



Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

SECURITY AND CONTINUITY OF OPERATIONS

September 25, 2013

In reply refer to: NN-1

Charles Johnson
Physicians for Social Responsibility
812 SW Washington St, Ste 1050
Portland, OR 97205

FOIA #BPA-2013-01616-F

Dear Mr. Johnson:

This is the final response to your request for records that you made to the Bonneville Power Administration (BPA), under the Freedom of Information Act, 5 U.S.C. 552.

You requested the following:

“The October 2009 BPA report documenting Columbia Generating Station performance problems and expectations for the new Chief Executive Officer.”

Response:

BPA is releasing the responsive documents in their entirety.

Pursuant to 10 CFR 1004.8, if you are dissatisfied with the adequacy of the search, you may appeal this FOIA response in writing within 30 calendar days of receipt of a final response letter. The appeal should be made to the Director, Office of Hearings and Appeals, HG-1, Department of Energy, 1000 Independence Avenue, SW, Washington, DC 20585-1615. The written appeal, including the envelope, must clearly indicate that a FOIA Appeal is being made.

Please contact Kim Winn, FOIA Specialist, at 503-230-5273 with any questions about this letter.

Sincerely,

/s/Christina J. Munro
Christina J. Munro
Freedom of Information/Privacy Act Officer

Enclosure



J. V. Parrish
Chief Executive Officer
P.O. Box 968, Mail Drop 1023
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jvparrish@energy-northwest.com

October 16, 2009

Steve Wright
Administrator
Bonneville Power Administration
905 NE 11th Ave.
P.O. Box 3621
Portland, OR 97208-3621

Subject: COLUMBIA GENERATING STATION PERFORMANCE 2009

Dear Steve,

As a follow-up to our recent discussions on Columbia Generating Station, I'm passing along our Columbia Operational Performance 2009 whitepaper, which specifically addresses recent plant performance. The analysis provides broad historical context, rather than a recent snapshot, and presents an expert-based perspective with which to evaluate potential trends compared to industry performance norms. I hope you'll find the report a compelling evaluation of historical long-term success, recent set-backs and future plant strength.

Though the document discusses issues addressed in BPA's October 2009 "Draft—Columbia Generating Station Performance," the Energy Northwest whitepaper is not intended to endorse BPA's outside view of the operation, but simply explore and expertly address issues of shared concern. Any policy decisions regarding Columbia operations clearly reside with Energy Northwest's Executive Board and Board of Directors, and therefore are not addressed in this paper.

We are cognizant and acutely aware of how recent plant operation has impacted our performance metrics and caused them to significantly decrease in recent months. The Energy Northwest leadership team is disappointed—and ultimately accountable for current performance levels. We recognized indications of declining performance in late 2008 and took prompt action. A comprehensive strategic initiative has been developed to improve and sustain excellence in plant operation. In addition, nationally-recognized third-party industry expertise is being used to rigorously analyze our recent performance issues.

Energy Northwest is ultimately responsible for nuclear policy and the safety of Columbia's operations, and we will not falter in this obligation. This focus has ensured that Columbia is and will remain an exceptionally safe plant. Past external budget pressures, however, resulted in short-term gains rather than long-term reliability, and introduced inherent risks that brought us to the performance challenges we face today. Certainly, in the best long-term interest of the region, the reliable and safe operation of Columbia should always remain the priority.

Steve Wright
Page 2 of 2
October 16, 2009
Columbia Generating Station Performance 2009

Maintaining public, regulator and regional confidence in the operation through open communication and transparency is also paramount, especially as we prepare to submit Columbia's license renewal application to the Nuclear Regulatory Commission in early 2010. I believe caution should be exercised to not inadvertently erode this confidence in Columbia Generating Station, and by extension Energy Northwest's ability to safely operate the plant, based solely on our recent performance.

It is my genuine hope that this whitepaper will be used to support an accurate and compelling picture of regional nuclear power benefits; please feel free to use all or any of it as you see most appropriate.

The entire Energy Northwest team is committed to the public power energy needs of our region. I am very confident that the investments of the last two and a half years—and continued appropriate levels of investment—will help ensure Columbia's long-term reliability.

Respectfully,

A handwritten signature in black ink, appearing to read "J. V. Parrish". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

J. V. Parrish
Chief Executive Officer

cc: Andy Rapacz, Bonneville Power Administration
Energy Northwest Executive Board
Energy Northwest Board of Directors
Participants' Review Board
Columbia Nuclear Safety Review Board

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Columbia Operational Performance 2009

Introduction

The Energy Northwest consortium of 27 public-owned utilities is a transparent joint operating agency formed to serve the power needs of Washington State and the Pacific Northwest. Energy Northwest aggregates the power needs presented by member utilities, and develops projects to best satisfy those needs. The agency's largest and most-visible operation is the Columbia Generating Station nuclear energy facility, a valuable regional asset which on average produces enough electricity to power over a million Washington homes.

Background

Historically a very dependable source of energy for the region, Columbia recently demonstrated a decline in performance primarily as a result of funding decisions made during the last two decades. Four forced and one maintenance outage (February, May, June, August and September), plus an unplanned extension to the May-June refueling outage, have prevented Columbia from meeting generation goals. Identifying the causes behind recent performance require a review of capital investment.

Beginning in fiscal year 2001, a long period of underinvestment placed Columbia well into the lowest quartile for capital expenditures across all U.S. plants—culminating in fiscal 2006 with Columbia's distinction as the lowest-level capital-funded plant in the industry. While Columbia demonstrated a steadily improving generation trend from 1992 through 2008, equipment reliability began to falter. Beginning in 2007, a five-year major re-investment window began to address long-standing concerns.

Following the initial re-investment year, Energy Northwest leaders made calculated, yet optimistic estimates that Columbia would achieve first-quartile performance by 2009—much faster than the industry trend. These estimates failed to recognize that performance improvements are rarely immediately realized following periods of heavy investment, as demonstrated industry-wide.

Industry Trends

Poor plant performance following a period of heavy investment is disappointing, but not uncommon in the industry. After replacing its reactor head in 2003, performance at a plant in the Southeast proceeded to decline over the course of its operating cycle—the 18-month to two-year time span between refueling outages. The plant moved from the top half (second quartile) of the nation's performers to the bottom quarter (fourth quartile). In 2004, a Southern top-quartile performer invested in their turbine, turbine systems and reactor vessel. One operating cycle later it slipped into the fourth quartile, where it remained for three years.

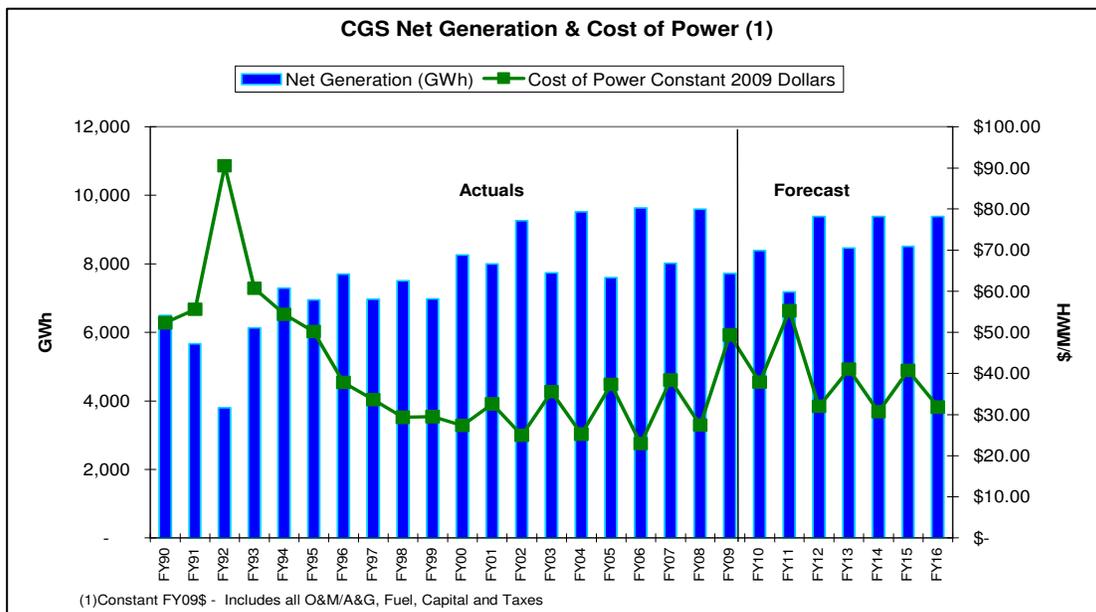
In 2005, a reactor head replacement project at another plant in the Southeast led to a drop, over the course of an operating cycle, from the top quartile to fourth, where that plant remains today. Similar performance stories can be found among more than two dozen U.S. boiling-water-reactor plants.

Like Columbia, the above plants entered periods of heavy investment in new equipment and systems. Within two years, performance exhibited a precipitous drop that can be traced, in part, to organizational stress associated with new and often first-time practices. Performance decline, in turn, resulted in a change of organizational expectations, behaviors and standards resulting in historically slow recoveries. Historically, two to five years are required to return a plant to pre-investment performance as the underlying organizational weaknesses surface and are addressed.

In addition to identifying and addressing underlying performance issues early on, the Columbia team, after an extensive look into industry trends and influencing factors, is using industry lessons learned to minimize turnaround time. Additionally, renewed emphasis on plant performance, in combination with continued investment reflected in the long-range plan, has already begun to provide the “new plant” focus and resources needed to move Columbia back up the performance spectrum.

Plant History

In the early 1990s Columbia’s performance was in decline, with generation falling well short of regional expectations. In 1992 a new CEO and a restructuring of senior leader and management positions, supported by a vital infusion of investment, put the plant back on its feet. For the last 17 years Columbia’s generation performance has been trending upward; the plant has demonstrated historically strong net generation, and cost of power dramatically declined and has since stabilized.



Cost of Power to Ratepayers

Columbia produces some of the most affordable power in the region, and the plant's cost of power compares consistently well next to other single non-fleet operations. And among the drivers of regional rate increases, Columbia ranked fourth, under the Bonneville Power Administration's fish and wildlife investment, Army Corps of Engineers and reclamation costs, and normal depreciation and net interest costs.

