	137	431	232	124	356	21	10	18
TOTAL	7298	3700	%10698	4795	3109	7721			
MINIMUM	129	62	280	118	54	205	-5	%-105	-14
MAXIMUM	313	196	457	232	185	367	51	46	47
AVERAGE	243	128	369	160	107	266	~~33~~ 33	~~12~~ 18	27

PROCESS PERFORMANCE

PO4 REMOVAL EFFICIENCY

(KILOPOUNDS)

	---- INFLOW ----			--- OUTFLOW ----			- REMOVALS (%) -		
DATE	East	West	Comb	East	West	Comb	East	West	Comb
1	6.0	3.0	9.0	4.6	2.5	7.1	23	16	21
2	5.3	1.6	6.8	3.3	2.5	5.7	38	~~-59~~ 0	16
3	6.0	3.0	8.9	4.7	2.9	7.6	22	2	15
4	4.5	3.0	7.5	4.3	3.1	7.4	4	~~-2~~ 0	2
5	4.7	3.4	8.1	3.8	3.8	7.6	19	~~-12~~ 0	6
6	5.3	3.4	8.7	3.8	3.3	7.1	29	2	18
7	5.8	3.1	8.8	5.0	2.6	7.6	14	16	14
8	4.4	1.9	6.3	4.9	1.7	6.6	~~-13~~ 0	9	-6
9	5.3	2.4	7.7	4.5	2.1	6.6	15	14	14
10	6.0	2.2	8.1	3.7	2.2	5.9	37	~~-0~~ 0	27
11	3.8	1.7	5.5	3.9	2.7	6.6	~~-3~~ 0	~~-53~~ 0	-19
12	7.9	2.4	10.3	4.8	2.2	7.1	39	5	31
13	6.0	2.2	8.2	4.2	1.9	6.1	30	14	26
14	5.3	2.0	7.3	4.4	1.7	6.1	17	14	16
15	5.1	2.5	7.6	4.2	2.0	6.2	17	20	18
16	4.1	1.2	5.3	3.7	1.2	4.9	12	~~-1~~ 0	9
17	7.8			5.5			30		
18	5.9	2.3	8.2	4.7	2.0	6.8	20	13	18
19	4.6	2.8	7.4	4.0	2.0	6.0	13	27	18
20	4.2	3.8	8.0	3.3	3.2	6.6	21	14	18
21	4.4	3.4	7.8	2.9	3.0	5.8	34	12	25
22	5.8	2.4	8.2	3.6	1.9	5.5	39	20	33
23	4.9	2.8	7.7	2.8	3.0	5.8	43	~~-7~~ 0	25
24	3.9	3.6	7.5	4.3	2.9	7.3	~~-13~~ 0	19	3
25	3.4	3.8	7.1	3.5	3.2	6.7	~~-5~~ 0	16	6
26	5.2	2.5	7.7	3.7	2.2	6.0	29	10	23
27	9.5	3.5	13.0	3.9	3.2	7.1	59	8	45
28	6.1	2.8	8.9	5.2	2.4	7.6	15	13	14
29	6.4	2.1	8.5	5.5	1.8	7.3	14	13	14
30	5.6	2.6	8.2	5.2	2.5	7.7	7	6	7
OTAL	162.9	77.5	232.5	125.9	72.0	192.5			
INIMUM	3.4	1.2	5.3	2.8	1.2	4.9	-13	-59	-19
AXIMUM	9.5	3.8	13.0	5.5	3.8	7.7	59	27	45
VERAGE	5.4	2.7	8.0	4.2	2.5	6.6	~~20~~ 21	~~5~~ 9	16

WASTEWATER DIVISION
PRIMARY TREATMENT BRANCH
DATA FROM MAY 1, 1995

Wed NOV 15, 1995

PROCESS PERFORMANCE

TSS REMOVAL EFFICIENCY

(KILOPOUNDS)

DATE	---- INFLOW ---- East	West	Comb	--- OUTFLOW ---- East	West	Comb	- REMOVALS (%) - East	West	Comb
1	140	62	203	96	43	139	32	30	31
2	204	136	340	102	110	212	50	19	38
3	253	48	302	145	49	194	43	~~-1~~ 0	36
4	227	84	311	126	42	168	45	50	46
5	448	42	490	166	40	206	63	4	58
6	257	61	318	158	63	222	38	~~-4~~ 0	30
7	339	75	414	140	75	215	59	0	48
8	397	90	487	101	63	164	75	30	66
9	238	79	317	120	51	171	50	36	46
10	423	92	515	143	43	186	66	53	64
11	465	127	592	107	53	160	77	58	73
12	349	80	429	178	39	217	49	52	50
13	322	96	418	192	65	257	40	33	39
14	393	134	526	174	70	245	56	47	54
15	326	82	407	132	43	175	59	47	57
16	255	98	354	150	54	204	41	46	42
17	307	153	460	94	96	191	69	37	58
18	327	67	394	160	101	260	51	~~-50~~ 0	34
19	337	118	455	112	153	265	67	~~-29~~ 0	42
20	159	73	232	108	44	152	32	40	35
21	231	57	288	163	31	195	29	45	32
22		109		129	64	193		42	
23	248	133	381	130	73	203	47	45	47
24	255	133	388	148	95	243	42	28	37
25	292	180	472	180	127	307	38	29	35
26	258	140	399	129	124	253	50	11	36
27	139	117	256	97	75	172	30	36	33
28	188	174	362	124	99	224	34	43	38
29	145	110	255	121	83	204	17	24	20
30	197	119	315	80	76	156	59	36	51
31	179	107	286	106	72	178	41	33	38
TOTAL	8299	3178	11368	4113	2215	6327			
MINIMUM	139	42	203	80	31	139	17	-50	20
MAXIMUM	465	180	592	192	153	307	77	58	73
AVERAGE	277	103	379	133	71	204	48	~~28~~ 31	44

