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THE TWENTY-FIRST CENTURY PANAMA CANAL: POST-PANAMAX OR POST-PANAMA?

Antonio Rothenbach



*“Aprueba usted la propuesta de construcción del tercer juego
de esclusas en el Canal de Panamá?”¹*

— Referendum Question

Introduction

On October 22, 2006, by answering the above simple question with a “Yes” or “No” vote, Panamanians made a democratic decision about an expansion of the Panama Canal that will determine the future of their country and much of world trade. Panamanian President Martín Torrijos described the referendum as “the most important decision about the canal and its role in the twenty-first century.” (Torrijos) Regardless of a 43 percent turnout and controversy about polls and government pro-expansion promotion, the official results confirmed what previous polls had been predicting; the

“Yes” vote won with an overwhelming 77 percent of the ballots. (Palm) Thorough forecasts and studies show that the project, which will add a larger third set of locks, is feasible and will be profitable; and many economic benefits have been promised to Panamanians. Nevertheless, the overwhelming victory does not reflect the intense national debate that took place, one in which critics questioned the project’s necessity and success by identifying its huge risks.

In this article, I examine in detail the proposed expansion and the national debate. I also argue why the Panama Canal Authority (ACP²), the government, and Panamanian citizens

¹Spanish for “Do you approve the proposal for the construction of the third set of locks at the Panama Canal?”

²The Autoridad del Canal de Panamá is the autonomous entity of the Panamanian government that operates and manages the Panama Canal.

should keep in mind the issues involved in this megaproject if they are to achieve the common goal of assessing, mitigating, and managing the associated risks. Panamanians have the opportunity to prove that they are capable of making the best of their most valuable asset in the twenty-first century, but to do so they will need a special effort, *un esfuerzo especial*.

Background

Canal History³

The canal has been a huge part of Panama's past and its development as a nation. For much of the nation's history, Panama's role in the canal that bears its name had been close to nonexistent; but since the country gained full control, a much different history has transpired. Since the Spanish conquistador Vasco Núñez de Balboa first crossed the Isthmus of Panama in 1513, the potential for a trading route between the world's largest oceans was evident. In 1893 a French 13-year-long canal attempt led by Ferdinand de Lesseps, the chief organizer behind the Suez Canal construction, failed due to the complexity of building a sea-level canal and the widespread prevalence of tropical disease. The United States, prompted by Theodore Roosevelt's desire to have a two-ocean navy, took over the project after facilitating Panama's independence from Colombia in exchange for the right to build the canal and for control over a 10-mile-wide strip of land known as the Canal Zone. Recognized as one of the greatest engineering achievements of all time, construction was completed in 1914, success being attributed to the elimination of tropical disease and a lock-based elevated design. In 1939 the U.S. started the addition of a larger third set of locks for military reasons. A significant amount of material was excavated before the project was interrupted by WWII but was never completed. After the war, increasing tensions between the U.S. and Panama motivated by protests from many who believed that the Canal Zone rightfully belonged to Panama led to the Torrijos-Carter Treaties being signed in

³The following summary of the Panama Canal's history is drawn primarily from McCullough's *The Path between the Seas*, "The Panama Canal," and *La Prensa* articles.

1977, which started the process of handing over the canal to Panama. On December 31, 1999, the ACP gained full control even though there was concern in the U.S. and the shipping industry. The Panamanian constitution thereafter mandated that any subsequent canal expansion would require a public referendum vote as canal ownership was to revert to the Panamanian people. The ACP's administration proved everyone who thought that Panamanians could not manage the canal wrong, and turned the previously non-profit operation into a very profitable business. For more than six years, the ACP has, in fact, operated the canal efficiently on a debt-free basis, while bringing in huge profits and maintaining security and safety standards. From 2000 to 2005, canal revenues to the government have totaled \$2 billion, while also generating an additional indirect contribution of approximately \$2.7 billion to the national economy. In 2006 alone the canal brought in \$1.4 billion of revenue, its all-time highest.

Reaching Maximum Capacity⁴

The maximum ship size and daily transit capacities of the 50-mile transoceanic waterway are now being reached. In 2006 the then 92-year-old canal was running at 85 percent of its maximum sustainable capacity, with approximately 50 percent of the ships using the canal of Panamax⁵ size. Increasingly long waits of four to five days (Kraul and White) at both canal entrances is a clear consequence of a boom in world trade and an obvious sign that an update is in order. According to the ACP, between 2009 and 2012 the existing canal is expected to reach its maximum sustainable capacity, which is limited by the current locks.