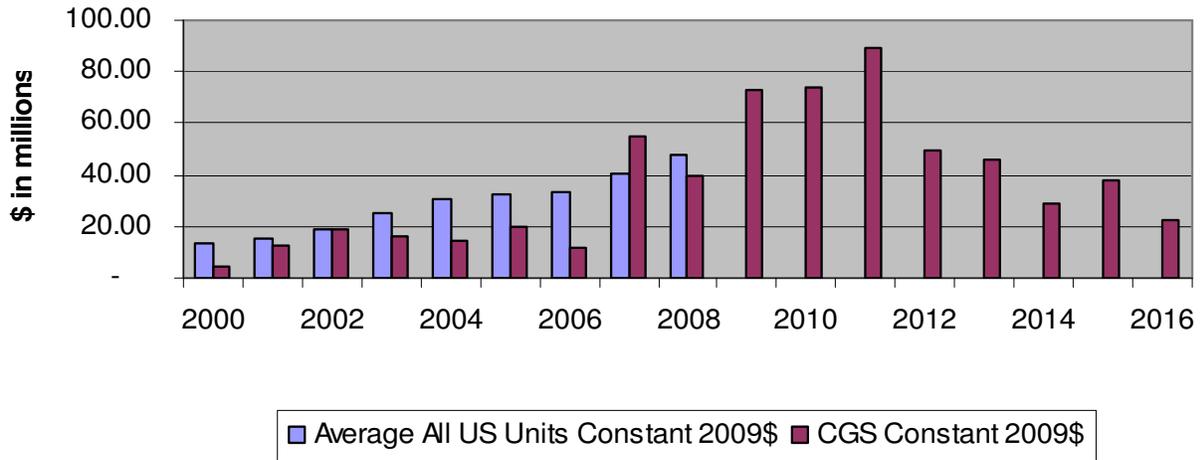
BPA FY10-FY11 RATE CASE

Drivers of Power Costs for FY 2010-2011	Increase/(Decrease) 2010-2011 Rate Proposal	Changes in 2010- 2011 Power Costs from IPR1	Net Increase/ (Decrease)	IPR1 added	Percent Change
	(1)	(2)	(1)-(2)	(3)	(2)/(3)
BPA'S Fish and Wildlife Costs net of 4(h) (10)credits	70	(15)	55	534	-3%
Corps and Reclamation O&M	40	(10)	30	577	-2%
Depreciation and Net Interest	24	0	24	0	0%
CGS O&M	74	(51)	23	634	-8%
Conservation	17	(2)	15	174	-1%
Non-Federal Debt Service	13	0	13	0	0%
Regional Energy Efficiency	10	0	10	0	0%
Internal Operations	25	(18)	7	276	-7%
Renewables includes Rate Credit	0	(1)	(1)	92	-1%
Post Retirement Contribution	0	(1)	(1)	32	-3%
Long-term Generation Program	0	(3)	(3)	64	-5%
Other - Colville Settlement, Non-Op Generation	0	(5)	(5)	54	-9%
Residential Exchange	(116)	0	(116)	0	0%

Capital Investment

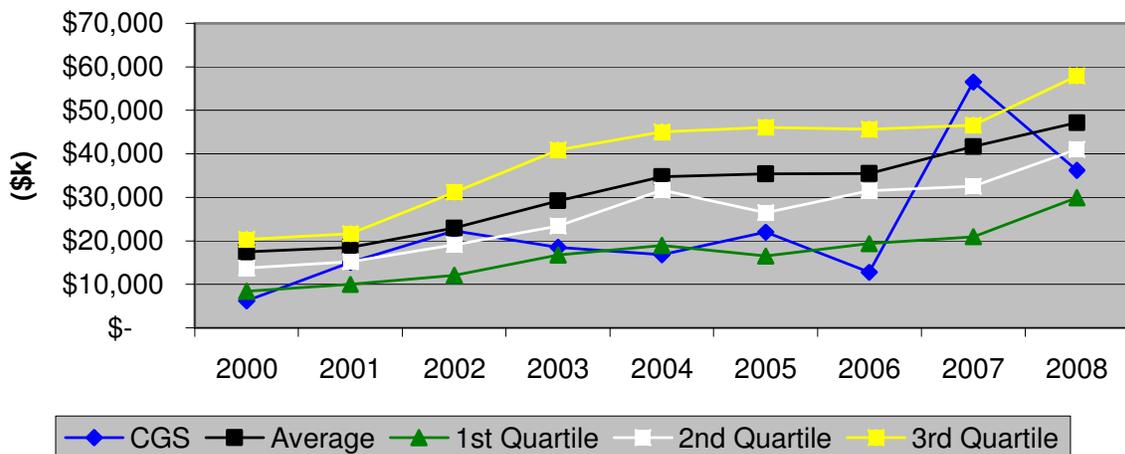
Unfortunately, years of insufficient investment in Columbia's infrastructure prior to fiscal 2007 is now delivering undesirable, yet not unanticipated consequences. There are clear causal factors from the past—supported by industry data—that offer explanations for the recent downturn in plant performance, and point the way forward to disciplined, fiscal investment focused on long-term reliability.

Total capital Costs - Constant 2009 \$



But from 2000 to 2006, capital investments at Columbia ranked consistently as the lowest or nearly the lowest in the industry nationwide. In many of those years, investments for capital improvements at Columbia also ranked as the lowest in the industry. It's worth noting that a large portion of capital investment during those years was directed toward post-9/11 security requirements mandated by the Nuclear Regulatory Commission.

Capital Costs - All US Units



In 2007, following seven years of limited investment, budgetary measures to address equipment reliability improvements brought investments in line with industry norms. This began a focused effort to address equipment issues and plant material condition.

Columbia's long-range plan was also modified in 2007 to increase spending for major equipment projects during refueling outages 17, 18, 19 and 20. This period of increased spending was projected to deliver a more reliable operation going forward.

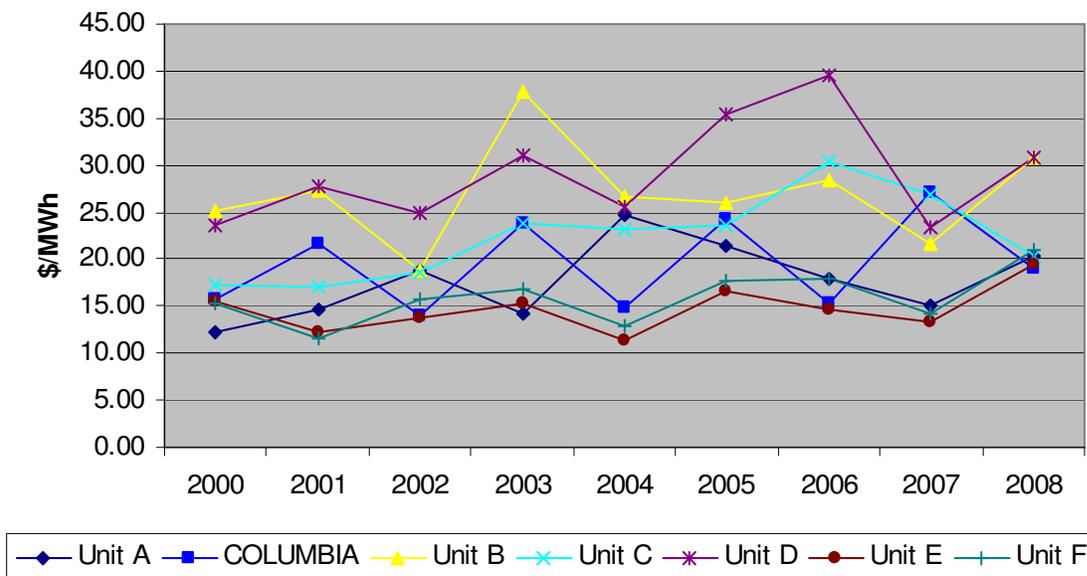
The danger of capital investment influx followed by investment drop-off is now apparent. The cycle of major investment years versus underinvestment years must end if Columbia is to avoid a future post-investment performance repeat. Fiscally-disciplined capital investment is required.

Operating Costs

Operating costs at Columbia continue to compare reasonably well to other single units of similar design, and the plant has been an average performer in terms of net generation and cost when compared to the industry overall—Columbia has shown a consistent averaged improvement in net generation and cost of power from the early 1990s through today. In the 2000 to 2002 timeframe Energy Northwest transitioned Columbia to a 24-month refueling cycle, resulting in additional decreases in operating cycle costs. In 2008, Columbia was the best performer from an operating cost perspective compared to other single non-fleet plants.

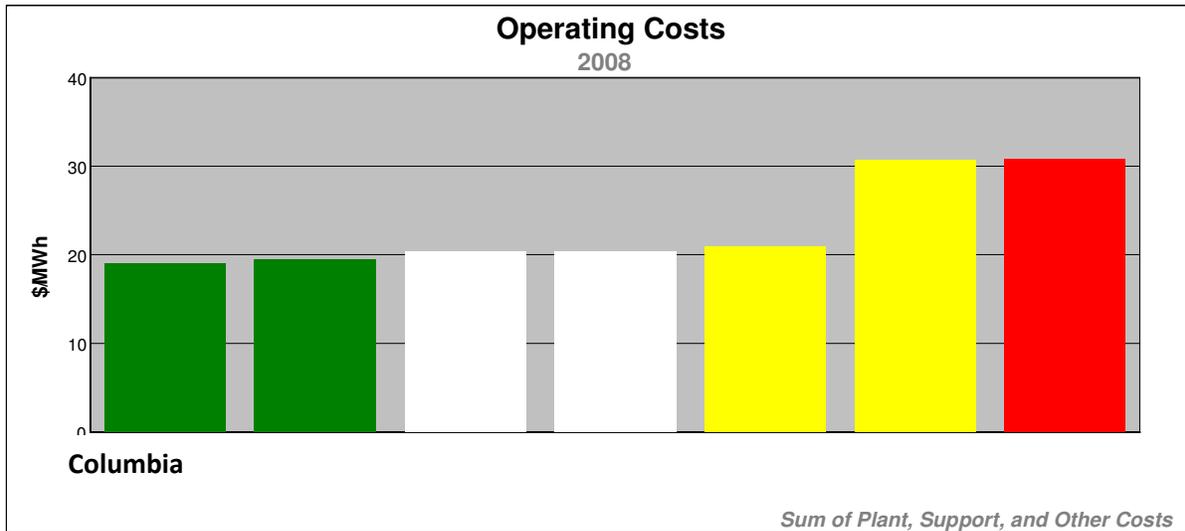
In 2009, challenges following heavy investment began to emerge, moving Columbia into the lowest operating cost quartile by August.