PROCESS PERFORMANCE

BOD REMOVAL EFFICIENCY

(KILOPOUNDS)

	---- INFLOW ----			--- OUTFLOW ----			- REMOVALS (%) -		
DATE	East	West	Comb	East	West	Comb	East	West	Comb
1	202	99	301	183	68	251	10	31	17
2	195	151	347	124	100	223	37	34	36
3	241	70	312	196	77	273	19	~~-10~~ 0	12
4	272	93	365	153	39	192	44	58	47
5	371	61	433	181	43	225	51	30	48
6	325	78	403	184	80	264	43	~~-3~~ 0	34
7	323	120	443	167	81	249	48	32	44
8	332	96	428	189	112	301	43	~~-17~~ 0	30
9	287	151	438	139	97	236	52	36	46
10	341	98	439	185	62	248	46	36	44
11	297	102	399	186	90	276	37	12	31
12		85		197	74	271		13	
13		37		172	49	220		~~-31~~ 0	
14	245	132	377	164	81	244	33	39	35
15	297	49	346	154	45	199	48	7	42
16	283	120	403	139	77	217	51	35	46
17	302	155	457	124	142	266	59	8	42
18	318	72	390	120	73	193	62	~~-1~~ 0	51
19	284	122	406	124	138	262	56	~~-13~~ 0	35
20	195	122	317	140	99	238	28	19	25
21	245	93	338	182	41	223	26	56	34
22		119		173	88	261		27	
23	144	100	243	125	85	209	13	15	14
24	219	102	321	146	87	234	33	14	27
25	293	178	471	150	125	276	49	30	42
26	177	115	292	107	93	200	40	19	32
27	159	145	305	109	96	204	32	34	33
28	248	159	407	121	121	242	51	24	41
29	167	138	305	114	99	213	32	28	30
30	209	128	337	121	90	212	42	29	37
31	169	119	288	123	86	210	27	27	27
OTAL	7144	3408	%10310	4692	2640	7331			
INIMUM	144	37	243	107	39	192	10	-31	12
AXIMUM	371	178	471	197	142	301	62	58	51
VERAGE	255	110	368	151	85	236	40	~~20~~ 22	35

PROCESS PERFORMANCE

PO4 REMOVAL EFFICIENCY

(KILOPOUNDS)

DATE	INFLOW East	INFLOW West	INFLOW Comb	OUTFLOW East	OUTFLOW West	OUTFLOW Comb	REMOVALS (%) East	REMOVALS (%) West	REMOVALS (%) Comb
1	5.6	2.3	7.9	4.4	1.9	6.4	21	16	19
2	4.5	3.4	8.0	4.0	2.9	7.0	11	14	12
3	6.5	1.6	8.1	5.3	1.8	7.0	19	~~-12~~ 0	13
4	5.9	2.3	8.2	5.4	1.3	6.6	9	46	19
5	7.6	1.4	9.0	5.3	1.2	6.5	30	15	27
6	6.3	1.9	8.2	4.4	1.9	6.3	31	2	24
7	6.9	1.7	8.6	4.7	1.9	6.6	32	~~-9~~ 0	24
8	7.5	2.4	9.9	4.8	2.2	7.0	36	9	29
9	6.8	2.6	9.4	4.0	2.0	6.0	41	23	36
10	7.3	1.8	9.1	5.1	1.4	6.5	30	22	29
11	7.0	2.4	9.4	4.6	2.2	6.8	35	7	28
12	6.2	2.2	8.4	4.3	1.6	5.8	31	29	31
13	5.7	1.6	7.3	3.7	1.6	5.3	35	2	28
14	5.8	2.2	8.0	3.6	1.7	5.3	37	24	34
15	9.1	1.4	10.5	4.6	1.6	6.1	50	~~-11~~ 0	42
16	6.0	2.7	8.7	4.3	2.6	6.9	28	3	21
17	6.4	3.6	10.0	3.2	3.3	6.5	50	8	35
18	7.4	2.1	9.5	4.2	2.0	6.2	43	6	35
19	5.6	3.1	8.6	3.3	3.0	6.4	40	1	26
20	4.3	2.4	6.7	3.7	2.2	5.9	14	10	13
21	4.9	1.9	6.8	4.7	1.3	6.1	4	30	11
22		2.9		5.2	2.5	7.7		14	
23	5.8	4.0	9.8	4.8	3.2	8.0	17	19	18
24	5.5	3.8	9.3	5.5	3.6	9.1	~~-0~~	4	2
25	6.1	3.8	9.8	5.2	2.9	8.1	14	23	17
26	5.3	3.0	8.4	3.7	3.3	7.0	31	~~-9~~ 0	16
27	4.5	3.6	8.2	3.4	3.6	7.0	24	0	14
28	5.1	3.6	8.7	3.9	3.6	7.5	24	1	14
29	4.2	3.5	7.7	4.0	3.4	7.5	4	3	3
30	4.4	2.3	6.6	3.8	2.2	6.1	12	3	9
31	4.7	2.8	7.5	4.5	2.5	7.0	6	9	7
TOTAL	178.9	80.4	256.3	135.7	72.4	208.1			
MINIMUM	4.2	1.4	6.6	3.2	1.2	5.3	-0	-12	2
MAXIMUM	9.1	4.0	10.5	5.5	3.6	9.1	50	46	42
AVERAGE	6.0	2.6	8.5	4.4	2.3	6.7	25	~~10~~ 11	21

