Revenue
New Issue

Puerto Rico Aqueduct and Sewer Authority

Ratings

$1,281,575,912 Revenue Bonds, Series A (Senior Lien)	BBB–
$20,640,000 Revenue Bonds, Series B (Senior Lien)	BBB–
$155,890,000 Revenue Refunding Bonds, 2008 Series A (Guaranteed by the Commonwealth of Puerto Rico)	BBB–
$121,925,000 Revenue Refunding Bonds, 2008 Series B (Guaranteed by the Commonwealth of Puerto Rico)	BBB–

Rating Outlook

Stable

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New Issue Details

Sale Information: Revenue Bonds, Series A (Senior Lien) and Revenue Refunding Bonds, 2008 Series A (Guaranteed by the Commonwealth of Puerto Rico), will be sold publicly via negotiation, while the remaining series of bonds will be sold in the local Puerto Rico market during the week of March 3.
Purpose: Refinance a portion of the authority's outstanding debt, fund a portion of the authority's capital improvement program, and pay costs of issuance.
Final Maturity: July 1, 2010–2047.

Related Research

- *Employees Retirement System of the Government of the Commonwealth of Puerto Rico, Jan. 16, 2008*
- *Puerto Rico Sales Tax Financing Corporation, July 5, 2007*
- *Puerto Rico Electric Power Authority, April 12, 2007*

Rating Rationale

- System operations have improved rapidly since the reorganization of the Puerto Rico Aqueduct and Sewer Authority (PRASA, or the authority) in 2004.
- Sizable rate increases have been implemented that have restored positive financial margins, and additional rate hikes have been approved, providing a basis for continued adequate financial performance.
- Substantially all regulatory lawsuits have been settled and a capital improvement plan (CIP) has been developed that addresses stipulated requirements while also providing for other system enhancements.
- The CIP is substantial, which will necessitate significant near- and medium-term borrowing and lead to accelerating pressure on PRASA's fixed-cost structure.

Key Rating Drivers

- Continued demonstration of positive financial results, consistent with current projections.
- Successful management of the extensive CIP and control of rising capital costs.
- Conclusion to and finalization of labor negotiations, which have been ongoing for some time between management and the authority's largest union.

Credit Summary

The authority provides water service to virtually the entire Commonwealth of Puerto Rico (the commonwealth), including the estimated 4 million residents and 5 million annual tourists; sewer service is limited to about one-half of the population. During the past couple of decades, system performance had declined, resulting in numerous lawsuits regarding repeated violations of regulatory requirements. From 1995–2004, operations were handed over to the private sector with the goal of improving performance, but with limited success. Subsequently, in 2004 operations were transitioned back to the public side and the commonwealth reorganized PRASA's board and executive management with the goals of limiting political influence, improving the organizational structure, and returning the authority to financial viability with limited, if any, commonwealth assistance. Since this change, operating, financial, and regulatory performance have improved and successful implementation of ongoing measures should continue this trend.

Due to the lack of historical investment in the system, capital needs are extensive: the five-year CIP through fiscal 2012 totals $1.98 billion. Of this amount about 50% is related to mandatory compliance projects. Identified capital needs for fiscal years 2013–2017 are equally large, but are expected to be more focused on system enhancements as opposed to stipulated requirements. Given the size of the CIP and the expectation of limited commonwealth assistance, funding for the CIP will be derived largely from additional borrowings, which will put increasing pressure on PRASA's cost structure as the CIP progresses. While the CIP is substantial, Fitch Ratings views the expected capital costs as relatively well-defined.

Rating History

Senior Lien Revenue Bonds

Rating	Action	Outlook/ Watch	Date
BBB–	Assigned	Stable	1/16/08

Commonwealth Guaranteed Bonds

Rating	Action	Outlook/ Watch	Date
BBB–	Assigned	Stable	1/16/08

Recent measures taken by PRASA to ensure sufficient funding of capital and operations include a cumulative 128% rate increase effective during fiscal years 2006 and 2007, the first adjustments since 1987. Additionally, the authority may adjust rates annually beginning in fiscal 2010 up to a cumulative 25% before returning to the public hearing process to seek further adjustments. Fitch views PRASA's actions favorably, but notes that additional rate hikes above those already approved will be necessary as early as fiscal 2014 to fund the CIP and maintain adequate financial margins based on authority projections.