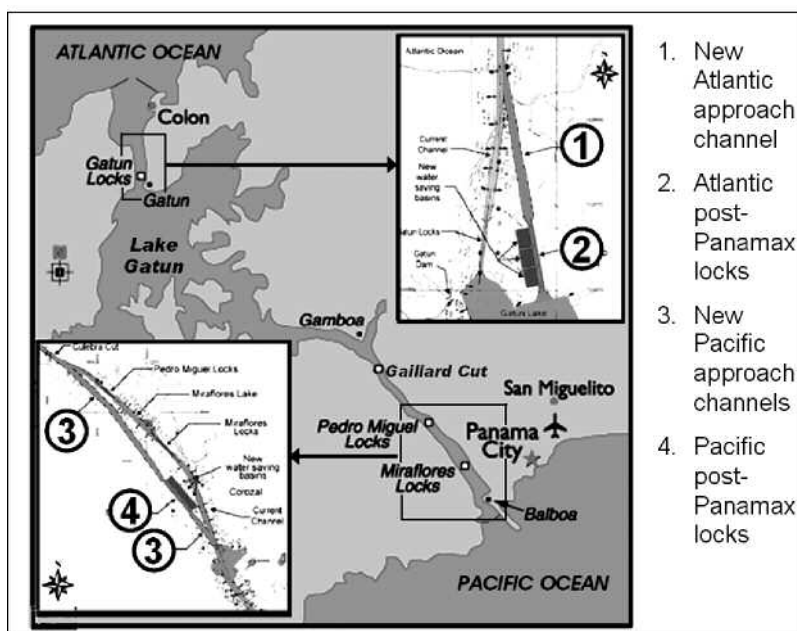
Expansion Proposal

On April 24, 2006, after a long period of speculation, the ACP unveiled details of the proposed expansion. The proposal not only

⁴Most details on the expansion project in this and other sections come from the ACP's *Proposal for the Expansion of the Panama Canal — Third Set of Locks Project*, which for further reference can easily be accessed online, as well as can all the ACP studies, at www.pancanal.com.

⁵Panamax refers to the maximum size ship that can currently use the Panama Canal.

Figure 1
Proposed Canal Expansion and Route Map



Source: Edited from www.WorldAtlas.com and *Proposal for the Expansion of the Panama Canal*, pp. 13–14.

describes the design, but also analyzes the necessity, feasibility, and economic justification for the project. The design entails the creation of a third lane of traffic by the construction of two new sets of locks at the Atlantic and Pacific entrances. (See Figure 1 above, numbers 2 and 4.)

Each new lock facility would be composed of three lock levels or chambers, each 180 feet wide, 1,400 feet long, and 60 feet deep. Like the existing smaller locks, the new ones will work by gravity, thereby not requiring pumps. The second component of the project is the construction and widening of access channels, which would, as would the new locks, take advantage of the 1939 excavations. A third component is the deepening of navigation channels and the elevation of Gatun Lake's maximum operating level.⁶ The projected \$5.25 billion modification would allow for the transit of so-called post-Panamax ships that exceed the dimensions of the existing canal. The expected completion of the expansion by the end of 2014,

the centenary of the canal's inauguration, would almost double the canal's total capacity by allowing the transit of ships carrying up to 12,000 twenty-foot containers (TEU), 2.5 times the cargo capacity of a Panamax ship.

The Debate and Critical Arguments

The fact that the “No” position received only 22 percent (Palm) of the referendum votes is somewhat misleading as it may not reflect the validity and strength of the arguments proposed by the well-organized opposition. Public opinion was influenced by a huge expansion campaign promoted by the ACP and the government. However, skeptics came up with many well-thought-out powerful arguments against the expansion, backing them up with evidence and demanding clarification and future analysis. Even though critics were not successful in altering the referendum result, their concerns must be considered and managed well if the expansion is to be a success. Not all anti-expansion arguments were well-grounded, emerging as they did out of an anti-ruling elite opposition, with the clear political intent of persuad-

⁶Also referred to as Lake Gatun, it is the artificial lake that is a major component of the Panama Canal.

ing Panamanians to vote against the project. Nonetheless, the critics did identify a number of very real potential risks that warrant discussion.