Total Operating Cost of Power



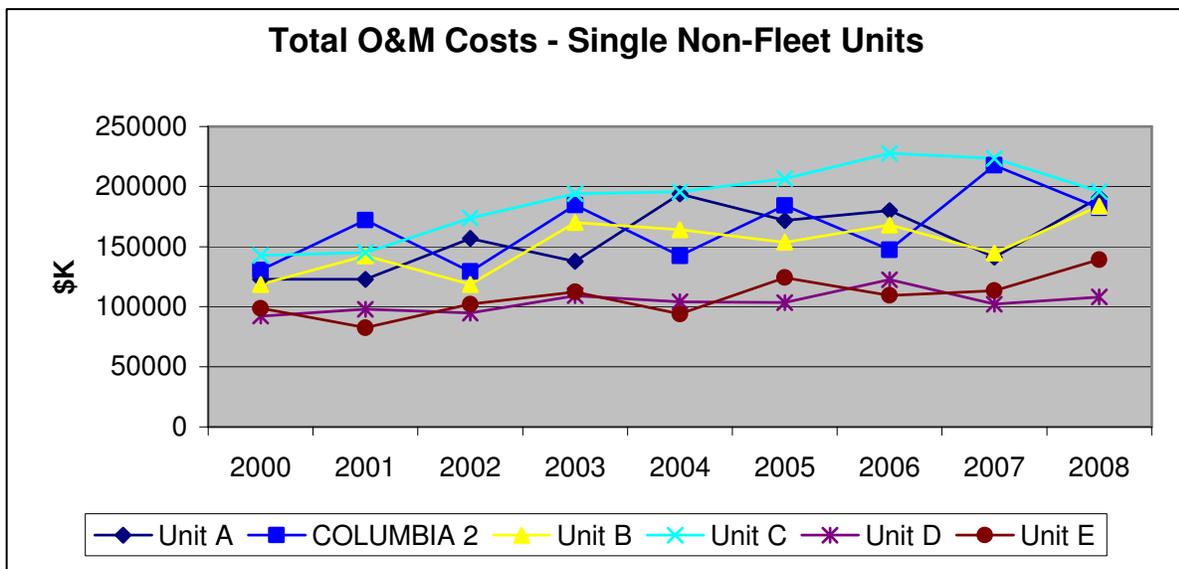
A look back to 2000, however, reveals that for eight out of nine years Columbia's operating costs were lower than those of the newer—and more cost-efficient—boiling water reactors.

U.S. Single Non-fleet Generating Stations – 2008



O&M Costs

Columbia's operations and maintenance costs have historically been center-of-mass compared to other single non-fleet plants. Beginning in approximately 2007, larger-than-expected increases in fees from regulatory agencies, membership fees from industry organizations, and higher staffing needs, resulted in considerable increases within the plant's O&M budget. The single-most influential factor in O&M costs however, is Columbia's higher staffing needs.

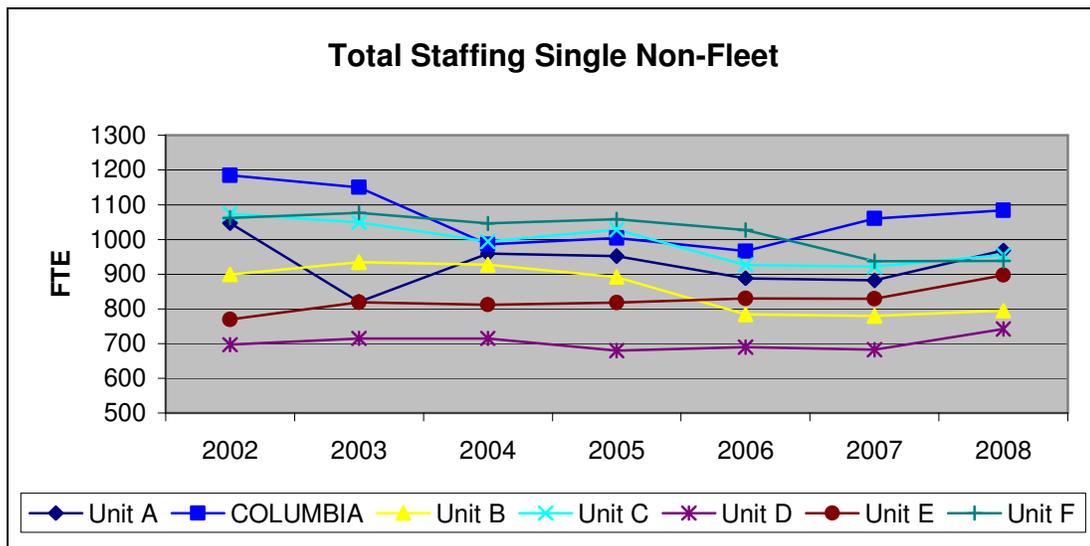


O&M Costs – Staffing

Reliable operations require investments in both equipment and the labor necessary to perform maintenance and upgrades. Significant improvements to Columbia's infrastructure require additional headcount through the 2011 outage. As the largest portion of this effort concludes, staffing levels will decrease. The long-range plan includes a reduction of 30 full-time positions in fiscal year 2012 and a reduction of 25 full-time positions in fiscal 2014. In addition, a staffing study is under way to further optimize staffing levels.

Project and temporary employees brought in to support design and installation work for new equipment will depart as workload diminishes. Employees hired in support of workforce planning will be absorbed into plant organizations as retirements occur or employees move on to other opportunities. (From fiscal year 2010 to 2012, Columbia's retirement and attrition rate is anticipated to reach 10 percent.) Plans are being developed to employ technology in several key areas to compensate for staffing losses without the need to replace departing employees.

Early in this decade, Columbia had the largest staff of any single non-fleet nuclear plant. The agency made a significant effort to reduce staffing through reduction-in-force, retirements and attrition in 2003. In 2006 plant staffing levels began to increase to support the investment in equipment project spending and workforce planning activities. A small increase was required in 2009 as part of the Nuclear Regulatory Commission-mandated Worker Fatigue Management rules.



A 2009 survey by Goodnight Consulting, Inc. of U.S. nuclear plant staffing revealed that levels in the industry have increased 3 percent on average since last year. The increase appears to be due to the combination of two principle factors currently occurring in the

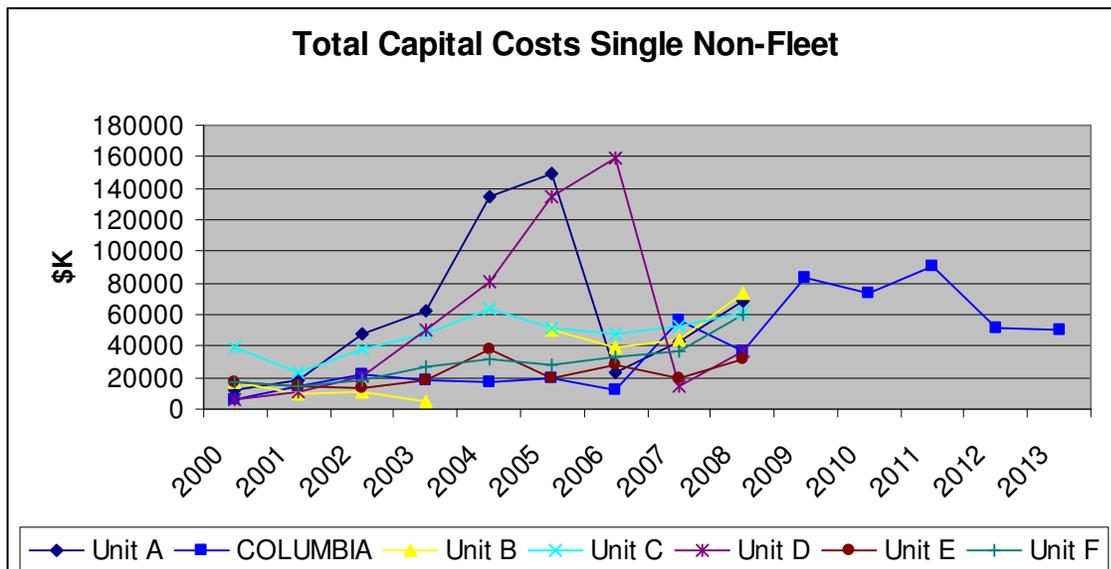
industry, 1) new hires brought in to offset impending retirees in the aging workforce, and 2) additional operations and security staffing to meet the amended NRC Worker Fatigue Management requirements of Chapter 10, Code of Federal Regulations, Part 26. According to Goodnight's October 2009 newsletter, staffing levels for single-unit plants range between 0.56 and 1.47 full-time equivalents per installed megawatt-electric. Columbia's staffing levels are 0.98.

Columbia's geographic location also effects staffing requirements. The plant requires greater than average staffing levels as an isolated, single-site unit. Columbia does not benefit from the shared resource pool available to other operations, the majority of which are in close proximity to one another.

Fostering Change

This has been a challenging year, for which the leadership team assumes ultimate accountability for current plant performance. Improved performance will require both sound leadership and a committed workforce. To achieve this objective, the "Pride in Performance" organization-wide initiative was launched in September. The initiative centers upon five focus areas: radiological safety, outage/forced-outage readiness, leadership effectiveness, equipment reliability, and safety and human performance. Using these focus areas, the Energy Northwest team will identify performance gaps and plot a clear path to meeting and exceeding industry standards.

Energy Northwest has also initiated a comprehensive strategic review by third-party industry experts which involves a rigorous analysis of recent performance issues. And looking ahead, Columbia's long-range plan projects improved reliability and reduced O&M costs, including decreases in staffing levels.



Individual and team accountability are cornerstones of the nuclear industry. Energy Northwest expects its senior leaders and managers to live by core values such as excellence, trust, teamwork and safety. An on-going leadership effectiveness assessment will help ensure Energy Northwest promotes these values through talented leaders that display high levels of operational knowledge and organizational skill. Through this assessment process, the agency has already made changes in key leadership positions in the areas of operations, maintenance and engineering.

Current Assessment

Recent plant performance, though not uncharacteristic of industry-wide performance swings, is primarily influenced by cyclical investment strategies. A steady level of investment is necessary to retain Columbia's positive long-term performance record.

Performance would certainly have been exacerbated if not for early recognition by plant management in 2008 of declining performance indicators. As a result of early evaluation, during the 2009 refueling outage Columbia management decided to address all emerging maintenance and equipment issues—such as leaks and valve repairs—unlike previous planned outages when such work was deferred to meet schedule expectations. Similar decisions during the 2009 maintenance and forced outages traded in short-term performance gains in favor long-term plant reliability.

The Columbia workforce, from the expert technicians on the plant floor to the Chief Nuclear Officer, is among the very best in the industry. This expertise is leveraged by the nuclear industry in a variety of ways. Columbia leaders participate in the Utility Service Alliance, which provides a fleet-like environment in which senior plant managers observe the performance and plans of other U.S. nuclear operations. Senior leadership expertise is also present on a number of notable industry boards, including the oversight board of the nuclear industry's only third-party-operated generating station.

The truest measure of an organization is never a snapshot in time, but rather a long-term view showing how it moves forward from adversity to embrace and embody professional excellence. The plant is currently well-resourced to move back up the performance spectrum. Future momentum will increase in direct proportion to the strength of leadership, a committed and well-trained workforce, and disciplined investment.



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jvparrish@energy-northwest.com

October 21, 2009

Mr. Steve Wright
Administrator
Bonneville Power Administration
905 NE 11th Ave.
P.O. Box 3621
Portland, OR 97208-3621

Subject: COLUMBIA GENERATING STATION WHITEPAPER DISCUSSION 2009

Dear Steve,

Thank you for reaching out and opening the discussion on our "Columbia Operational Performance" whitepaper. We share vital interests, which include our mutual responsibility to the Pacific Northwest ratepayer. As such, allow me to expound on issues regarding our performance projections and our ownership of plant performance issues and related improvement plans.

Let me assure you that I and every individual at Columbia takes complete ownership and recognizes our role in addressing the issues that have impacted our recent performance. Specifically, the Energy Northwest leadership team shoulders direct accountability for any set-backs in Columbia's performance.