PROCESS PERFORMANCE

TSS REMOVAL EFFICIENCY

(KILOPOUNDS)

DATE	---- INFLOW ---- East	West	Comb	--- OUTFLOW ---- East	West	Comb	- REMOVALS (%) - East	West	Comb
1	266	106	372	102	52	154	62	51	59
2	314	110	424	173	68	241	45	38	43
3	323	92	414	162	60	222	50	34	46
4	134	100	233	116	47	162	14	53	31
5	303	126	429	181	106	286	40	16	33
6	204	99	302	141	88	229	31	11	24
7	148	107	255	119	59	179	19	45	30
8	168	136	304	92	78	169	46	43	44
9	201	140	341	139	112	250	31	20	27
10	194	171	364	125	87	212	35	49	42
11	131	235	366	121	68	189	8	71	48
12	141	226	367	155	88	243	~~-10~~ 0	61	34
13	176	140	316	119	114	233	32	19	26
14				131					
15	190	112	302	85	56	141	55	50	53
16	125	128	253	77	94	171	38	27	32
17		149		140	69	209		54	
18		119		116	83	198		30	
19	160	164	324	116	99	215	28	39	34
20		134		89	65	154		51	
21		115		117	47	164		59	
22	158	88	246	119	77	196	25	12	20
23		64		202	149	351		~~%-131~~ 0	
24	264	94	358	170	82	252	36	13	30
25	185	153	338	69	77	146	63	50	57
26	186	116	303	89	80	169	52	31	44
27	239	180	419	84	50	133	65	72	68
28	303	132	436	84	116	201	72	12	54
29	271	102	373	60	70	129	78	32	65
30	187	83	270	128	70	198	32	16	27
OTAL	4972	3720	8111	3621	2309	5799			
INIMUM	125	64	233	60	47	129	-10	%-131	20
AXIMUM	323	235	436	202	149	351	78	72	68
VERAGE	207	128	338	121	80	200	39	~~32~~	40
							39	36	

PROCESS PERFORMANCE

BOD REMOVAL EFFICIENCY

(KILOPOUNDS)

DATE	INFLOW East	INFLOW West	INFLOW Comb	OUTFLOW East	OUTFLOW West	OUTFLOW Comb	REMOVALS (%) East	REMOVALS (%) West	REMOVALS (%) Comb
1	257	119	376	147	88	236	43	26	37
2	314	102	416	138	89	226	56	13	46
3	232	96	329	132	67	199	43	31	39
4	136	120	256	110	81	192	19	32	25
5	260	116	376	145	119	263	44	~~-2~~ 0	30
6	217	137	355	118	104	221	46	25	38
7	115	134	249	113	92	205	2	31	18
8	153	158	311	109	82	192	28	48	38
9	151	160	311	138	108	246	9	32	21
10	168	160	328	149	95	244	11	41	26
11	127	157	284	134	105	239	~~-5~~ 0	33	16
12	127	181	308	122	107	229	4	41	26
13	156	133	289	148	125	273	5	6	6
14				128					
15	217	142	359	149	103	251	32	28	30
16	96	153	249	140	113	254	~~-46~~ 0	26	-2
17		123		143	67	210		45	
18		158		122	81	203		49	
19	127	168	295	130	100	230	~~-3~~ 0	40	22
20		117		121	65	186		44	
21		149		123	100	223		33	
22	184	97	281	127	95	222	31	3	21
23		141		163	88	252		37	
24	241	113	354	144	108	251	40	4	29
25	167	121	289	127	91	219	24	25	24
26	177	120	297	144	95	238	19	21	20
27	186	166	353	116	81	198	38	51	44
28	162	93	255	94	142	235	42	~~-53~~ 0	8
29	171	91	261	71	80	150	59	12	42
30	150	78	228	80	73	153	46	7	33
TOTAL	4292	3802	7407	3825	2744	6441			
MINIMUM	96	78	228	71	65	150	-46	-53	-2
MAXIMUM	314	181	416	163	142	273	59	51	46
AVERAGE	179	131	309	127	95	222	~~24~~ 26	~~25~~ 27	26