Technological Feasibility and Environmental Risk

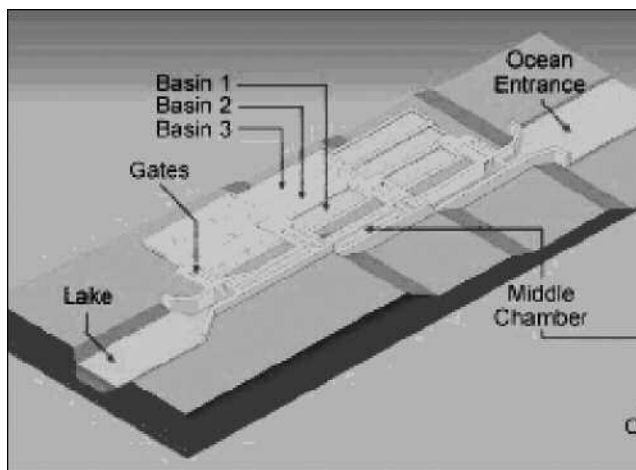
The ACP's design appears to make the expansion technologically feasible and to minimize negative environmental effects. Nevertheless, the opposition has questioned both the design itself and the associated environmental studies, identifying potential risks. Water supply for operating a larger set of locks is the main environmental concern, both in terms of ensuring sufficient availability and in terms of the potential implications of additional usage.

The design selected by the ACP would not require the creation of new reservoirs, which will minimize environmental and social impacts. Instead it incorporates three gravity-operated, water-reutilization basins per lock chamber, capable of recycling approximately 60 percent of the water. (See Figure 2 below.) This technology has already been used in similar locks in Germany. In fact, the proposed locks would use only 93 percent of the amount of water the current locks use per transit even though their volume is 54 percent larger. In

addition, the navigation channels at Gatun Lake and Gaillard Cut will be deepened by 4 feet, and the lake's maximum operating level will be increased by 1.5 feet, both of which will increase storage capacity. As a result of the three methods (water-saving basins, increased lake level, and deeper channels), water supply will be sufficient to manage 17,700 current equivalent transits per year; consequently, the ACP does not envision water availability issues to be a factor.

A major concern for the population, half of which depends upon drinking water that comes from the system of lakes that make up the canal, is that the water-reutilization basins would cause the intrusion of salt water into the watershed. The ACP proposal claims that its studies conclude that water quality will be maintained at Gatun and Alajuela lakes. ANCON (National Association for Nature Conservation), a major environmental organization, agrees that there will be very low levels of salinization, which will ensure water quality for human consumption as well as preserve existing biodiversity by maintaining a fresh water environment. (Arias Loredo and Sucre G.) However, critics claim that the ACP is manipulating and misrepresenting the results of their own studies. For example, journalist Eric Jackson has pointed out that the studies conclude that salinity will inevitably increase and that the

Figure 2
The New Locks Complex



Source: *Proposal for the Expansion of the Panama Canal*, p. 12.

suggested mitigation measures are either too expensive or require flushing the locks with fresh water, which is counterproductive to the purpose of the water-saving pools. (Jackson, “Propaganda...”)

The opposition has also been concerned about a water supply sufficient to meet demand. They argue that the potentially negative effects of El Nino/La Nina and global warming on water supply were not analyzed and taken into proper account. (Menendez) Before the official proposal was released, many Panamanians were opposed to the expansion because they anticipated the construction of new dams, which would cause the flooding of farmland and populated areas and the major alteration of ecosystems. Somewhat ironically, now that a dam-less project is moving ahead, critics have suggested that the ACP could consider constructing dams later on, if water supply is jeopardized or just because building dams is cheaper than water-reutilization basins. (“El Canal de la Discordia”; “10 Grandes Razones...”)

The planned adoption of viable and proven technologies suggests that the project, although challenging, appears both technically and environmentally feasible with minimal adverse effects. However, environmental risks are certainly present and should receive ongoing monitoring.

Opportunity versus Need

Even though it seems obvious that the canal’s capacity will soon be reached, the “need” for an expansion has been questioned. Perhaps independent of the question of need per se, the expansion certainly appears to be an opportunity.