While there were many factors that brought us to the reality of today, we fully admit, without any reservation, that we were overly optimistic in our projections for progress following major plant maintenance.

In 2007, with insight into negative industry trends, we initiated strategies that we believed would avoid our inclusion in industry's post-investment statistics. Our optimism was grounded in expertise, industry benchmarking of best practices, pro-active planning and performance indicators. We missed the mark in those projections. In 2008, we recognized declining performance, and with industry assistance executed strategies to move Columbia up the performance ladder. Those strategies, gleaned from top performing peers and outlined in our whitepaper, are in-place and moving us forward.

We currently enjoy strong public, regional and regulator trust based on our long-term historical performance. It is the earnest intent of the Energy Northwest team to maintain, and to strengthen, that confidence through Columbia's long-term reliability.

Respectfully,

J. V. Parrish
Chief Executive Officer

cc: Andy Rapacz, Bonneville Power Administration
Energy Northwest Executive Board
Energy Northwest Board of Directors
Participants' Review Board
Columbia Nuclear Safety Review Board



Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

EXECUTIVE OFFICE

October 30, 2009

In reply refer to: A-7

To The Energy Northwest Executive Board:

Enclosed is a report on the recent performance of the Columbia Generating Station (CGS). This report focuses on the period beginning when Energy Northwest (EN) requested increased expense and capital funding to address safety, reliability, and efficiency (performance) issues at CGS. We believe evaluating CGS performance since that time is important because the Bonneville Power Administration (BPA) ratepayers have made substantial incremental investments in the plant based on recommendations from EN that such investments would improve plant performance. At this point, improvements forecast by EN have yet to be realized and, in fact, there has been a decline in performance. As a result, we believe it is time to begin a discussion with the various parties that influence or are impacted by CGS performance to determine how we can work together to achieve the improved performance we all desire.

We want to be clear that even with unrealized expectations for performance, CGS is a cost-effective resource that is likely to become even more so as carbon costs are included in electricity pricing. We want and need this plant to operate safely, reliably, efficiently, and remain an important component of our generating fleet. We believe the relicensing process should be pursued and are looking forward to supporting those efforts. By addressing issues now, we have the best chance to improve plant performance quickly and thus successfully extend the life of the plant. We also want to be clear that all the evidence we can see indicates the plant is being operated in a safe manner.

We shared a draft of this report with the EN management team for comments. Instead, EN provided the enclosed response (referred to as the EN Paper). The EN Paper makes some important points. Because of that, we are appending the EN Paper to our report. For example, the EN Paper identifies improvements that have occurred at CGS over the last 15 years, including increases in generation output and reductions and stabilization, until recently, in the cost of power. These types of improvements have been occurring across the nation in the nuclear industry, and we need to continue at CGS to make this kind of progress to support increased confidence in the use of nuclear power.

The EN Paper focuses on long-term capital underinvestment in the plant as the primary cause of performance not meeting expectations. Through budget increases, we have indicated agreement that this is at least one of the problems.¹ The EN Paper touches lightly on the need for cultural change to improve performance. We agree that this is necessary. We support the recently initiated “Pride in Performance” effort but intend to have more discussion regarding how it is likely to prove more successful than previous culture improvement efforts.

In one particular area we found the EN Paper disappointing and not reflective of the numerous meetings we have held with the EN management team since the initiation of budget increases. Our fundamental purpose behind the quarterly meetings was to achieve agreement on the performance we should expect from the plant assuming increased investment and then to test progress along the way. Our disappointment is with the report’s explanation of current low performance scores:

- Poor performance following investment is “disappointing, but not uncommon in the industry” (p. 1)
- “Historically, two-to-five years are required to return a plant to pre-investment performance” (p. 2)
- “Unfortunately, years of insufficient investment in Columbia’s infrastructure prior to fiscal 2007 is now delivering undesirable yet not unanticipated consequences” (p.3)

These statements suggest that CGS’ current performance is not surprising. I want to be clear that I am surprised and that current performance is not what I expected based on our discussions with the EN management team.

It’s important to recognize that the performance indicators used in our report were the ones EN presented to us in 2007 as the best summary measure of plant performance. The forecasts of performance as measured by the indicators were developed by EN. We informed EN management that we would be using the performance indicators in our own performance contracts to make clear how important this was to us and to assure we were in alignment regarding performance improvement expectations. We do not recall discussions about multiple examples of plants experiencing reductions in performance after receiving infusions of capital. Even as late as this past June, following the disappointing refueling outage, EN management projected plant performance to be excellent for the next two years due to the substantial

¹ We also note two points regarding expenses. First, the EN narrative describing the graph on p. 2 describes the cost of power as having “stabilized.” Based on this graph this is true for most of the period from 1996 on, except 2009 actuals and the forecast for the next two years. We have concerns about whether the substantial increase in expense budgets at EN are establishing a new plateau which would be among the highest in the industry or whether it will decline in real terms in coming years. Second, the description of EN cost increases in 2010-11 vs. the prior year rates misses the point that EN raised its expense budgets by a substantial amount in 2007-2009 after the rate case was completed. This increase was masked by the fact that BPA needed to conduct a special rate case in 2009 to address residential exchange issues and updated the EN spending forecast in that rate case. The fact of the matter is the increases in EN budgets from 2007 forward are having a much bigger impact on BPA rates than the table on p. 3 would imply.

maintenance work that was performed. In addition, as late as last May, EN management was urging BPA to use higher capacity factor numbers for the 2010-11 rate period.

To their credit, we have heard the EN management team say it is disappointed, did not expect, and ultimately takes accountability for current decline in performance. This was clarified in an October 21 letter from the EN CEO (enclosed).

EN's Paper and our report share some common ground in that both recognize there has been a decline in performance and that the plant is currently well resourced. Our report includes a series of recommendations for positive change. We want our report to begin a constructive dialogue with BPA customers and EN about how we can work together to promptly and effectively turn performance around. We believe the measures EN has underway are likely necessary but not sufficient. I appreciate that the EN executive and full boards have taken time to meet with me and appear poised to take additional action.

Fundamentally, what we all want is straightforward. We want plant performance (particularly reliability and efficiency) to improve. Let me reiterate that we want and need this plant to succeed. CGS is an important and integral part of the Federal Columbia River Power System. Our commitment has been demonstrated by our financial support and regular engagement with EN management. We believe the Executive Board and full Board of Directors, as well as the rest of Bonneville's customers, share our goals for CGS' performance. This is a problem that can and should be solved within the public power/BPA community. We look forward to a dialogue on how best to proceed.

Sincerely,



Stephen J. Wright
Administrator & Chief Executive Officer

Enclosures

cc:
Energy Northwest Board of Directors

COLUMBIA GENERATING STATION PERFORMANCE

October 2009

Bonneville Power Administration

Overview

Energy Northwest and the Bonneville Power Administration share responsibility for Columbia Generating Station: EN owns and operates CGS while BPA funds the nuclear plant and markets its power. EN and BPA both view CGS as a valuable source of carbon-free power that is being operated safely. We jointly seek improved plant performance, defined through measurements of safety, power generation, reliability and efficiency. BPA is committed to working with EN to support and promote the improved performance that both organizations want.

This report

BPA assembled this report to clearly describe the region's increasing investments in CGS and the plant's operational record in the three years since those investments began. BPA intends this report and its recommendations to focus and motivate constructive change and strengthened performance at CGS. The report draws on information provided by Energy Northwest, BPA's own budget data, nuclear industry statistics and the expertise of a nuclear industry executive contracted by BPA to provide independent input.

Introduction

This is a summary of Columbia Generating Station (CGS) performance during the past three years. CGS is a single-unit boiling water nuclear reactor owned and operated by Energy Northwest (EN), a consortium of Washington state utilities. The plant, which has an approximate capacity of 1,150 megawatts, began operating in 1984 and remains the Pacific Northwest's only nuclear power plant.

The Bonneville Power Administration (BPA) purchases all of the plant's energy and funds the plant's operations, maintenance and capital needs with revenues from its regional ratepayers. CGS provides about 10 percent of the power marketed by BPA and is an important part of BPA's and the Northwest's power generating resources. From all evidence available to BPA, CGS is being operated safely. It remains a very cost-effective resource that emits no CO₂. In the future, as carbon costs are included in electricity pricing, we would expect CGS to become even more valuable. Therefore, BPA wants CGS to be successful in providing reliable, safe and efficient energy for the region.



However, the plant's costs also comprise a significant, and rising, portion of BPA's wholesale power rates. The annual operations and maintenance costs for CGS now total

more than the annual operations and maintenance costs for the 31 hydroelectric dams that produce about 90 percent of the power that BPA markets.

In 2007, EN sought and BPA provided substantial CGS budget increases for FY 2007-2009 beyond the amounts included in BPA's established rates. EN explained that the investments were necessary to improve performance.¹ BPA agreed that measurable improvements in plant performance were desirable and supported the funding increases. EN has since requested substantial funding increases for FY 2010-11, which BPA has included in its new rates. This report describes the actual performance since the FY 2007-2009 funds were provided.

BPA and EN agreed on a set of performance indicators used throughout the industry to track nuclear plant operations. EN anticipated that CGS performance, which had remained in the lowest quartile nationally since mid-2004, would improve substantially as a result of the increased investment. Unfortunately, plant performance has not improved. At the end of EN's fiscal year, in June 2009, plant performance indicators stood lower than they did in 2007 when the additional investments began. Since that time, plant performance has continued to decline. Most recently, CGS performance indicators in August reached their lowest point in more than a decade. At this point it appears that CGS stands close to the bottom of the lowest quartile of the 104 operating U.S. nuclear plants in terms of performance. This is distressing given the ratepayer investments in the plant.

CGS has remained in good standing with the Nuclear Regulatory Commission, which focuses primarily on nuclear safety. This has been to Energy Northwest's credit, and BPA commends plant management for meeting NRC standards. However, the NRC has recently applied more scrutiny to CGS because of the number of unexpected reactor trips.

The bottom line is that increased ratepayer investments have not delivered the improvements that EN committed to and which BPA is striving for. While the plant's safety record has remained solid, its generating performance does not approximate that of the rest of the nuclear industry or match the expectations associated with the plant's elevated budgets. A benchmark assessment of operation and maintenance costs commissioned by BPA suggests that CGS costs are well above average for similar plants in the United States.² BPA is not alone in its concerns. EN executives have also indicated that plant performance has not met their expectations and that positive progress is needed. This situation requires increased focus, attention and change.

Part 1: Background

BPA normally establishes its power rates for two- or three-year periods through a public process that examines the costs of the power system and the revenue required to operate

¹ In the context of this paper, performance covers safety, reliability, power generation and cost.

² Columbia Generating Station's Performance, 2005-2009, David Oatley Consulting, Aug. 20, 2009.

it. In 2006, BPA incorporated budgets for CGS into its rates for the upcoming 2007-2009 period based on EN's projected spending levels for the plant. The initial CGS operations and maintenance budgets included in the 2007-2009 rates were \$263.7 million in 2007, \$188.7 million in 2008 and \$242.9 million in 2009. The 2008 budget was substantially lower because it was not a refueling year for the plant and did not include costs associated with a refueling shutdown. These budgets included operating and maintenance costs, nuclear fuel purchases, Decommissioning Trust Fund contributions and insurance.