PROCESS PERFORMANCE

PO4 REMOVAL EFFICIENCY

(KILOPOUNDS)

DATE	---- INFLOW ----			--- OUTFLOW ----			- REMOVALS (%) -		
	East	West	Comb	East	West	Comb	East	West	Comb
1	5.5	2.9	8.4	4.4	2.8	7.2	20	4	15
2	6.5	3.4	10.0	4.4	2.4	6.8	33	29	32
3	3.1	2.4	5.5	4.1	1.9	6.0	~~-32~~ 0	21	-8
4	3.3	2.9	6.2	3.4	2.1	5.4	~~-3~~ 0	30	12
5	5.7	3.1	8.9	3.9	5.6	9.5	32	~~-77~~ 0	-7
6	5.1	4.1	9.1	3.5	3.6	7.2	30	11	22
7	3.6	3.8	7.4	3.9	3.2	7.0	~~-8~~ 0	16	4
8	3.9	4.3	8.2	3.5	3.0	6.5	10	30	20
9	3.8	3.7	7.5	4.4	3.2	7.6	~~-15~~ 0	13	-1
10	3.2	3.4	6.6	4.3	2.6	6.9	~~-33~~ 0	23	-4
11	3.2	3.5	6.7	3.9	2.9	6.8	~~-25~~ 0	19	-2
12	3.0	3.6	6.6	4.0	2.9	6.8	~~-34~~ 0	21	-4
13	3.6	3.7	7.2	4.6	3.1	7.7	~~-28~~ 0	14	-7
14				4.7					
15	6.3	3.8	10.1	5.3	3.3	8.6	15	13	14
16	2.1	3.3	5.4	4.3	2.9	7.2	~~%-102~~ 0	13	-32
17		3.2		4.4	2.4	6.8		25	
18		3.0		3.6	2.4	5.9		21	
19	3.3	3.8	7.2	3.9	3.1	7.0	~~-17~~ 0	19	2
20		3.7		4.2	2.6	6.7		31	
21		3.9		3.8	3.4	7.2		13	
22	4.9	2.5	7.4	4.4	2.8	7.2	11	~~-14~~ 0	3
23		3.9		5.3	3.1	8.5		20	
24	6.6	3.7	10.3	4.4	3.1	7.5	33	17	27
25	4.7	3.2	8.0	3.2	2.7	5.9	32	18	26
26	4.3	3.2	7.5	4.1	2.8	6.9	5	13	8
27	5.7	4.3	10.0	3.9	3.1	7.0	31	28	30
28	5.4	3.1	8.5	5.4	3.3	8.7	~~-2~~ 0	~~-5~~ 0	-3
29	5.7	3.0	8.7	2.8	3.0	5.8	50	3	33
30	3.7	2.1	5.8	2.4	1.9	4.3	36	10	26
OTAL	106.0	98.8	187.2	122.3	85.1	202.7			
INIMUM	2.1	2.1	5.4	2.4	1.9	4.3	%-102	-77	-32
AXIMUM	6.6	4.3	10.3	5.4	5.6	9.5	50	31	33
VERAGE	4.4	3.4	7.8	4.1	2.9	7.0	~~2~~ 12	~~13~~ 16	9

PROCESS PERFORMANCE

TSS REMOVAL EFFICIENCY

(KILOPOUNDS)

DATE	INFLOW East	INFLOW West	INFLOW Comb	OUTFLOW East	OUTFLOW West	OUTFLOW Comb	REMOVALS (%) East	REMOVALS (%) West	REMOVALS (%) Comb
1	298	111	408	111	86	197	63	22	52
2	139	101	240	44	68	112	68	32	53
3	160	133	293	69	91	159	57	32	46
4	192	218	410	103	124	227	46	43	45
5	247	125	372	130	63	193	48	50	48
6	298	348	646	117	129	246	61	63	62
7	236	100	335	77	57	134	67	43	60
8	154	122	276	54	134	187	65	~~-10~~ 0	32
9	197			74			62		
10	205	88	293	98	77	175	52	13	40
11	197	83	279	62	91	153	68	~~-10~~ 0	45
12	214	151	365	59	117	176	72	22	52
13	166	145	311	48	151	199	71	-5	36
14	200	135	335	66	80	146	67	41	56
15	275								
16	218	139	358		92			34	
17	212	113	324	116	101	216	45	10	33
18	272			115			58		
19	275			52			81		
20	284			67			76		
21	502	168	670	96	116	212	81	31	68
22	261	122	383	61	101	162	77	17	58
23	270	108	378	58	101	159	78	7	58
24	267	150	417	70	101	171	74	33	59
25	256	262	518	69	103	172	73	61	67
26	213	171	384	66	148	214	69	13	44
27	304	245	549	293	126	420	3	48	24
28	461	163	623		125			24	
29	200	109	309	74	80	154	63	27	50
30	254	117	371	71	114	185	72	2	50
31	323	121	444	47	127	174	86	~~-6~~ 0	61
TOTAL	7750	3846	10293	2366	2703	4544			
MINIMUM	139	83	240	44	57	112	3	-10	24
MAXIMUM	502	348	670	293	151	420	86	63	68
AVERAGE	250	148	396	84	104	189	64	~~25~~ 26	50