The ACP is afraid that deterioration in service of a canal operating at full capacity would lead to an irreversible loss of customers to other routes, enabling them to supplant the Panamanian one. The ACP especially wants to secure the containership trade between Northeast Asia and the U.S. East Coast (hereafter the “focus route”), one of the canal’s strongest current market segments. This segment has the highest growth potential but also faces strong competition. With a 61 percent market share, the U.S. Intermodal system⁷ is

currently the principal competitor to the canal’s focus route market, as it provides shorter times and the advantage of using post-Panamax ships. Even though the U.S. Intermodal system is also approaching its maximum capacity, studies analyzing the construction of railways connecting to ports on the west coast of Mexico or Canada suggest further potential competition. (*Proposal for the Expansion...*, p. 23) Most importantly, the Suez Canal, which can also accommodate post-Panamax vessels, is anticipated to capture most of the growing demand as the other two major routes reach their maximum capacities. Shippers currently operating on the focus route could increase their productivity per vessel by switching from using Panamax ships through Panama to using post-Panamax ships through Suez because the difference in distance is not that significant. (*Proposal for the Expansion...*, p. 21)

The opposition has rejected ACP claims that without the expansion the canal would become obsolete, arguing that the existing two-lane canal would continue to bring in profits. According to Tomas Drohan, the canal’s retired Director of the Department of Engineering, Dredging and Construction, the waterway will keep operating at maximum capacity. He has further claimed that, despite an inability to capture additional cargo, short supply of canal transits would even enable the ACP to raise prices and increase revenues in the short-term. (Drohan, Remarks...)

Even though the ACP’s predictions about what awaits the canal without the expansion have been questioned, there is clearly an opportunity. The existing canal will definitely keep generating profits if it is not expanded, and it is even feasible to expand the capacity to a certain extent by making improvements. However, there is an opportunity to improve the operational efficiency and productivity of the canal, but most importantly there is an opportunity to bring in greater profits by capturing the revenues from a growing market. The ACP expects the recent growth in international trade caused by Asian economic booms to continue, with the

⁷The transpacific route to U.S. West Coast ports (Los Angeles-Long Beach or Seattle), combined with the U.S. rail network and highway system.

volume of global containerized cargo growing at 5.6 percent annually and the canal's tonnage volume increasing at an average annual rate of 3 percent. The ACP also predicts there will be approximately 670 post-Panamax container-ships by 2011, accounting for 37 percent of containership capacity. An analysis of the economics and risks of the project provides a better understanding of its benefits and setbacks, as discussed in the next section.

Project Economics and Risks⁸

Economics will play the most important role in determining the success of the expansion and its positive impact on Panama's future. The ACP has addressed three questions. How much will the expansion cost? Can the project be financed? Will the undertaking be profitable in the long run?

Project Cost

The published estimate of the total cost, one major determinant of the project's financial feasibility and profitability, has been the target of much criticism. The ACP's estimate was based on a limited conceptual design as well as experience and information gleaned from similar projects and activities. It presumably includes all the factors that contribute to the total cost and provides for contingencies and inflation. (*Proposal for the Expansion...*, p. 17) Nevertheless, many argue that the ACP's \$5.25 billion price tag is underestimated and point to the huge cost overrun risks that megaprojects generally pose and the implications this would generate, especially for such a small country.

The ACP has emphasized that the soundness and reliability of the cost estimate have been assured by a thorough analysis of the requirements and components of design and execution, as well as by the degree of detail in the estimation of costs and contingencies. On the other hand, opponents have identified items that were not clearly included in the estimate, like the construction of a bridge or tunnel

across the canal in the Atlantic entrance as well as a spillway in Gatun. The ACP has yet to clarify whether some of these costs were included within more general categories, or whether they were ignored either because they represent government expenditures or because they are part of an ongoing modernization of the canal. Also, critics have questioned the degree of detail, claiming that the ACP only worked with a 30-percent-complete conceptual design. Drohan has referred to the ACP estimate as a "flagrant lowball bid" after comparing it with that for a similar 1993 design, which would now cost \$12.5 billion. (Drohan as quoted by Jackson, "The 'No' Campaign...") The Panamanian Society of Engineers and Architects (SPIA) came up with an itemized estimate of \$7 billion in May 2006. While less than Drohan's rough estimate, it is still higher than that of the ACP and could make the project unprofitable, according to University of Panama economics professor Roberto Mendez. (Mendez as quoted by Jackson, "On the Campaign...")

Critics further argue that the ACP has underestimated the costs assigned to contingencies that cover risks and unexpected events. The ACP used a risk analysis model to calculate an additional \$1.03 billion for contingencies that account for increases in the cost of labor, equipment, operating supplies, and materials, as well as possible delays. According to the ACP, "This contingency level is adequate and sufficient for this type of project in its conceptual phase of design," especially because it incorporates proven activities (dredging, contracting, managing) and technologies with which it has extensive experience. (*Proposal for the Expansion...*, p. 11) Nevertheless, many disagree with the ACP. According to Drohan, the project involves the construction of two large rock dams and huge locks with water-reutilization basins, structures that have never been built by the ACP. He, as well as other critics, thinks the contingency factor should be higher than 28 percent for a megaproject of this nature, even higher than 50 percent, to ensure confidence for a final design. (Drohan, "The True Cost...")