Financial performance has greatly improved since fiscal 2004. At the time PRASA resumed public operations, operating margins were negative and liquidity was marginal. However, in the intervening years operating margins have improved as the initial rate adjustments have become effective, and for fiscal 2007 the authority posted positive operating results, including a 2.0 times (x) annual debt service (ADS) coverage on all obligations. Liquidity remains limited although the master indenture provides for funding of a 90-day operating reserve, which will be accomplished through a line of credit from the Government Development Bank for Puerto Rico (GDB).

The authority has prepared both a base case and a more strenuous alternative cash flow projection through fiscal 2017, incorporating approved rate increases up to the 25% cumulative level along with assumptions for additional adjustments. The cash flows also incorporate outlays and borrowing contemplated in the authority's fiscal years 2008–2017 CIP, as well as informal agreed upon compensation levels with the authority's largest labor union. Pursuant to the base case cash flows, PRASA anticipates maintaining senior lien ADS coverage of no less than 1.3x and all-in ADS coverage (including the commonwealth-guaranteed bonds) of 1.0x; the alternative cash flow anticipates similar results, in large part because of higher additional rate hikes than forecast in the base case model. However, with each cash flow projection, all classes of debt show consistent ADS coverage declines as leveraging increases. No forecast is available beyond fiscal 2017, but it is anticipated that further tightening will occur in the out years unless ongoing rate hikes beyond those already approved, as well as those contemplated, are adopted.

Security

Senior lien bonds are secured by net revenues of the combined water and sewer system after payment of operations and maintenance (O&M) expenses. Revenues includes user charges, impact fees, and rate stabilization fund withdrawals (net of deposits), and commonwealth grants and appropriations available for O&M and debt service, but exclude commonwealth payments for commonwealth-guaranteed or commonwealth-supported debt service. Commonwealth-guaranteed bonds are secured by net system revenues, subordinate in payment to all other system obligations, as well as a full faith, credit, and taxing power pledge of the commonwealth.

Rate Covenant

The authority covenants to maintain rates and charges sufficient to generate 120% ADS on the senior lien bonds; 110% ADS on the combined senior and senior/subordinate lien bonds; and 100% ADS for all debt and flow of funds requirements.

Additional Bonds Test

Issuance at any lien must satisfy the following respective tests based on historical net revenues:

- 120% MADS for senior lien bonds and 100% MADS for all debt, excluding commonwealth guaranteed and supported obligations.
- 110% MADS for senior/subordinate lien bonds and 100% MADS for all debt, excluding commonwealth guaranteed and supported obligations.

- 100% MADS for subordinate lien bonds. There is also an alternative, prospective test which calls for 100% MADS for each of the three years following issuance of the subordinate lien bonds.

Reserves

The debt service reserve fund (DSRF) for senior, senior/subordinate, and subordinate lien bonds shall be the amount specified in the supplemental agreement, or, if no amount is specified, the least of MADS; 10% of proceeds of the outstanding bonds; or 125% average ADS. The master trust agreement also establishes an operating reserve to be funded in an amount equal to $150 million if funded through a line of credit from GDB or at least 90 days of current expenses if funded from cash. This reserve may be used to pay debt service on the senior, senior/subordinate, and subordinate lien bonds, if necessary, but is not available for debt service on commonwealth-guaranteed or supported obligations. PRASA expects to fulfill the operating reserve through a line of credit agreement with GDB.

Flow of Funds

Net revenues are deposited to the deposit fund and disbursed monthly as follows:

- For senior lien debt service and replenishment of the senior lien DSRF, if necessary.
- For senior/subordinate lien debt service and replenishment of the senior/subordinate lien DSRF, if necessary.
- For subordinate lien debt service and replenishment of the subordinate lien DSRF, if necessary.
- To restore the operating reserve, if necessary.
- To the capital improvement fund, as required by the consulting engineer or annual budget.
- To the commonwealth payments fund for payment of commonwealth-guaranteed and commonwealth-supported obligations.
- To the surplus fund, which is available for transfer to the rate stabilization account or for any lawful purpose.