After BPA finalized its 2007-2009 rates, EN returned to BPA in 2007 seeking substantially increased budgets for the rate period, beyond the costs that had been built into the rates. EN increased CGS budgets by a total of \$88.1 million for operations and maintenance and \$62.9 million in capital expenses over BPA fiscal years 2007 through 2009 from the levels it had earlier described and BPA had planned on for the rate period.

EN stated that the increased budgets were necessary to arrest the declining performance of CGS, as measured against industry standards. The nuclear plant had endured several years of below average performance related to its inconsistent generation and unexpected outages. The plant's operations improved in the late 1990s and, in 2000, CGS briefly displayed above average performance.³ However, performance deteriorated shortly thereafter until commonly used industry benchmarks placed the plant within the lowest quartile of nuclear plants in the United States. The industry measures used to determine this ranking are based on widely recognized key performance indicators including the plant's energy generation relative to its capability, unplanned outages, emergency shutdowns and other measures of reliability, safety and efficiency.

Seeking improvement

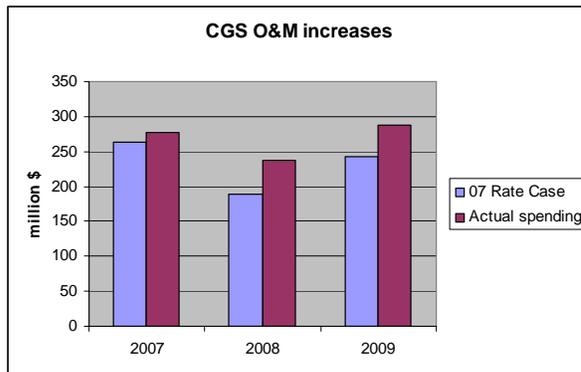
The West Coast Energy Crisis that peaked in 2000 and 2001 caused BPA to severely cut its own costs and ask its partners including EN and operators of hydroelectric dams to tighten budgets where possible. BPA emphasized at the time that cost constraints should not compromise safety or reliability. EN worked with BPA to reduce expenses by, for example, capitalizing the spent-fuel storage system.⁴ In early 2003, EN's Executive Board committed "to focus on making the operation of Columbia the most efficient possible" and noted that "any increased efficiency must be accomplished without

³ Integrated Program Review, Columbia Generating Station, May 22, 2008.

⁴ Letter to the region from Paul Norman, May 2, 2002.

jeopardizing the long-term safe and reliable operation of Columbia.” Based on a staff benchmarking study, EN’s Executive Board noted at the time that CGS’ cost of power was comparable to other single-unit plants and that its staffing was somewhat high. The Board described efforts to reduce the length of refueling outages and improve reliability by reducing the number and duration of unplanned outages.⁵

After plant’s performance ranking fell, EN also set improvement targets. EN indicated during presentations in 2005 that its goal was for CGS to rank within the top 50 percent of comparable nuclear plants nationally.⁶ However, plant performance did not subsequently approach that goal. EN leadership explained when seeking increased

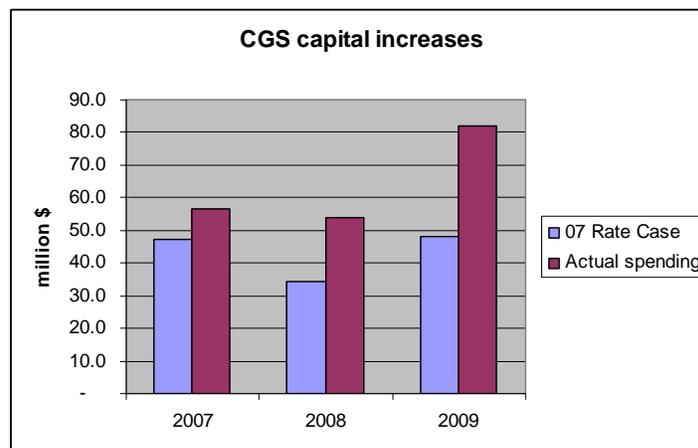


budgets in 2007 that underinvestment in previous years had compromised the plant’s performance, leading to breakdowns and failures as equipment aged. The result was that the plant experienced an escalating number of unexpected power reductions and outages, raising concerns about its safety and reliability.

EN outlined plans to replace specific aging components such as pumps, motors, heaters and the condenser so that the plant could better meet its production schedule and regional expectations for power generation. While some of the planned replacements were straightforward, others were more complex. For instance, the plant’s steam condenser was the source of repeated leaks that led to outages and power reductions. Its replacement is very complex and the procurement process lengthy, so planning efforts are well underway for the work to take place in 2011.

EN projected that the investments would markedly improve plant performance beginning in 2007. EN forecast that those improvements would continue, bringing the plant into the ranks of the top half of nuclear plants nationwide by 2009 and into the highest-ranked quartile by 2013.⁷

EN’s ultimate goal is for CGS to operate in the top performance quartile relative to other U.S. nuclear plants.⁸



⁵ Energy Northwest Executive Board Review of Nuclear Program, January 23, 2003.

⁶ Energy Northwest presentation to BPA Power Function Review, March 15-16, 2005.

⁷ EN projection, October 31, 2007.

⁸ CGS IPR, 2008.

While examining the increased CGS budgets, BPA reviewed past operations and agreed that the plant's performance clearly warranted improvement. BPA has the authority to disapprove CGS budgets if the agency believes the spending plans are imprudent. However, BPA has never done so during the operational history of the plant. In 2007, BPA accepted EN's increased spending program and planned capital improvements. At the same time, however, BPA sought an objective means to ensure that the upgrades and updates to the power plant effectively translated into improved generation, reliability and safety. BPA's goal in doing so was to provide accountability for ratepayer funding, and a means to efficiently track progress and quickly identify and address any shortcomings.

BPA's commitment

BPA believes that success at CGS requires a joint commitment from EN and BPA. In 2007, BPA proposed an overarching principle to set the direction for a collaborative relationship between EN and BPA. The principle was meant to outline the joint goals and commitments of the two organizations as they entered the period of increased spending and improvements. The draft principle read:

BPA and EN are committed to working in a mutually supportive fashion to ensure long-term safe, reliable operation of CGS accomplished at the lowest reasonable cost necessary to achieve those objectives. It is also our objective to integrate CGS with the Federal Columbia River Power System and to achieve optimum utilization of the resources of that system taken as a whole and to achieve efficient and economical operation of that system.

While CGS spending and improvements proceeded, EN did not endorse the draft principle. BPA continues to urge joint adoption of this principle.

Either way, however, BPA remains committed to ensuring high quality operations at CGS. Just as BPA recognizes the importance of CGS as a regional power resource, BPA also recognizes the significance of its own role in supporting and promoting the plant's performance. BPA is accountable to the region for the performance of its power generation fleet.

In 2008, BPA added CGS performance standards to BPA's key agency targets that are used to determine employee awards. BPA also added the standards to the personal performance targets for the Administrator and top BPA power executives. In doing so, BPA and its senior officials committed to measure their own success in part on the success of EN and CGS in strengthening the nuclear plant's operations. The goal of this action was to make absolutely clear that BPA, from the top down, is dedicated to safe, reliable and efficient operation of the nuclear plant.

Gauging performance

To measure progress at CGS, BPA and EN agreed to use the same performance indicators that EN had cited in describing the plant's low ranking and the need for increased spending and upgrades. These indicators are widely used by the nuclear industry as benchmarks of plant operations. They include:

- *Capability factor*, which is the percentage of the plant's maximum power capability that it delivers to the grid.
- *Forced loss rate*, which is the percentage of the plant's power capability it cannot deliver to the grid because of unplanned outages or down-powers.
- *Unplanned scrams*, which are plant shutdowns caused by malfunctions.
- *Other factors* such as staff radiation exposure and industrial accidents.

These indicators are combined through a standard industry formula that weights them according to their importance into an overall performance score. A score of 100 reflects a plant that fully meets nuclear industry goals for 2010. CGS' score has remained in the lowest quartile of plants since 2004.

In addition, BPA and EN agreed to include the cost of power produced by CGS among the performance measures. Cost of power is measured on a dollars-per-megawatt-hour basis, providing a gauge of the plant's cost efficiency compared to similar plants nationally. On average, nuclear plants in the United States have consistently reduced their cost of power in recent decades by operating more efficiently.⁹ For purposes of comparison to the rest of the nuclear industry, the benchmark cost of power reflects operations and maintenance expenses but not nuclear fuel costs.

The cost of CGS power for the period 2005 to 2007 stood above average for single large station nuclear plants. This was the result of operations and maintenance costs in or near the highest quartile of comparable plants nationally. However, EN projected that the plant's cost of power would begin to level off, reflecting improving efficiency and generation, as major maintenance issues were addressed in coming years.

Since adopting the performance standards to track improvements in CGS operations, BPA leadership and staff have met and continue to meet on a quarterly basis with EN to review performance indicators and progress in CGS maintenance and capital upgrades. The meetings are designed to promote timely communication between BPA and EN and to identify and address concerns so the two organizations can work together to strengthen CGS performance. The meetings have monitored EN's forecasts of more consistent power generation, fewer unexpected outages and a better safety record illustrated by reduced employee radiation exposure and accidents.

⁹ U.S. Electricity Production Costs and Components, Nuclear Energy Institute, May 2009.

Accelerating investment

Funding for capital and other improvements at CGS increased quickly, with more than \$119 million invested in replacing and updating equipment by 2007, according to EN's 2007 annual report. For example, the main turbine control system was replaced with a triple-redundant, fault-tolerant system designed to significantly improve equipment and plant reliability. In addition, two major feedwater heaters were replaced, and many pumps, motors, valves and other essential equipment were either replaced or overhauled. These steps should improve the long-term reliability of the plant.

Operations and maintenance budgets for CGS from 2005-2006 were higher than the industry median and have risen further since 2007. O&M budgets from 2007-2009 remained in the highest quartile of the industry and above the budgets of typical nuclear plants not within a fleet. The plant's O&M budget in 2009 increased by at least a third over the budgets of other refueling outage years.¹⁰

Staffing is also a large driver of nuclear plant O&M budgets. EN projected three years ago that staffing levels would decrease as plant management addressed maintenance issues and improved efficiency.¹¹ However, staffing levels have increased by approximately 10 percent in that time, placing CGS in the highest quartile of comparable single large station nuclear plants according to the number of full-time equivalent positions. EN expects further spending increases through 2011 as upgrades and replacements continue. Much of the CGS budget will continue to cover staffing costs.