IASTEWATER DIVISION
'RIMARY TREATMENT BRANCH
'ATA FROM JULY 1, 1995

Wed NOV 15, 1995

PROCESS PERFORMANCE

BOD REMOVAL EFFICIENCY

(KILOPOUNDS)

	---- INFLOW ----			--- OUTFLOW ----			- REMOVALS (%) -		
DATE	East	West	Comb	East	West	Comb	East	West	Comb
1	219	106	325	129	94	222	41	12	32
2	148	100	247	83	86	169	44	13	32
3	152	113	265	86	78	163	44	31	38
4	145	122	267	103	77	180	29	37	33
5	247	61	308	123	56	179	50	8	42
6	161	127	289	115	86	202	28	32	30
7	135	136	272	152	42	194	~~-12~~ 0	69	29
8	138	112	249	72	100	173	48	10	31
9	180			90			50		
10	232	83	316	132	75	207	43	9	34
11	188	121	309	62	121	183	67	0	41
12	175	168	343	71	119	189	60	29	45
13	156	153	310	67	160	227	57	~~-4~~ 0	27
14	195	122	316	90	71	161	54	42	49
15	207								
16	193	146	340		82			44	
17	190	246	436	94	79	173	50	68	60
18	193			104			46		
19	197			81			59		
20	216			61			72		
21	253	152	404	123	90	213	51	40	47
22	180	96	276	86	82	168	52	14	39
23	347	104	452	122	134	256	65	~~-28~~ 0	43
24	262	190	452	115	140	255	56	26	44
25	186	150	336	111	135	245	40	11	27
26	189	189	378	116	291	407	39	~~-54~~ 0	-7
27	177	128	306	97	108	205	45	16	33
28	278	129	406		232			~~-80~~ 0	
29	200	133	333	115	132	247	43	1	26
30	183	127	310	101	125	226	45	2	27
31	209	151	360	92	151	243	56	-0	32
OTAL	6132	3467	8606	2792	2947	5089			
INIMUM	135	61	247	61	42	161	-12	-80	-7
AXIMUM	347	246	452	152	291	407	72	69	60
VERAGE	198	133	331	100	113	212	47	~~13~~ 14	35

PROCESS PERFORMANCE

PO4 REMOVAL EFFICIENCY

(KILOPOUNDS)

DATE	---- INFLOW ----			--- OUTFLOW ----			- REMOVALS (%) -		
	East	West	Comb	East	West	Comb	East	West	Comb
1	5.3	2.7	7.9	3.7	2.5	6.2	29	7	22
2	3.0	2.6	5.6	2.3	2.4	4.7	25	6	16
3	4.1	3.3	7.4	2.7	2.4	5.1	34	26	30
4	4.7	3.3	8.0	3.2	2.9	6.1	32	12	24
5	4.6	2.2	6.8	4.0	1.7	5.7	14	21	16
6	5.3	3.9	9.3	3.7	3.6	7.4	30	8	21
7	4.8	2.2	7.0	3.3	1.4	4.7	32	35	33
8	2.9	2.9	5.8	2.2	2.8	5.0	26	3	15
9	3.9			3.3			16		
10	5.1	2.3	7.4	4.3	2.1	6.4	16	8	14
11	4.7	3.4	8.1	108.5	3.7	112.2	0 ~~%-2213~~	~~-7~~ 0	~~%-1282~~ 0
12	4.6	4.3	8.9	1.9	3.9	5.8	59	8	34
13	3.4	4.6	8.0	2.2	4.4	6.6	35	4	17
14	4.9	3.0	7.9	2.4	2.4	4.7	52	20	40
15	5.1								
16	4.9	3.3	8.3		2.5			25	
17	4.7	3.2	7.9	2.7	2.8	5.5	43	12	30
18	5.9			3.6			40		
19	4.9			2.4			52		
20	5.9			3.4			42		
21	5.7	3.5	9.2	3.8	2.6	6.4	33	26	30
22	3.6	2.6	6.3	2.7	2.5	5.2	26	5	17
23	4.8	2.5	7.3	3.0	2.5	5.5	37	0	25
24	5.3	3.9	9.2	3.3	3.2	6.5	38	18	29
25	4.7	3.1	7.8	3.0	3.1	6.1	36	1	22
26	5.2	3.7	8.8	3.0	5.3	8.3	42	~~-44~~ 0	6
27	5.9	3.3	9.2	3.5	3.2	6.7	41	4	27
28	6.2	2.9	9.0		2.8			1	
29	4.9	3.1	8.0	3.6	2.8	6.3	28	11	21
30	4.1	2.9	7.0	2.7	2.6	5.3	34	10	24
31	4.9	3.5	8.4	2.4	3.3	5.7	51	6	32
TOTAL	148.2	82.0	204.5	190.7	75.4	248.1			
MINIMUM	2.9	2.2	5.6	1.9	1.4	4.7	%-2213	-44	~~%-1282~~
MAXIMUM	6.2	4.6	9.3	108.5	5.3	112.2	59	35	40
AVERAGE	4.8	3.2	7.9	6.8	2.9	10.3	~~-45~~	~~9~~	-31
							26	11	10