Background and Governance

PRASA was created as a public corporation and component unit of the commonwealth by Act No. 40 in 1945. Beginning in the early 1980s, operations began to weaken substantially, with the authority experiencing numerous regulatory infractions and related lawsuits since that time. In an effort to improve service, operations were privatized in 1995. However, despite this change, and despite O&M and capital being heavily subsidized by the commonwealth, system performance continued to decline. Seeking to limit political influence, improve the organizational structure, and return the authority to financial viability with limited, if any, commonwealth assistance, the commonwealth passed Act No. 92 in 2004, which returned PRASA to public operations and resulted in the following:

- The establishment of a nine-member board of directors composed of four ex-officio members and five members appointed by the governor with staggered five-year terms.
- A change of the organizational and operational structure from a large centralized agency to five regional operating areas with centralized functional processes for administration, finance, communications, etc.
- The authorization for the GDB to loan PRASA $325 million for urgent capital and

equipment needs and operating shortfalls.

- The establishment of seven new executive management positions, each with six-year appointments by the board.

Since the reorganization, PRASA has filled its executive management team with well-qualified individuals, has made significant strides in improving operational and financial performance, and has begun addressing capital deficiencies that ultimately should return the system to full regulatory compliance. Also, labor relations, which experienced difficulty in recent years and which led to an 84-day strike by the authority's largest union in 2004, appear to have improved, with most issues that led to the strike reportedly having been agreed to between management and labor, including wage increases. However, to date no contract has been executed. Maintenance of good labor relations will be critical in addressing the ongoing operating and capital challenges facing PRASA and in meeting the stipulated milestones required under the authority's various consent decrees.

System

Description

PRASA provides water service to about 97% of the commonwealth, but provides sewer service to only 55% of the population. Overall, PRASA operates a fragmented and largely localized supply of water sources, treatment plants, and collection and delivery systems that have been developed on a community level and with irregular funding over the decades. Illustrating the extent and complexity of system assets, which is much greater than other comparable U.S. utilities of its size, PRASA owns and operates 349 wells, 129 water treatment plants (WTPs), more than 1,000 water pump stations, more than 1,200 storage tanks, 62 wastewater treatment plants (WWTPs), and 619 wastewater pump stations. Where feasible, PRASA is looking to close or consolidate treatment facilities to minimize operating costs and address regulatory issues. This is expected to result in a reduction of 17% of the authority's WWTPs by fiscal 2016 and 15% of the WTPs by fiscal 2025.

Despite the localized nature of assets, PRASA has managed to create some redundancy related to water supplies. Most notably, the North Coast Superaqueduct (operational since 2000) brings water from the northwest portion of the island to the San Juan area. This redundancy, along with the authority's recent completion of an additional reservoir and the inclusion of three new reservoirs in the CIP, is important given the island has experienced severe localized droughts in the past, particularly in 1994 when dwindling supplies led to rationing and reduced sales. The island is also currently experiencing localized drought conditions, but the authority is much better positioned to meet ongoing demands without instituting austerity measures as a result of these enhancements.

Another area where PRASA is in the initial stages of improvement, which will not only alleviate supply constraints but also reduce operating costs and boost revenues, is unaccounted for water loss (UAFWL). For fiscal 2007, PRASA estimates that the UAFWL rate was an exceptionally high 62%, approximately 5.0x–6.0x the average of U.S. utilities. PRASA has incorporated funding in the CIP to address line breaks that will aid in reducing system losses and has instituted a water accountability pilot program that tracks water usage of 25,000 residents over the authority's five service areas in an effort to gauge losses at both the points of delivery from the treatment facilities and customer connections; a mega census that incorporates the entire island is expected to occur by fiscal 2010. Preliminary results from the pilot program indicate that 10% of customer locations go unbilled due to theft or lack of billing data. To ensure collection of payment for its services, PRASA is taking actions through either voluntary compliance or legal action when such instances are discovered. The authority has also implemented a systemwide program to replace all customer meters that are more than 15 years of age. To this end, some 370,000 customer meters (29% of all meters) were replaced from fiscal years 2005–2007, and an additional 144,000 are targeted for replacement by fiscal 2010. In addition, PRASA has stepped up its level of meter reading in recent years with 87% of customer meters read for fiscal 2007 as opposed to just 73% two years ago. To address UAFWL on the production side, the authority is replacing or installing meters at its 26 largest production facilities (80% of total production) in fiscal 2008 and will address 52 additional facilities (16% of total production) in fiscal years 2009–2012, which will assist in determining where losses are occurring within the system. Based on the conversion of nonpaying customers to paying accounts and the ability to more accurately bill customers for usage, the authority estimates that as much as $34.9 million of additional annual revenues may be generated by fiscal 2010 and $50.4 million by fiscal 2017. In addition, with the improvements to the distribution/delivery system, PRASA should be able to gradually reduce its cost of production, of which the 62% UAFWL rate in fiscal 2007 resulted in an estimated $26 million in additional operating costs.