Part 2: Results

The industry performance indicators that EN and BPA agreed upon as the appropriate benchmarks for CGS operations have not shown the improvement that EN projected. An unusual number of breakdowns and outages have compromised the plant's operational and generation performance. As measured by the industry benchmarks, the performance of CGS compared to other nuclear plants has declined since the beginning of the investment campaign designed to elevate plant performance. EN executives have indicated at briefings and in reports that the plant's performance has fallen short of their expectations and that improvements are essential.¹²

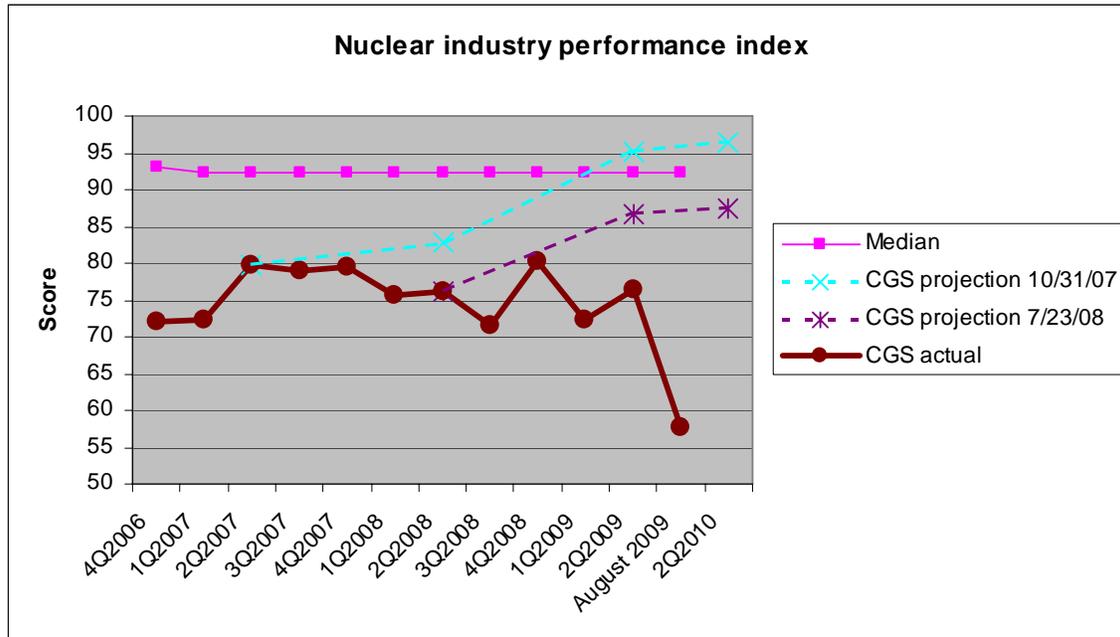
While CGS has ranked within the lowest quartile of nuclear plants since mid-2004, its quarterly rankings improved somewhat in 2007, about the time EN sought and began receiving additional funding. Modest improvement from there would have moved the plant out of the lowest quartile nationally. This held promise as the start of the improved performance trajectory that EN had set as a goal. In 2008, EN leadership reported that

¹⁰ David Oatley Consulting, 2009.

¹¹ IPR, 2008.

¹² Columbia Generating Station, Fiscal Year 2009 Business Plan, EN.

plant performance was improving as a result of the increased investments.¹³ However, the plant's quarterly performance rankings have since declined, with the exception of one slightly higher ranking in December 2008. CGS monthly scores most recently dropped in August to the plant's lowest such score in more than a decade.



The result is that CGS has not met the performance projections that EN outlined in its justifications for the increased budgets and spending. As the plant's performance did not show the predicted improvements in 2007 and 2008, EN revised its projections downward. In 2007, EN had forecast the CGS performance scores would place it close to the highest quartile of plants nationally by 2009. But EN later reduced its 2009 forecast to place CGS in the next-to-lowest quartile.¹⁴ The actual year-end score in June 2009, the end of EN's fiscal year, kept the plant in the lowest quartile nationally.

The past few months have proved especially difficult. EN executives stressed the importance of the plant's spring 2009 refueling outage and committed to extra planning and preparation to ensure the outage was completed on time and under budget.¹⁵ However, the outage ran more than eight days longer than planned and was followed by three more unexpected outages, one of which kept the plant out of service for all of August 2009. This has further depressed the plant's performance indicators. The plant's August performance score was significantly lower than when BPA began providing

¹³ IPR, 2008

¹⁴ EN performance index projections: October 31, 2007; January 23, 2008; May 12, 2008; July 23, 2008; April 7, 2009.

¹⁵ Fiscal Year 2009 Business Plan, EN.

additional funding three years ago and was the lowest CGS score on record using current parameters.

The plant's cost of power also has not reflected the increased efficiency that EN outlined in its justifications for increased budgets and spending. This is fundamentally because the increased budgets have not been accompanied by improved generation. Although the higher budgets were expected by EN and BPA to temporarily drive up the cost of power for several years, initial projections showed that the cost of power would level off and then begin declining. There is little sign of such a shift so far.

In EN's long-range plan prepared with the 2008 CGS budget, EN projected a 2009 cost of power of \$45 per megawatt-hour.¹⁶ EN's 2009 CGS budget increased that estimate to \$48.24/MWh.¹⁷ The actual CGS cost of power for fiscal 2009 was \$49.36/MWh.¹⁸ This escalation in the cost of power was largely the result of unplanned outages that reduced generation below expectations. EN's latest projections show that the cost of CGS power is on average expected to continue increasing, with some year-to-year variations reflecting the biennial refueling cycle, though 2017.

Data from other nuclear plants indicate that operators should not have to choose between cost and safety or reliability. Many plants that consistently perform in the top quartile also deliver power at average or better costs.

Although the plant's cost of power has climbed, CGS remains extremely valuable as a generating asset that does not emit carbon dioxide. Although power prices will vary greatly as market fundamentals shift, recent estimates show the price of power purchased on the market for a five-year period comparable to CGS operations would run about \$50/MWh to \$60/MWh, which includes the risk of additional carbon costs that may be attached to power during that time. If carbon costs were actually imposed, market prices would be expected to rise further. New wind power, which does not emit carbon dioxide, would currently cost in the range of \$110/MWh to \$125/MWh, when purchased in a flat block of steady generation equivalent to CGS output.

Loss of the carbon-free power produced by CGS would also have serious environmental consequences. Replacing CGS power in the near-term with market purchases, generated at least in part by burning fossil fuels, would increase the carbon emissions of the FCRPS by approximately 3.7 million metric tons per year. This is calculated based on CGS' average annual output of 1,030 aMW in 2008, a non-refueling year, and marginal carbon dioxide emissions rates provided by the Northwest Power and Conservation Council.¹⁹

¹⁶ Fiscal Year 2008 CGS Long Range Plan.

¹⁷ EN Fiscal Year 2009 CGS Annual Operating Budget.

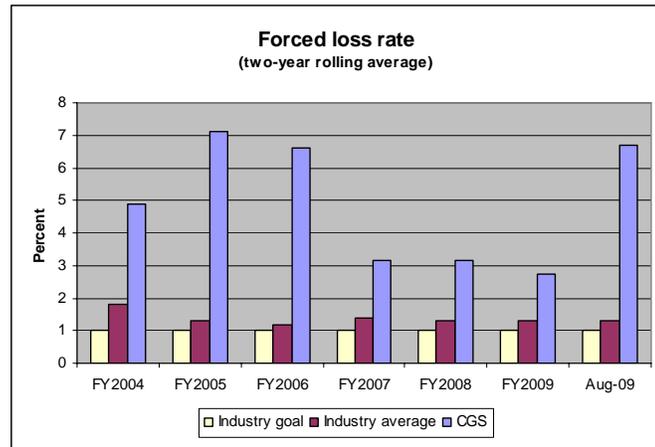
¹⁸ EN Monthly Financial Cost Report June 2009.

¹⁹ Marginal Carbon Dioxide Production Rates of the Northwest Power System, Northwest Power and Conservation Council, June 13, 2008.

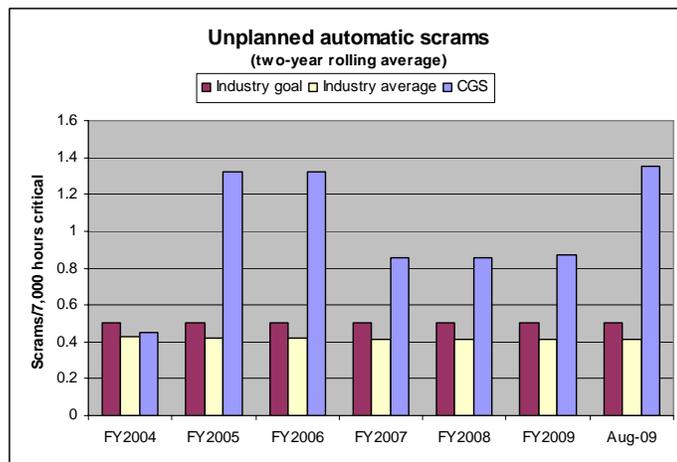
Generation issues

The reasons that the plant has not met its performance goals relate mainly to the most heavily weighted factors in its benchmark scores. These include its capability factor, forced loss rate, unplanned outages, unexpectedly long refueling outages and other factors such as collective radiation exposure. A complex operation such as CGS reasonably requires time to translate increased investment into stronger performance. But plant performance and future projections do not show that CGS performance is moving in the positive direction that EN and BPA both anticipated when the increased investments began.

The most prominent factor affecting CGS performance indices and cost of power in recent years has been its inconsistent power generation. In six of the last eight years, CGS has not produced the amount of power EN had budgeted. The CGS capability factor index has not exceeded 90 percent in recent years, placing it in the third or fourth quartile nationally. The plant's annual forced loss rate, which represents power losses caused by breakdowns or errors, has measured more than twice the industry average for more than five years.



This is a consequence of unexpected outages and reductions in power. These can come in many forms. For example, unplanned scrams can shut down the plant without notice. The U.S. nuclear industry averages 0.5 unplanned automatic scrams per year, according to the Nuclear Energy Institute.²⁰ CGS has averaged about twice that rate of scrams since 2005, including at least three automatic scrams during each of the last two operating cycles. During the most recently completed generation cycle at CGS, equipment failures caused four automatic scrams, two additional forced outages and five deep



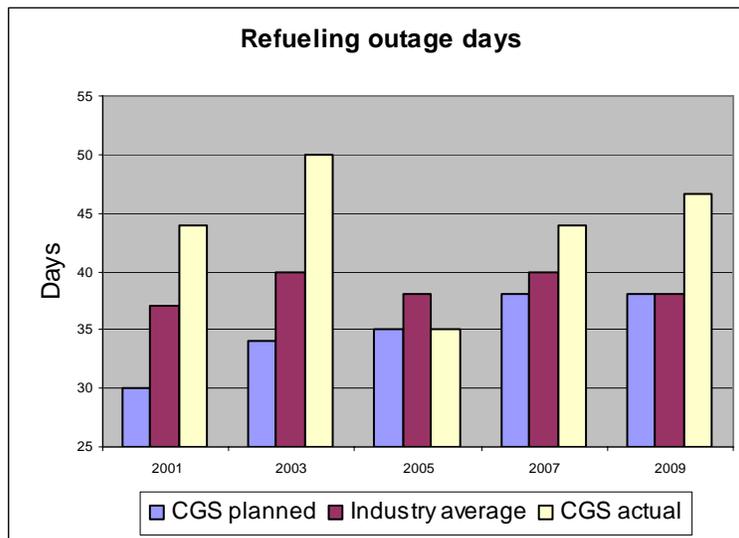
²⁰ U.S. Nuclear Unplanned Automatic Scrams, NEI, April 2009.

down-powers to repair plant equipment. These significantly eroded the plant's generation of power.