Even though the ACP was assisted in its cost estimation procedures by teams of inter-

⁸Unless otherwise specified, details on the economics of the project in this and other sections come from the ACP's *Proposal for the Expansion of the Panama Canal — Third Set of Locks Project*.

national consultants and construction experts, the participation of Parsons Brinkerhoff International has produced skepticism. This firm is infamous for its involvement in the “Big Dig” in Boston, a megaproject that ended up costing almost three times the initial estimate and still has unresolved technical issues. In addition, the company has been involved in corruption scandals and fraudulent acts. Therefore, its possible future involvement in the construction of the new locks is also a source of concern to critics like University of Panama professor Miguel Antonio Bernal. (Bernal)

In general, the nature of megaprojects dictates that in most ventures actual costs exceed planned costs, which in turn is often the source of even more costly legal disputes. According to the authors of *Megaprojects and Risk: An Anatomy of Ambition*, cost overruns occur in nine out of ten megaprojects, with one of the major causes being the lack of realism of the initial estimates. (Flyvbjerg et al., p. 12) Even after a final estimate is completed in Panama, either corruption (in the form of *negociados*⁹ during the bidding process or unwarranted high salaries) or higher-than-expected contingency costs could lead to overruns. These concerns, combined with the ones discussed in the next section, illustrate the potential risks of this megaproject.

Profitability, Financing, and Risk

The ACP proposal implies that the project is a sound investment, describing it as highly profitable, self-financing, and entailing manageable risks. The ACP has estimated the project’s most probable internal rate of return to be approximately 12 percent. The investment would be financed mainly by the increase in revenues from a combination of a 3 percent average annual growth in traffic volume and a 3.5 percent average annual increase in tolls, along with interim external financing. (*Proposal for the Expansion...*, p. 71) The ACP projects an initial investment payback

period of less than ten years, a reasonable time in its view. (*Proposal for the Expansion...*, p. 21) Opponents, however, believe that ACP revenue projections are based on overly-simplistic assumptions about uncertain future events and that these may jeopardize the project’s financing and profitability, thereby making the risks enormous. The former canal administrator Fernando Manfredo claims that the success of the expansion is based on unrealistic and uncertain projections about both maritime trade and the world economy. (“Panama President to...”) Others, such as Roberto Mendez, think it is unreasonable to expect that U.S. imports from China will continue to grow as quickly as they recently have over the next twenty years. (Jackson, “On the Campaign...”) Critics view the current U.S.-China trade imbalance as unsustainable and hence predict it will be adjusted, while ACP forecasts assume that this imbalance will keep increasing.

The ACP claims that the canal will remain competitive, even in the face of higher tolls, as it expects users to pay reasonable increases if their operation costs decrease by virtue of their new ability to utilize larger containerships. A planned toll policy focused on price differentiation by vessel size and cargo type will capture the value of the canal to each market segment. (“Proposal to Modify...”) Post-Panamax containerships provide economies of scale that reduce the operational costs per container. Besides, the Panama Canal has some advantages over its competition. Compared to the Suez Canal route, Panama is more convenient for the Northeast Asia-U.S. East Coast route given the same vessel capacity. It has a comparative advantage of 23 percent savings in total transportation cost per container (*Proposal for the Expansion...*, p. 30), and shorter times give shippers the opportunity to use fewer ships, providing them with a higher return on investment. (*Proposal for the Expansion...*, p. 28) On the other hand, the U.S. Intermodal system faces higher and growing costs and lower reliability due to near-capacity congestion, and there are also political obstacles to further growth. (*Proposal for the Expansion...*, p. 28; “Panama Canal Expansion...”)

⁹*Negociado* refers to an illicit or unethical agreement in which contracts are won with bribes or because of personal relationships. In this case, it has been suggested that contractors could bribe ACP officials to win bids.