ASTEWATER DIVISION
RIMARY TREATMENT BRANCH
ATA FROM AUGUST 1, 1995

Wed NOV 15, 1995

PROCESS PERFORMANCE

TSS REMOVAL EFFICIENCY

(KILOPOUNDS)

	INFLOW			OUTFLOW			REMOVALS (%)		
DATE	East	West	Comb	East	West	Comb	East	West	Comb
1	226	132	358	51	100	150	78	25	58
2	168	203	370	45	84	129	73	59	65
3	132			54			59		
4		179		71	133	204		26	
5		106		78	49	127		53	
6	133	162	295	93	93	186	30	43	37
7	161	144	305	90	109	199	44	24	35
8	166			107			36		
9	147	184	331		112			39	
10	208	223	431	137	153	290	34	32	33
11		146		94	102	196		30	
12		220		95	118	213		47	
13		211		95	125	220		41	
14		211		118	84	202		60	
15		220		92	108	200		51	
16				95					
17		139		169	121	290		13	
18	215			57			74		
19	254	116	369	139	134	273	45	~~-16~~ 0	26
20	181	137	319	88	99	187	52	28	41
21	205	99	304	90	88	179	56	11	41
22	311	71	382	83	37	120	73	48	69
23	260	124	384	119	78	196	54	37	49
24	140	144	285	91	97	188	35	33	34
25	407	133	540	57	129	187	86	2	65
26	159	86	245	64	73	137	59	16	44
27	160	68	227	57	58	115	64	15	50
28	139	100	239	54	98	152	61	3	37
29	197	108	305	52	61	114	73	43	63
30	201	136	337	55	109	164	72	20	51
31	324	251	575	66	61	127	79	76	78
OTAL	4493	4053	6601	2556	2610	4741			
INIMUM	132	68	227	45	37	114	30	-16	26
AXIMUM	407	251	575	169	153	290	86	76	78
VERAGE	204	150	347	85	97	182	59	~~32~~ 37	49

PROCESS PERFORMANCE

BOD REMOVAL EFFICIENCY

(KILOPOUNDS)

	INFLOW			OUTFLOW			REMOVALS (%)		
DATE	East	West	Comb	East	West	Comb	East	West	Comb
1	162	134	296	76	123	199	53	8	33
2	161	191	352	77	156	233	52	18	34
3	116			76			35		
4		223		106	195	301		13	
5		169		111	98	208		42	
6	82	121	203	120	107	226	~~-46~~ 0	12	-11
7	162	127	289	100	89	189	38	30	35
8	162			108			33		
9	180	183	363		120			34	
10	175	145	321	118	142	261	32	2	19
11		176		109	189	299		~~-7~~ 0	
12		158		106	140	246		12	
13		151		89	104	194		31	
14		187		98	125	224		33	
15		186		95	114	208		39	
16				95					
17		126		91	102	193		19	
18	160			84			48		
19	198	99	296	86	91	177	56	8	40
20	176	130	305	96	107	203	46	17	34
21	192	156	347	119	123	242	38	21	30
22	251	93	344	121	83	204	52	11	41
23	206	165	370	131	125	256	36	24	31
24	166	141	306	118	129	247	28	9	19
25	168	105	273	88	127	216	47	~~-21~~ 0	21
26	215	124	339	117	350	467	45	~~%-182~~ 0	-38
27	221	116	337	128	123	251	42	~~-6~~ 0	25
28	195	125	321	100	110	210	49	12	34
29	203	154	357	97	105	202	52	32	43
30	211	172	383	120	135	255	43	22	33
31	160	133	293	95	69	164	40	48	44
TOTAL	3922	3988	6096	3078	3479	6073			
MINIMUM	82	93	203	76	69	164	-46	%-182	-38
MAXIMUM	251	223	383	131	350	467	56	48	44
AVERAGE	178	148	321	103	129	234	~~39~~ 40	~~10~~ 17	26