Regulatory

System operations are subject to federal regulatory laws administered by the U.S. Environmental Protection Agency (EPA), as well as local statutes administered by various commonwealth agencies. Over the past several decades, PRASA has been cited for numerous regulatory violations, the extent of which has led to millions of dollars in fines and five formalized and outstanding consent decrees between PRASA and regulators. The consent decrees stipulate strict milestones for completion of numerous projects and processes related to essentially all aspects of the authority's operations and outline penalties in the event of nonperformance. Since the reorganization of PRASA, management has negotiated two of these consent decrees — one with the EPA (PRASA V) and one (the 2006 DW Settlement) with the Puerto Rico Department of Health (DOH) — both of which include substantial capital outlays. The authority is also in the process of negotiating a separate consent decree with the EPA (anticipated by calendar 2009), which will effectively substitute and close two outstanding consent decrees (effective in 1995 and 2000) related to compliance with PRASA's sludge treatment systems.

PRASA V, negotiated in 2006, includes a criminal plea agreement, as well as the typical civil settlement. Pursuant to the criminal indictment, PRASA pleaded guilty to 15 counts of repeated discharge violations under the federal Clean Water Act (CWA) at 61 WWTPs and is required to pay a $9 million fine (reportedly the largest ever paid by a utility for CWA violations). The authority paid the initial $1.8 million installment in fiscal 2007, with the remaining portions due in equal annual payments over the next four fiscal years; EPA has the right to foreclose on as much property as needed to pay the remaining fine if PRASA fails to make them as scheduled. In addition to the fine, PRASA is required to construct numerous improvements at certain WWTPs and fund operation studies at various facilities. PRASA also was placed on a five-year probationary term during which time the authority is obligated to meet full compliance with the civil decree. The civil decree component dictates remedial upgrades at 61 WWTPs to improve operating performance and prevent future violations; the submission of an integrated preventive maintenance program to EPA by January 2009; and the submission of a spill response and cleanup plan to EPA (completed September 2006). To date, the authority has met all requirements under PRASA V.

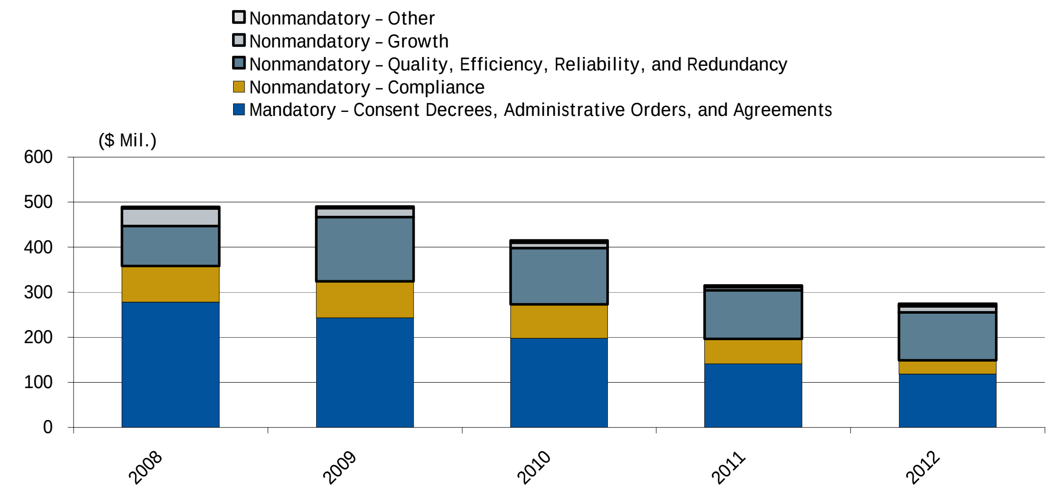
The 2006 DW Settlement relates to noncompliance and alleged violations with the federal Safe Drinking Water Act and Puerto Rico laws and regulations at 132 of the authority's potable water systems, including 112 WTPs. In total, the consent decree stipulates the payment of a $1 million civil penalty (paid during fiscal 2007) and requires the completion of some 540 short-term actions within 12 months of ratification of the decree; 159 midterm actions by 36 months; and 210 long-term projects thereafter through calendar 2021. The decree has been signed by both PRASA and the DOH and is receiving comments by EPA, with final ratification by the courts expected by the end of calendar 2008.