In contrast, critics believe that the ACP is irresponsibly assuming that the maritime industry is willing to pay toll increases of any magnitude and is ignoring their ability to use other routes. The major threat is that the Suez Canal, which can already accommodate post-Panamax containerships, could capture the growing Northeast Asia-U.S. East Coast trade since Suez's current financial security gives it the flexibility to lower its tolls. (Drohan, "What the 'Yes'...") Opponents' fears became a reality in April 2007 when Suez announced discounts for shippers on the focus route at the time that Panama announced a toll increase of 33 percent for containerships over the next three years. (Muñoz) Furthermore, the U.S. Intermodal system is also a strong competitor since it offers shorter times; and even though the ACP claims the system has obstacles to further growth, critics are still concerned about the possibility of future expansion. (Mendez)

Finally, critics have disputed the reliability of the overall self-financing argument and are afraid of the financial risks. To face the peak construction period (2009 to 2011), the project requires approximately \$2.3 billion in external financing, which would be easily obtained by the ACP, according to international investment firms such as Bear Stearns. (Berrocal R.) However, external financing is risky because the estimate is almost half the investment, and its true value is uncertain and variable. Besides, a detailed financing plan has not yet been developed. Toll increases could potentially cause a loss of Panamax vessels that do not need or cannot afford a size upgrade. If a significant loss of the most valuable current customers occurs before construction is completed or before the investment is recovered, huge financing risks suddenly loom. (Reynolds; Drohan, "What the 'Yes'...") What if the repayment of loans is jeopardized? What if lack of funding delays or prevents the completion of the project?

Impact and Risk

ACP projections for the expansion include huge economic benefits to Panama. An investment of this magnitude would boost the national economy due to the multiplier effect, as other economic activities that revolve around the canal, such as port activity and the Colón Free

Trade Zone, would grow as well. According to the ACP, Panamanian GDP in 2025 would be 2.5 times the 2005 levels, an annual rate of increase of approximately 5 percent (1.2 percentage points higher than the rate without the expansion). A major economic benefit of special interest to Panamanians is the creation of new jobs. The ACP has estimated that 6,750 jobs would be created during the execution of the project, while the number of permanent jobs created as a direct and indirect result of the expansion would be between 150,000 and 250,000 by 2025. However, many consider these job estimates exaggerated and criticize the lack of an accompanying social development plan.

The proposal clearly stated that payments to the National Treasury from canal operation during the project's execution would not be less than those in FY 2006 (\$489 million). These contributions would increase once the third set of locks begins operating, tripling by 2015 and rising to eight times the FY 2005 level in 2025. The proposal also makes it clear that the project would not entail state endorsement or guarantees for the required loans. Indeed, Panamanian law does not allow government involvement in the canal's finances. However, since the ACP is a government agency, does this not mean that public debt would dangerously increase? (de la Guardia) In addition, it appears almost inevitable that if anything goes wrong financially as the expansion moves on, those payments to the government's general fund, which are essential to cover the fiscal expenses planned in the upcoming years, would decrease. What if the state does not receive the treasury contributions? Would the government provide funding to the ACP to pay off debts? These and other risks will have to be mitigated and managed, as discussed in the next section.

Moving Forward — Next Steps

Engineering economy and technology decisions are yes-no decisions, but end results depend on the details of how a process is carried out. The ACP did its job by funding approximately 120 studies, totaling some 55,000 pages, costing \$30 million, and resulting in well-reasoned predictions and analyses from renowned firms. The executive and legislative branches of the government both approved the

ACP proposal, providing the technical design and a solid economic justification, and the project received a green flag via the referendum. Nonetheless, the ACP still needs to recognize that its predictions might not prove to be 100 percent accurate due to potential miscalculations and inherent uncertainty and risks, as identified by the opposition and discussed in previous sections. As a result, it will be important to monitor the project for significant changes and continue to receive legal, risk, and financial assistance from specialized firms. A poll conducted in June 2006 indicates that 50 percent of Panamanians do not feel they can trust the ACP's integrity and transparency during the expansion process. (Perez) To be successful, therefore, the ACP and Panamanians must maintain careful control to minimize deviations from the plan and prevent any taint of corruption. The ACP should have the ability to adapt to changes while making sure most promises are kept, but it should also have the determination to abort the project if necessary. In particular, the ACP must seek to mitigate and manage risks in terms of design considerations, cost overruns, and revenue projections.