PROCESS PERFORMANCE

PO4 REMOVAL EFFICIENCY

(KILOPOUNDS)

DATE	INFLOW East	INFLOW West	INFLOW Comb	OUTFLOW East	OUTFLOW West	OUTFLOW Comb	REMOVALS (%) East	REMOVALS (%) West	REMOVALS (%) Comb
1	4.2	3.8	7.9	2.3	3.6	5.9	44	4	25
2	4.0	4.6	8.6	2.6	4.1	6.7	34	11	22
3	3.9			2.6			34		
4		4.4		2.6	4.1	6.7		7	
5		3.5		3.0	2.5	5.5		29	
6	2.4	3.1	5.4	3.4	2.7	6.1	~~-45~~ 0	11	-13
7	5.2	3.3	8.6	3.6	3.2	6.8	30	5	20
8	4.3			3.7			14		
9	4.5	4.3	8.8		3.4			21	
10	4.4	3.9	8.3	4.2	3.9	8.1	4	0	2
11		3.7		3.0	3.2	6.2		14	
12		3.5		3.2	3.0	6.2		14	
13		3.8		3.1	3.3	6.4		13	
14		3.8		3.2	3.2	6.4		18	
15		3.8		3.3	3.8	7.1		0	
16				3.2					
17		3.2		3.7	3.4	7.1		~~-5~~ 0	
18	4.6			3.3			29		
19	4.7	2.6	7.3	3.1	2.9	6.0	34	~~-11~~ 0	18
20	4.6	2.9	7.5	3.3	2.7	6.0	28	7	20
21	4.7	3.3	7.9	3.5	3.1	6.6	25	6	17
22	6.0	2.1	8.0	3.7	2.1	5.8	37	-0	28
23	5.0	3.5	8.5	4.1	3.2	7.3	19	8	15
24	3.0	2.6	5.6	2.8	2.5	5.3	7	4	6
25	4.4	2.6	7.0	2.5	3.3	5.8	43	~~-26~~ 0	17
26	4.2	2.4	6.6	3.6	26.0	29.5	15	0 ~~%-992~~	%-350
27	4.8	2.5	7.4	3.5	2.4	5.9	27	5	19
28	4.3	2.6	6.9	3.2	2.5	5.7	25	6	18
29	5.0	3.7	8.7	3.1	2.6	5.7	38	30	35
30	5.0	3.8	8.8	3.4	3.5	6.8	33	8	22
31	5.3	3.5	8.8	3.5	2.7	6.2	35	23	30
ITAL	98.5	90.8	146.7	97.5	106.7	188.0			
INIMUM	2.4	2.1	5.4	2.3	2.1	5.3	-45	%-992	%-350
XIMUM	6.0	4.6	8.8	4.2	26.0	29.5	44	30	35
ERAGE	4.5	3.4	7.7	3.2	4.0	7.2	~~24~~ 25	~~-29~~ 4%	-3

PROCESS PERFORMANCE

TSS REMOVAL EFFICIENCY

(KILOPOUNDS)

DATE	---- INFLOW ---- East	West	Comb	--- OUTFLOW ---- East	West	Comb	- REMOVALS (%) - East	West	Comb
1	171	144	315	61	158	219	64	~~-10~~ 0	30
2	244	163	406	50	83	134	79	49	67
3	343	100	443	50	55	106	85	45	76
4	250	94	345		71			25	
5	261	106	367	56	90	146	79	15	60
6	171	139	310	58	62	120	66	56	61
7	161	134	295	71	71	142	56	47	52
8	246	107	353	58	85	143	77	20	59
9	350			55			84		
10	200	107	306	60	71	131	70	33	57
11	155			67			57		
12	262			47			82		
13	273			44			84		
14	304	92	396	64	81	145	79	11	63
15	178	135	313	55	73	128	69	46	59
16	260	137	397	69	96	165	74	30	58
17	263	143	406	70	81	151	73	43	63
18	241	180	421		90			50	
19	202	159	361	71	103	175	65	35	52
20	81	99	180	57	110	167	29	~~-11~~ 0	7
21	166	198	364	59	101	159	65	49	56
22	102	107	208	57	114	171	44	~~-7~~ 0	18
23	270	80	351	48	100	148	82	~~-25~~ 0	58
24	286	162	448	109	153	263	62	5	41
25	230	108	338	91	90	180	61	17	47
26	252	146	399		109			25	
27	66	149	215	53	89	142	20	40	34
28	183			45			75		
29	131			48			63		
30	220	195	415	64	113	177	71	42	57
TOTAL	6523	3184	8353	1637	2252	3311			
MINIMUM	66	80	180	44	55	106	20	-25	7
MAXIMUM	350	198	448	109	158	263	85	56	76
AVERAGE	217	133	348	61	94	158	67	~~26~~ 28	51