Extended outages

EN plans its biennial refueling outages in advance, with the goal of minimizing the length of the outage and maximizing the efficiency of refueling efforts as well as maintenance and capital replacements that take place at the same time. The length of refueling outages affects the regional power supply, so BPA coordinates its power resources to account for the planned outages. However, four of the last five refueling outages have exceeded their planned lengths, lasting an average of almost nine extra unanticipated days per outage. The actual lengths of the last four outages averaged 44 days, longer than the current industry average of 38 days, according to the Nuclear Energy Institute.²¹

In addition, the plant has not operated reliably within the first several weeks following its refueling outages. For example, each of the last three refueling outages was followed within 45 days by two forced shutdowns. These unplanned and often lengthy shutdowns have the net effect of extending the refueling outages. This lost operating time depresses CGS generation and therefore causes the plant's capability factor to decline.



The last refueling outage, completed in July 2009, was forecast by EN to last 38 days. However, unexpected challenges and delays actually extended the outage to 46.6 days. A forced shutdown just after the refueling outage and an additional seven days of reduced generation at about one-half of normal operations further contributed to lost generation in July. A

second shutdown caused by a fire in early August kept the plant out of service for most of August. Each day that CGS remains off-line equates to a value of about \$1 million a day worth of lost power, although the value will vary significantly depending on market prices at the time. BPA estimates that the unplanned outages in the summer of 2009 had a net cost of about \$50 million.

Refueling outages will remain challenging. EN is currently planning its most complex refueling outage ever, which will take place in 2011. It will include refueling as well as

²¹ U.S. Nuclear Refueling Outage Days, NEI, January 2009.

replacement of the plant's main condenser and major upgrades to nuclear instrumentation in the control room.

In response to recent trends, EN rolled out a "Pride in Performance" initiative, designed to foster improvements in five key areas: radiological safety, outage readiness, leadership effectiveness, equipment reliability and safety and human performance. EN plans to identify performance gaps in each area and use its findings to develop a plan for meeting and exceeding industry standards. EN has also begun a strategic review of recent CGS performance by industry experts. These positive steps have potential to bring increased commitment and expertise to bear on the challenges facing CGS. However, EN has undertaken similar efforts before. The complexity of the upcoming condenser replacement makes it more important than ever that these efforts deliver improved performance.

A few indicators at CGS, such as industrial safety, have shown positive trends in recent years. EN has demonstrated that it can address problematic issues by adopting a list of the top 10 equipment issues at the plant and focusing on them to successfully shorten the list. However, other critical areas where performance has either not improved or declined – such as generation reliability – have outweighed these improvements in terms of the plant's overall performance scores.

In summary, the additional investments and capital replacements at CGS have not yet translated overall into stronger performance, as EN predicted. This is not to suggest the investments have been wasted. The funds have supported upgrades that should improve the plant's long-term safety, reliability, generation and efficiency. Such improvements should reasonably take time and come in increments, which is why BPA and EN agreed to monitor the plant's operations and its performance standards closely. The monitoring, however, does not show signs of the improved trends or incremental benefits that were expected to accompany the investments. In fact, the plant's most recent scores indicate that overall performance has deteriorated to the lowest point in more than a decade.

Part 3: Projected 2010/2011 CGS budgets

BPA commends EN for developing a much more rigorous long-term budgeting and planning process in the last few years and a greater commitment to managing to its long-term plan. This commitment gives BPA greater confidence in CGS budgets.

EN sought and received further budget increases for CGS during the BPA ratemaking process for 2010 and 2011 as its efforts to address equipment obsolescence and improve the plant's safety, reliability, generation and efficiency continue. The CGS budget will rise significantly in 2011. The extended refueling outage planned for in 2011 will involve the complete replacement of the plant's condenser tubes. This will make the outage particularly expensive and complex and will require substantial extra power purchases by BPA to replace lost CGS generation over the course of the outage.

The original 2009 CGS operations and maintenance budget as reflected in the 2007-2009 rate case totaled \$242.9 million, which rose to \$274.3 million in the subsequent supplemental rate proposal. The final 2009 supplemental rate case totaled \$293.7 million, reflecting continued spending increases. The initial 2010 budget for CGS totaled \$269.2 million, with the 2011 budget totaling \$365 million, primarily because of the additional costs for the outage that will accommodate the condenser replacement. BPA revisited its budget in light of significantly reduced revenue during the 2010-2011 period and worked with EN to reduce the forthcoming CGS budgets to \$257.9 in 2010 and \$324.9 in 2011. This was accomplished primarily by moving fuel purchase costs out of this rate period and taking advantage of fuel costs that proved lower than expected.

Condenser replacement

EN and BPA agree the condenser replacement is especially important to improving the plant's long-term reliability and, in turn, its performance scores. The condenser has been the source of chronic leaks since CGS began operations in 1984, resulting in more than 20 shutdowns or down-powers to repair the leaks. The plant staff has also expended considerable effort and cost to perform condenser cleaning and tube plugging when the plant was off-line for refueling outages. EN analyses indicate that reliable operation of the plant cannot be assured beyond 2015 unless the condenser is replaced.²²

The impacts of the repeated condenser leaks extend beyond the plant's power generation. They also substantially increase CGS operational costs. Condenser leakage has been identified as the root cause of fuel rod corrosion, leading to changes in CGS chemistry controls and additional costs for coolant system decontamination. The plant's chemistry costs are also higher than comparable plants because demineralizers must be changed more frequently and increased chemical treatment is required in conjunction with circulating water treatment designed to reduce impurity concentrations. In addition, checking for and identifying leaks in the condenser is very costly. Finally, the cost of replacement power to offset generation losses attributed to condenser leaks has cost more than \$12 million since 2001, according to an EN white paper update in 2006.²³

The serious and far-reaching nature of the problems surrounding the steam condenser make its successful replacement that much more critical. While BPA had concerns about the cost of this action when it first arose years ago, BPA is convinced that this is a necessary investment that should proceed expeditiously. EN has been planning several years for the 2011 outage, when the replacement will take place. The execution of this outage and the complex work it will involve will be especially vital in setting the plant on a course to improve its reliability and efficiency in coming years.

²² Condenser Replacement Project Update, EN, March 26, 2008.

²³ Columbia Generating Station, Main Condenser, Addendum 1, EN.

Performance forecasts

Although EN has extended its timeline for improvements in CGS operations, EN's recent projections continue to show the plant's performance improving in coming years. Since the plant has not met EN's goals for fiscal year 2009, EN will recalculate its projections based on the plant's recent performance and revised expectations. The most recent published EN projections indicated that the plant's performance ranking should rise to near average, compared to the rest of U.S. plants, within the next two years. From 2012 onward, following the replacement of the problematic steam condenser, EN forecasts that the plant's performance should improve quickly, moving the plant into the top quartile of nuclear plants nationally by 2013.

EN also forecasts that increases in the cost of CGS power should reach a high point in 2011, as a result of the additional expenses surrounding the condenser replacement. EN projects that the cost of power will then moderate, leveling off over subsequent years and then declining modestly as the plant's efficiency improves.

Part 4: BPA recommendations

BPA's priority for CGS is for the nuclear plant to deliver safe, reliable and cost-effective energy as a valuable component of the region's power system. BPA supports EN's continuing attempts to strengthen the plant's performance, but also remains accountable for ratepayer funds spent on CGS operations. BPA is therefore increasingly concerned about the rapid increase in CGS spending combined with the lack of measurable improvements in performance. We believe EN management shares our concern. These trends underscore the need for new direction, focus and commitment. BPA and EN must together ensure that the region's ongoing investments in the plant begin to yield the performance improvements that were anticipated.

Those improvements should be within reach. Other single-unit, non-fleet nuclear plants similar to CGS regularly display top-quartile performance. A recent review indicates that the top quartile of single-station plants displays a higher average performance score than the top quartile of fleet plants. Although CGS has now operated for more than 25 years, other nuclear plants of similar age and design have demonstrated superior reliability and efficiency. Some such plants have encountered operational challenges and then subsequently demonstrated impressive turnarounds in performance.

For example, Nebraska Public Power District's Cooper Nuclear Station began operating about 10 years before CGS. After the Cooper plant's reliability deteriorated and the plant faced scrutiny from the NRC, NPPD contracted with Entergy Corporation to manage the plant. Entergy, the second largest nuclear fleet operator in the nation, brought a new

management team and stronger organizational focus to the plant, which now exhibits much improved reliability and is in good standing with the NRC.

BPA seeks to sustain the strong safety record at CGS while working with EN to promote and improve the plant's reliability and efficiency. BPA recognizes that EN and CGS need time to translate increased investments into consistently better performance. However, time alone will not help in the absence of appropriate focus and direction. In that light, BPA recommends the following changes and improvements:

- **New leadership:** The upcoming CEO vacancy is a critical crossroads for EN, probably the most important decision the Executive Board will make. The new CEO must focus singularly on improving plant safety, reliability and generation output at a reasonable cost. We strongly encourage the selection of a CEO who has demonstrated capability to turn around nuclear plant performance. We also believe the CEO should be clearly and directly accountable for CGS operations. We appreciate that the EN Board has sought public input regarding the criteria for the CEO selection. Our input has been provided. BPA also strongly urges EN to engage BPA extensively in the CEO selection process given that BPA ratepayers are wholly accountable for the costs of CGS plant performance including any safety and reliability issues.
- **Vigilant, focused Executive Board:** The deteriorating situation at CGS indicates a need for reordered priorities. We encourage the Executive Board to focus on strengthening the nuclear plant's performance. This should be the highest priority, ahead of pursuing other strategic opportunities including new generation development. We strongly encourage the Board to spend more of its time on CGS performance issues.
- **Dedicated nuclear oversight:** BPA understands the Executive Board is considering creation of a committee focused on oversight of the nuclear plant. It has been proposed that the Corporate Nuclear Safety Review Board report to and provide input to this new committee. BPA strongly supports this action to elevate and intensify the Executive Board's supervision of nuclear operations, using industry expertise for advice and guidance.
- **Addition of nuclear experience to the Executive Board:** The Executive Board has substantial responsibilities. Operating a nuclear plant is an extremely complex proposition that requires substantial expertise and training. For many years there has been no individual on the EN Executive Board with experience as a senior management officer for an entity responsible for operating a nuclear plant. EN management would benefit if its responses to strategic challenges were informed by a debate with a board that includes members with nuclear plant operating experience. This demonstrated need should guide upcoming appointments.
- **Strengthened BPA partnership:** The performance of CGS is integral to BPA's success, and BPA will support and contribute to improvements in that performance. Problems at CGS are problems for BPA. We encourage the Executive Board to endorse the overarching principle BPA proposed in 2007 as a

foundation for a cooperative and constructive partnership. As the sole customer for CGS power, BPA wants a collaborative relationship based on integrated effort. BPA is prepared to increase its efforts to make CGS successful.