The risks that come from design considerations need to be mitigated because they could be the source of larger environmental and economic risks. Since the studies are not clear about what water salinity levels are acceptable, nor do they propose a plan to constantly monitor these levels, the ACP and environmental organizations have a responsibility to ensure that more studies are conducted. Promptly predicting whether providing adequate water supply would require the ACP to build reservoir dams or plan salinity mitigation measures would also be crucial. Any design alterations must be managed carefully because they could affect costs and revenues significantly. In addition, extensive design alterations would theoretically require a new referendum. Therefore, the ACP will need to minimize modifications while Panamanians should understand that some design changes might be necessary.

Similarly, the ACP must mitigate cost overrun risks caused either by inaccurate initial estimates or by flaws in the project's execution. The ACP should update the cost estimates of components and contingencies before the main bidding process starts in order

to determine a revised estimate for a complete final design. Special focus should be directed to the new locks and water saving basins, which represent roughly 70 percent of the total cost. This estimate will be useful for comparing with the documented bids of construction firms that will be based on their own detailed designs and cost estimates. The ACP can then take a more proactive role in the negotiations with construction firms, perhaps allowing them to increase their expected profit in exchange for bearing some of the responsibility for overruns. If the final cost estimates reveal the project would be either unprofitable or not sufficiently profitable compared to the risk, the ACP could consider an alternate design by changing the technical characteristics. If the expansion moves ahead, a careful analysis prior to granting the contracts could be complemented by the creation of a strong legal framework in which provisions for overruns have been previously established in detail. The ACP must also strictly control and supervise both the bid selection and construction processes, while promoting transparency at all levels to avoid corruption. If confronted with the possibility of overruns, the ACP could try to find the sources and devise ways to renegotiate costs.

Finally, the ACP must seek to mitigate revenue risks caused by demand growth projections not materializing or by toll increases that shift trade to competing routes. Since these risks depend to some extent on exogenous factors such as the world economy and alternative route competition, the ACP should constantly update its projections and analyses, while also comparing them to studies made in other countries. Initially, additional studies about the competition should be conducted, focusing on the U.S. Intermodal system's growth potential and the Suez Canal's ability to lower tolls to capture the focus market. Although the maritime industry has been generally supportive of the expansion plan, the key factor will be the effective implementation of toll increase policies so as not to drive customers away. Ongoing consultation with the maritime industry, which has already shown signs of grumbling, regarding its willingness to pay higher tolls, will be essential. ("ICS Submission...")

Conclusion

Proudly managing the canal since 2000, Panamanians now have sole responsibility for their greatest asset. They want to expand it

efficiently and to prosperous ends, and to do so by themselves, as owners and managers of their own destiny. If they are to be successful, however, it will be necessary to proceed with precision, foresight, and caution.