ASTEWATER DIVISION
RIMARY TREATMENT BRANCH
ATA FROM SEPTEMBER 1, 1995

Wed NOV 15, 1995

PROCESS PERFORMANCE

BOD REMOVAL EFFICIENCY

(KILOPOUNDS)

	---- INFLOW ----			--- OUTFLOW ----			- REMOVALS (%) -		
ATE	East	West	Comb	East	West	Comb	East	West	Comb
1	107	139	246	81	126	207	24	10	16
2	139	163	301	93	94	187	33	42	38
3	203	93	296	109	74	183	46	20	38
4	248	154	402		111			28	
5	212	126	338	112	100	212	47	20	37
6	206	171	377	108	99	207	47	42	45
7	175	155	330	112	128	241	36	17	27
8	293	125	418	122	102	224	58	18	46
9	269			121			55		
0	189	170	359	111	99	211	41	41	41
1	162			127			22		
2	222			104			53		
3	234			105			55		
4	235	121	356	105	98	203	55	19	43
5	221	193	415	110	167	277	50	14	33
6	228	130	358	117	114	231	49	12	35
7	327	145	472	132	122	253	60	16	46
8	221	188	410		134			29	
9	176	175	352	107	113	220	39	36	38
0	186	144	330	118	170	288	37	~~-18~~ 0	13
1	158	172	330	106	128	234	33	25	29
2	107	107	213	99	96	195	8	10	9
3	201	106	307	113	118	231	43	~~-11~~ 0	25
4	275	164	439	133	144	277	52	12	37
5	239	128	367	122	99	221	49	23	40
6	222	139	361		114			18	
7	121	192	313	86	150	236	29	22	24
8	231			123			47		
9	143			93			35		
0	175	122	297	102	101	203	42	17	32
TAL	6124	3522	8385	2971	2801	4740			
NIMUM	107	93	213	81	74	183	8	-18	9
XIMUM	327	193	472	133	170	288	60	42	46
ERAGE	204	147	349	110	117	226	42	~~19~~ 20	33

PROCESS PERFORMANCE

PO4 REMOVAL EFFICIENCY

(KILOPOUNDS)

DATE	INFLOW East	INFLOW West	INFLOW Comb	OUTFLOW East	OUTFLOW West	OUTFLOW Comb	REMOVALS (%) East	REMOVALS (%) West	REMOVALS (%) Comb
1	3.6	3.4	7.0	2.9	3.4	6.3	20	~~-1~~ 0	10
2	3.3	3.4	6.7	2.8	2.7	5.6	13	21	17
3	5.1	2.0	7.1	2.8	1.7	4.5	45	14	36
4	5.3	2.6	7.9		2.2			17	
5	5.2	3.0	8.2	3.0	3.0	6.0	42	2	27
6	4.6	3.8	8.4	3.1	2.8	5.9	32	26	30
7	4.6	3.5	8.1	3.1	2.7	5.8	33	23	28
8	4.1	3.1	7.1	3.6	2.6	6.2	11	15	13
9	4.8			3.1			35		
10	2.8	3.4	6.3	2.9	2.7	5.6	~~-2~~ 0	23	11
11	3.7			3.2			13		
12	5.7			2.8			52		
13	6.0			2.8			53		
14	5.4	3.0	8.4	3.0	2.8	5.8	44	6	31
15	5.1	3.9	9.0	3.3	3.8	7.1	35	5	22
16	5.4	3.2	8.7	3.5	2.5	6.0	36	23	31
17	7.2	2.8	10.0	3.4	2.7	6.1	52	5	39
18	4.4	3.6	8.1		3.2			11	
19	4.9	4.3	9.2	3.5	3.5	7.1	28	17	23
20	4.3	3.5	7.8	3.8	4.1	7.9	12	~~-16~~ 0	-0
21	3.6	3.9	7.6	3.6	3.4	7.0	1	15	8
22	2.3	2.3	4.5	2.7	2.4	5.1	~~-20~~ 0	~~-6~~ 0	-13
23	4.4	2.4	6.8	3.3	2.6	5.9	24	~~-6~~ 0	13
24	6.8	4.1	10.9	4.2	3.9	8.1	38	4	25
25	5.4	4.1	9.5	4.6	3.0	7.5	16	27	21
26	4.7	3.2	7.9		2.9			10	
27	2.5	4.4	6.9		3.8			12	
28	4.8			2.2			53		
29	3.7			2.6			30		
30	4.3	3.1	7.4	3.2	2.8	6.0	26	10	19
TOTAL	138.1	80.2	189.6	83.2	71.1	125.4			
MINIMUM	2.3	2.0	4.5	2.2	1.7	4.5	-20	-16	-13
MAXIMUM	7.2	4.4	10.9	4.6	4.1	8.1	53	27	39
AVERAGE	4.6	3.3	7.9	3.2	3.0	6.3	~~28~~ 29	~~11~~ 12	20