- **Performance improvement initiative:** BPA believes significant improvements are being made in EN's long-range planning. BPA endorses EN's new "Pride in Performance" initiative and its goals of improving staff and plant operations in key areas including radiological safety, outage readiness, leadership effectiveness, equipment reliability and safety and human performance. However, BPA also believes EN should clearly outline steps to ensure that that this positive action proves more successful than similar previous efforts. Finally, BPA believes the performance indicators need to be reestablished so that future performance can be appropriately evaluated.

EXECUTIVE SUMMARY: Columbia Generating Station performance

October 2009

Bonneville Power Administration

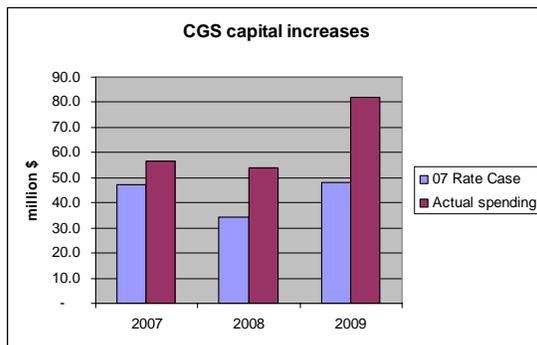
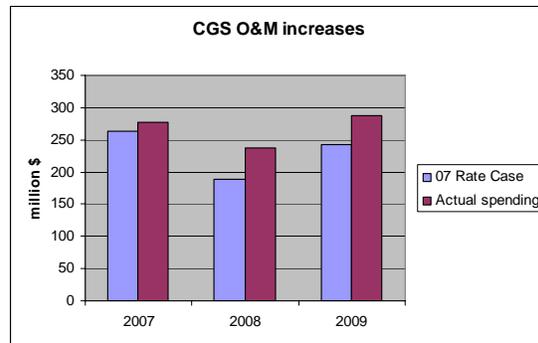
Overview

Energy Northwest (EN) and the Bonneville Power Administration (BPA) share responsibility for Columbia Generating Station (CGS): EN owns and operates CGS while BPA funds the nuclear plant and markets its power. EN and BPA view CGS as a valuable source of carbon-free power that is being operated safely. We jointly seek improved plant performance, defined through measurements of safety, power generation, reliability and efficiency. BPA is committed to working with EN to support and promote the improved performance that both organizations want.

This report

BPA assembled this report to describe the region's increasing investments in CGS and the plant's performance in the years since those investments began. BPA intends this report and its recommendations to focus and motivate constructive change and strengthened performance at CGS. The report draws on information provided by Energy Northwest, BPA's own budget and other data, nuclear industry statistics and the expertise of a nuclear industry executive contracted by BPA to provide independent input.

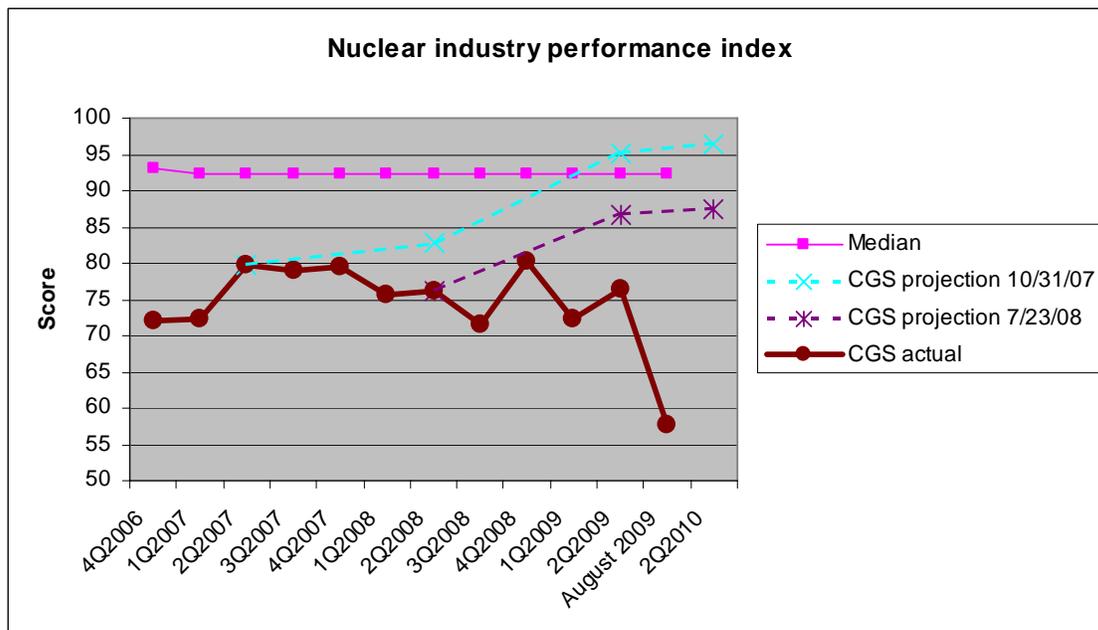
Columbia Generating Station, near Richland, is Washington's only nuclear plant. A nuclear industry index based heavily on the plant's generation and reliability record has placed its performance within the lowest quartile of 104 nuclear plants in the United States since mid-2004. This followed years in which BPA cut its own costs and asked partners including EN to tighten budgets, without jeopardizing safety or reliability, to help offset major power rate increases resulting from the West Coast Energy Crisis. In 2007 EN budgeted for significantly increased BPA funding to improve performance at CGS, subsequent to the establishment of BPA's rates. BPA provided the additional funding and has supported increased spending at CGS in all successive years through 2011.



From all evidence available to BPA, CGS is being operated safely. CGS remains a very cost-effective resource that emits no carbon dioxide. In the future, as carbon costs are included in electricity pricing, we would expect CGS to become even more valuable. Replacing CGS power in the near-term with market purchases, generated at least in part by burning fossil fuels, would increase the carbon emissions of the Federal Columbia River Power System by approximately 3.7 million metric tons annually.

EN and BPA agreed to track plant progress using common industry performance measures for safety, reliability and efficiency, as well as the additional measure of cost of power. EN predicted in 2007 that the added spending would strengthen CGS performance enough by 2009 to move the plant into the top quartile of plants nationally, as measured by a widely used nuclear industry composite performance score that emphasizes reliability.

The plant has not met these projections. Continuing equipment problems and unexpected outages have combined to keep CGS in the bottom quartile of nuclear plants. CGS performance scores have declined substantially since the increased investments began and in August reached their lowest point in more than a decade. Although the plant's safety record is solid, CGS performance now ranks very close to the bottom of all nuclear plants. EN executives have agreed that CGS performance in recent years has not met their expectations and that operations must improve. There is a substantial need for evaluation, new commitment and direction at CGS.



While a complex operation such as CGS may require time to translate increased investments into stronger performance, there is little evidence of a positive trend. The primary reasons include:

- Frequent shutdowns and power losses:** The CGS forced loss rate, which measures power losses caused by breakdowns or errors, has consistently measured more than twice the industry average. CGS has experienced about twice the industry average number of scrams, which are usually automatic shutdowns caused by malfunctions.
- Unexpectedly long outages:** Four of the last five CGS refueling outages exceeded their planned length, and the last three refueling outages have each been followed by two forced shutdowns. The last shutdown lasted almost all of August.

BPA supports EN's attempts to strengthen CGS performance, but is also accountable for ratepayer funds spent on plant operations. BPA is concerned about the rapid spending increase combined with the lack of measurable improvements in generation and reliability. Although CGS has operated for more than 25 years, other nuclear plants of similar age and design have demonstrated superior reliability and efficiency and successfully reversed performance declines.

BPA believes EN and BPA should work together to evaluate the situation and define solutions, but there are some actions that we encourage moving forward on now:

- **New leadership:** The upcoming CEO vacancy is a critical crossroads for EN, probably the most important decision the Executive Board will make. The new CEO must focus singularly on improving plant safety, reliability and generation output at a reasonable cost. We strongly encourage the selection of a CEO who has demonstrated capability to turn around nuclear plant performance. We also believe the CEO should be clearly and directly accountable for CGS operations. We appreciate that the EN Board has sought public input regarding the criteria for the CEO selection. Our input has been provided. BPA also strongly urges EN to engage BPA extensively in the CEO selection process given that BPA ratepayers are wholly accountable for the costs of CGS plant performance including any safety and reliability issues.
- **Vigilant, focused Executive Board:** The deteriorating situation at CGS indicates a need for reordered priorities. We encourage the Executive Board to focus on strengthening the nuclear plant's performance. This should be the highest priority, ahead of pursuing other strategic opportunities including new generation development. We strongly encourage the Board to spend more of its time on CGS performance issues.
- **Dedicated nuclear oversight:** BPA understands the Executive Board is considering creation of a committee focused on oversight of the nuclear plant. It has been proposed that the Corporate Nuclear Safety Review Board report to and provide input to this new committee. BPA strongly supports this action to elevate and intensify the Executive Board's supervision of nuclear operations, using industry expertise for advice and guidance.
- **Addition of nuclear experience to the Executive Board:** The Executive Board has substantial responsibilities. Operating a nuclear plant is an extremely complex proposition that requires substantial expertise and training. For many years there has been no individual on the EN Executive Board with experience as a senior management officer for an entity responsible for operating a nuclear plant. EN management would benefit if its responses to strategic challenges were informed by a debate with a board that includes members with nuclear plant operating experience. This demonstrated need should guide upcoming appointments.
- **Strengthened BPA partnership:** The performance of CGS is integral to BPA's success, and BPA will support and contribute to improvements in that performance. Problems at CGS are problems for BPA. We encourage the Executive Board to endorse the overarching principle¹ BPA proposed in 2007 as a foundation for a cooperative and constructive partnership. As the sole customer for CGS power, BPA wants a collaborative relationship based on integrated effort. BPA is prepared to increase its efforts to make CGS successful.

¹ Proposed overarching principle: *BPA and EN are committed to working in a mutually supportive fashion to ensure long-term safe, reliable operation of CGS accomplished at the lowest reasonable cost necessary to achieve those objectives. It is also our objective to integrate CGS with the Federal Columbia River Power System and to achieve optimum utilization of the resources of that system taken as a whole and to achieve efficient and economical operation of that system.*

- **Performance improvement initiative:** BPA believes significant improvements are being made in EN's long-range planning. BPA endorses EN's new "Pride in Performance" initiative and its goals of improving staff and plant operations in key areas including radiological safety, outage readiness, leadership effectiveness, equipment reliability and safety and human performance. However, BPA also believes EN should clearly outline steps to ensure that that this positive action proves more successful than similar previous efforts. Finally, BPA believes the performance indicators need to be reestablished so that future performance can be appropriately evaluated.