One area for which there are currently no regulatory actions, but where one could develop is in the level of effluent treatment provided at certain PRASA WWTPs. Of the 62 WWTPs operated by PRASA, 56 treat to secondary levels while six only treat to primary standards, requiring a 301(h) waiver of the CWA from the EPA. The waivers at four of these facilities have expired, but PRASA continues to operate under the existing waivers until they are renewed or a secondary permit is issued. PRASA has applied for, and expects renewal of, the waivers for each of these facilities. In 2000, the governor of the commonwealth signed a memorandum of agreement with EPA that proposed a 20-year plan for PRASA to voluntarily convert to secondary treatment at the six WWTPs. However, recognizing PRASA's large capital needs beyond the costs required to convert the WWTP to secondary treatment, EPA predicated the conversion on additional funding becoming available, particularly federal grants. At the time the agreement was signed, the cost of the conversion was estimated at $533 million for capital and $629 million for operating expenses over the 20-year period. No new estimates are available, but given the rapid rise in construction costs over the past few years, these figures are undoubtedly substantially higher. If PRASA is ultimately mandated to convert these facilities to secondary treatment, it is expected that there would be some impact to the CIP and the authority's financial capacity, which could be material even if the conversion is largely funded from federal sources.

Debt and Capital

The 10-year CIP, while substantial, is well-defined and appears to address virtually all major deficiencies within the system, as well as mandatory consent decree projects required during the period. Total program outlays for fiscal years 2008–2012 are $1.98 billion, while capital expenditures for fiscal years 2013–2017 CIP are similarly large at $1.97 billion. PRASA intentionally has front-loaded many consent decree projects through fiscal 2012 (49% of the fiscal years 2008–2012 CIP is for mandatory costs versus just 30% for fiscal years 2013–2017) to reduce violations, improve operation and reliability of the system, and ensure compliance with the consent decrees. The five-year CIP will be updated annually, per board requirement.

Fiscal Years 2008—2012 Capital Improvement Plan
(Fiscal Years Ending June 30)



Given the size and complexity of the CIP, as well as its impact on end users, it will be imperative that the CIP is effectively managed and costs are contained as much as possible. To this end, PRASA has prioritized projects into five categories ranging from mandatory (the highest priority) to nonmandatory/other, which are discretionary in nature. The authority also has hired five nationally recognized program management consultants to plan, design, and manage the CIP within each region.

The bulk of funding for the CIP will come from this and projected borrowings, including loans through the federally funded state revolving funds (SRF) and rural development (RD) program. For the fiscal years 2008–2012 CIP, a total of 89% is expected to be debt-financed. The remaining funding is expected to be derived from surplus system revenues, federal matching dollars, and contributions from the Puerto Rico Infrastructure Financing Authority.

After this transaction the authority will have approximately $2.7 billion in outstanding debt obligations, of which roughly one-half will be senior lien revenue bonds and one-half either will be guaranteed ($837 million) or supported ($361 million) by the commonwealth. The authority also will have $250 million in outstanding debt from a bank term loan that is considered senior/subordinate, but it is expected that this loan will be defeased with senior lien bonds by fiscal 2012; currently no additional obligations are forecast to be issued through fiscal 2017 under such lien. To fund the CIP, PRASA plans on using its senior pledge as the working lien. However, Act No. 45 of the commonwealth, as amended, provides that the authority may incur additional debt through fiscal 2010 that is guaranteed by the commonwealth, and it is the intention of PRASA to utilize this pledge for SRF and RD loans through such date; SRF and RD loans beyond fiscal 2010 are forecast to be issued as subordinate lien and senior lien bonds, respectively.