REFERENCES

- "10 Grandes Razones para Votar No en el Referendum." Confederacion Nacional de Unidad Sindical Independiente (CONUSI). August 5, 2006. Online. www.nodo50.org/caminoalternativo/canal/85.htm. Accessed October 29, 2006.
- Adames, Romel. "El Peso del Peaje Canalero." *La Prensa*. May 14, 2006. Online. www.laprensa.com.pa. Accessed May 14, 2006.
- Arias Loredo, Alfredo and Lider Sucre G. "Comunicado de Prensa." La Asociacion Nacional para la Conservacion de la Naturaleza (ANCON). October 3, 2006. Online. www.ancon.org/mambo/index.php?option=com_content&task=view&id=117&Itemid=150. Accessed December 29, 2006.
- Bernal, Miguel Antonio. "El 'Big Dig' de la Ampliación." *Panamá América*. August 18, 2006. Online. www.nodo50.org/caminoalternativo/boletin1/127-3.htm. Accessed September 22, 2006.
- Berrocal, R. and E. Rafael. "Canal Conseguira Facil Financiamiento." *La Prensa*. March 26, 2007. Online. www.laprensa.com.pa.
- de la Guardia, Maria Mercedes. "To Expand or Not to Expand: That's the Canal's Question." *Inter Press Service News Agency*. September 30, 2006. Online. ipsnews.net/news.asp?idnews=34951. Accessed October 29, 2006.
- Drohan Ruiz, Tomas. Remarks to Martindale Center Student Associates. May 12, 2006. Panama City, Panama.
- Drohan Ruiz, Tomas. "The True Cost of the Post-Panamax Locks." *Panama News*. August 20–September 2, 2006. Online. www.thepanamanews.com/pn/v_12/issue_16/opinion_01.html. Accessed September 4, 2006.
- Drohan Ruiz, Tomas. "What the 'Yes' Camp Doesn't Know." *La Prensa*. March 6, 2006.
- "El Canal de la Discordia." Panamaprofundo.org. Online. www.panamaprofundo.org/boletin/canaldepanama/Video/canal_discordia.htm. Accessed February 3, 2007.
- Flyvbjerg, Bent, Nils Bruzelius, and Werner Rothengatter. *Megaprojects and Risk: An Anatomy of Ambition*. Cambridge, United Kingdom: Cambridge University Press, 2003.
- "ICS Submission on ACP Toll Proposals." International Chamber of Shipping (ICS). March 2007. Online. www.marisec.org/news/Industry%20Submissions/Mar%2007%20ICS%20-%20Panama%20tolls%20submission.pdf. Accessed March 29, 2007.
- Jackson, Eric. "The 'No' Campaign Holds a Forum." *Panama News*. September 3–16, 2006. Online. www.thepanamanews.com/pn/v_12/issue_17/news_02.html. Accessed October 7, 2006.
- Jackson, Eric. "On the Campaign Trail for the Canal Expansion Referendum." *Panama News*. June 4–June 17, 2006. Online. www.thepanamanews.com/pn/v_12/issue_11/business_02.html. Accessed June 19, 2006.
- Jackson, Eric. "Propaganda, Studies Differ about Gatun Lake Water Quality." *Panama News*. June 18–July 8. Online. www.thepanamanews.com/pn/v_12/issue_12/business_01.html. Accessed October 7, 2006.
- Kraul, Chris and Ronald D. White. "Panama Is Preparing to Beef Up the Canal." *Los Angeles Times*. April 25, 2006.
- McCullough, David. *The Path Between the Seas: The Creation of the Panama Canal, 1870–1914*. New York, NY: Simon & Schuster, 1977.
- Mendez, Roberto. "Un Mal Negocio para Panama." *La Prensa*. June 3, 2006. Online. www.laprensa.com.pa.
- Menendez, Gonzalo. "Some Worrysome Environmental Aspects of the Panama Canal Expansion." *Panama News*. July 23–August 5, 2006. Online. www.thepanamanews.com/pn/v_12/issue_14/opinion_01.html. Accessed October 29, 2006.
- Muñoz, Mario A. "Nuevas Tarifas del Canal se Aplicaran desde Julio." *La Prensa*. April 6, 2007. Online. www.laprensa.com.pa. Accessed April 6, 2006.
- Palm, Mónica. "Se Impuso la Voluntad Popular: Torrijos." *La Prensa*. October 26, 2006. Online. mensual.laprensa.com/mensual/contenido/2006/10/26/hoy/panorama/778183.html. Accessed October 26, 2006.
- "The Panama Canal." Global Perspectives: A Remote Sensing and World Issues Site. Online. www.cet.edu/earthinfo/camerica/panama/PCtopic1.html. Accessed February 13, 2007.
- Panama Canal. WorldAtlas.com. Online. worldatlas.com/webimage/countrys/namerica/camerica/pncanal.htm. Accessed April 2, 2007.
- Panama Canal Expansion Position Paper. May 2006. World Shipping Council. Online. www.pancanal.com/eng/plan/world-shipping-council.pdf. Accessed May 25, 2007.
- "Panama President to Unveil Plan for Panama Canal Expansion." *U.S. Water News*. April 2006. Online. www.uswaternews.com/archives/arcglobal/6panapres4.html. Accessed May 25, 2006.
- Perez, Rafael. "Disminuye el 'No' a la Ampliacion." *La Prensa*. June 11, 2006. Online. www.laprensa.com.pa. Accessed June 11, 2006.
- Proposal for the Expansion of the Panama Canal — Third Set of Locks Project*. Panama Canal Authority. April 24, 2006. Online. www.pancanal.com/eng/plan/documentos/propuesta/acp-expansion-proposal.pdf. Accessed May 25, 2006.
- "Proposal to Modify the Regulations For the Admeasurement of Vessels for the Panama Canal and the Panama Canal Tolls." April 5, 2007. Online. www.pancanal.com/peajes/. Accessed April 8, 2007.
- Reynolds, Humberto. "Sugerencias Despues del Referendum." *La Prensa*. February 27, 2007. Online. www.laprensa.com.pa. Accessed February 27, 2007.
- Torrijos, Martin. "Discurso en Inicio de Periodo de Divulgacion del Proyecto de Ampliacion del Canal de Panama." April 24, 2006. Online. www.presidencia.gob.pa/discurso.php?cod=866&tex=. Accessed June 8, 2006.