Rates and Finances

Until recently, fiscal performance has been notably weak. However, since the reorganization in 2004, there has been dramatic improvement in the authority's financial position. For fiscal 2004, when operations were transitioned back to public management beginning mid-way through the fiscal year, operating margins were a negative 42%, debt service coverage was below 1.0x from current revenues, liquidity was marginal, and capital spending was only 69% of depreciation. Financial performance was little better, and even worse in some areas, for fiscal 2005 due in large part to a severe tropical storm and the prolonged labor strike, which limited meter reading and billing to some degree.

However, in September 2005 (fiscal 2006), PRASA's board of directors passed a resolution adopting a new rate structure, as well as the authority's first rate increase since 1987. The rate hike enacted provided for a two-step increase, which included a 65% adjustment effective October 2005 (fiscal 2006) followed by a 38% hike effective July 2006 (fiscal 2007); the combined rate adjustments resulted in a cumulative 128% increase. The resolution also provides for additional annual increases beginning in fiscal 2010 based on a formula that considers operating margins for the current year relative to those of fiscal 2007; the adjustments are limited to 4.5% annually up to a cumulative 25%.

As a result of these rate increases, operating margins have improved from a negative 59% in fiscal 2005 to a positive 22% for fiscal 2007, allowing the authority to generate 2.0x ADS coverage on all debt in fiscal 2007. In addition, while operating revenues were increasing during this period, management reduced the annual rate of growth in operating expenditures from 10.3% in fiscal 2005 to a more reasonable 3.4% in fiscal 2007. Liquidity remains relatively weak at just 28 days cash on hand for fiscal 2007, but the line of credit expected to be provided by GDB for the roughly 90-day operating reserve provided under the master trust ensures adequate financial flexibility.

Because of the scope of the CIP, further rate increases beyond those already approved and provided for under the 2005 resolution will be needed, possibly as early as fiscal 2014 according to the authority's projections. These adjustments will require the authority to go through a 60–90 day public hearing process, although PRASA may institute temporary emergency adjustments outside of this process for up to 90 days. Given the board's recent actions, it is anticipated that PRASA's governing body will pass adjustments as necessary to meet rate covenants and maintain sound financial margins.

Since the initial rate hikes became effective in fiscal 2006, delinquencies have climbed markedly, although there are signs of this stabilizing and returning to more reasonable, albeit weak, levels. In fiscal 2006, total collections were down to 94.7%, compared to a historical collection rate of 96%. With the implementation of the fiscal 2007 adjustment, collections declined further and continued to decline to 89.7% through September 2007 (fiscal 2008). Part of the reason for the poor collections rate likely is attributable to the initial rate shock from customers, but another significant contributor has been due to the unusually low collection rates of charges to the commonwealth and its agencies; for the first quarter of fiscal 2008, government account collections were only 68.2%. To boost collections, PRASA has: negotiated payment plans with major customers, including implementing an agreement with the commonwealth where government agencies will prioritize payment of their bills to PRASA; hired 250 temporary workers to handle customer disputes; outsourced collections; suspended service; and assessed fines and penalties to delinquent corporate customers. With these actions, PRASA expects that the delinquency rate will stabilize and is projecting a 6.7% annual delinquency rate in its forecasts. In addition, PRASA recently received a $9 million payment from the Puerto Rico Office of Management and Budget, which boosts the first quarter fiscal 2008 collection rate to 94.3%.

Another potential issue that has emerged that could affect PRASA's financial flexibility is related to political opposition. In February 2007, legislation was introduced in the Puerto Rico Senate to establish an independent review commission with certain powers, among which would be the power to prevent adopted rate increases by PRASA's governing board and rate increases by other public corporations in the commonwealth from taking effect without the commission's approval. Under the proposed legislation, PRASA could seek court relief to overturn an adverse ruling by the commission. The bill appears to have made little progress through the Puerto Rico Legislature since its introduction. It is believed that any such legislation, if signed into law, would be superseded by PRASA's covenants under the master trust agreement. Nevertheless, such a development would be considered a negative credit driver.

PRASA has prepared two financial projections for the period fiscal years 2008–2017, a base case *(see table, page 9)* and an alternative case, which incorporates more conservative assumptions. The cash flows incorporate the authority's CIP through fiscal 2017 along with the necessary rate increases to ensure 1.0x ADS on all system obligations. Under the base case scenario, annual rate hikes are expected at the 4.5% level through fiscal 2014, based on the approved 2005 rate package, followed by additional moderate adjustments of 3.8%–4.5% annually for fiscal years 2015–2017. Other revenue assumptions in the base case include an average annual customer growth rate of 1%, an increase in revenues from operational initiatives (i.e. UAFWL improvements, as discussed above), and a 33% increase in connection charges in fiscal 2009. Base case expenditure assumptions include the terms of the proposed union contract, a 3.5% increase in power costs for fiscal 2008 followed by a 2.0% increase annually thereafter, and a 1% increase in chemical costs in fiscal years 2008 and 2009 followed by a 3.5% increase annually thereafter.

Base Case Financial Projections

($000, Fiscal Years Ending June 30)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Operating Statement										
Total Operating Revenues	775,056	786,046	851,701	899,888	949,070	999,648	1,052,839	1,101,908	1,156,577	1,206,346
Total Operating Expenses	614,170	631,400	646,563	661,025	674,715	695,269	716,461	738,309	760,831	784,112
Net Revenues Available for Debt Service	**160,886**	**154,645**	**205,138**	**238,863**	**274,355**	**304,379**	**336,378**	**363,600**	**395,746**	**422,233**
Debt Service Requirements										
Senior Bonds	35,575	37,519	97,112	126,178	186,220	210,686	233,694	266,466	294,724	317,662
Senior/Subordinate Bonds	16,357	18,723	18,735	18,747	0	0	0	0	0	0
Subordinate Bonds	0	0	0	3,897	7,372	10,407	13,234	16,079	18,924	21,769
LOC Fees for Operating Reserve Funds	391	1,168	1,196	1,222	1,248	1,286	1,325	1,365	1,407	1,450
Commonwealth Guaranteed Bonds	43,375	55,344	58,010	57,992	56,804	56,775	56,787	56,619	55,859	55,639
Commonwealth Supported Bonds	54,451	27,240	27,237	27,238	11,536	18,407	19,206	19,624	20,076	20,574
Total Debt Service	**150,149**	**139,994**	**202,289**	**235,274**	**263,179**	**297,560**	**324,246**	**360,153**	**390,990**	**417,093**
Debt Service Coverage (x)										
Senior Bonds	4.52	4.12	2.11	1.89	1.47	1.44	1.44	1.36	1.34	1.33
Senior/Subordinate Bonds	3.10	2.75	1.77	1.65	1.47	1.44	1.44	1.36	1.34	1.33
Subordinate Bonds	3.10	2.75	1.77	1.61	1.42	1.38	1.36	1.29	1.26	1.24
Commonwealth Guaranteed and Supported Bonds	1.07	1.10	1.01	1.02	1.04	1.02	1.04	1.01	1.01	1.01

Note: Numbers may not add due to rounding.

Using these assumptions, senior lien ADS coverage is projected to be no less than 1.3X through fiscal 2017, with coverage of all debt obligations (including commonwealth-guaranteed and supported debt) at no less than 1.0x. The alternative case results in substantially similar ADS coverage throughout fiscal 2017, but takes into consideration factors such as less revenues generated from operational initiatives and higher energy and chemical expenses; these factors are offset by marginally higher annual rate adjustments. While the cash flows appear reasonable, both anticipate continued tightening in ADS coverage levels throughout the forecast period. As a result, Fitch believes that rate hikes above those contemplated in the cash flows will be required beyond fiscal 2017 to maintain sound coverage levels and financial margins, particularly as debt is issued in the latter years of the forecast and beyond and begins to amortize.