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IDAHO PUBLIC
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BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF IDAHO POWER COMPANY'S APPLICATION FOR AUTHORITY TO INCREASE ITS RATES FOR ELECTRIC SERVICE TO RECOVER COSTS ASSOCIATED WITH THE NORTH VALMY POWER PLANT.	CASE NO. IPC-E-16-24

IDAHO POWER COMPANY

DIRECT TESTIMONY

OF

TOM HARVEY

Q. Please state your name, business address, and present position with Idaho Power Company ("Idaho Power" or "Company").

A. My name is Tom Harvey and my business address is 1221 West Idaho Street, Boise, Idaho 83702. I am employed by Idaho Power as the Resource Planning and Operations Director in the Power Supply Department.

Q. Please describe your educational background.

A. I have a Bachelor of Business Administration in business management from Boise State University. I also attended the University of Idaho's *Utility Executive Course* in 2011.

Q. Please describe your work experience with Idaho Power.

A. I was hired by Idaho Power in July 1980 to work in the Plant Accounting Department. I continued working in the accounting area through 1985. From 1985 through 2009, I was the Fuels Management Coordinator and then was promoted to the Joint Projects Manager. In April 2015, I was promoted to my current position, Resource Planning and Operations Director. My current responsibilities include supervision over Idaho Power's jointly owned coal assets, integrated resource planning, cloud seeding program, river engineering, streamflow gaging, and operations hydrology.

Q. What is the purpose of your testimony in this case?

A. The purpose of my testimony is to discuss the prudence of investments made at the North Valmy power plant ("Valmy") that have added to the associated plant balances since the Company's last depreciation rate update became effective on June 1, 2012, and to inform the Idaho Public Utilities Commission of necessary future investments at the plant to ensure Valmy continues to be available for reliable load service through the end of 2025. My testimony also presents Valmy's current position in the Company's generation portfolio and the results of an analysis performed by Idaho Power that supports the proposed depreciable life at Valmy reflecting an end-of-life date as of December 31, 2025.

Q. Please describe the Valmy plant.

A. Valmy is a coal-fired power plant that consists of two units and is located near Winnemucca, Nevada. Unit 1 went in service in 1981 and Unit 2 followed in 1985. Idaho Power owns 50 percent, or 284 megawatts[1] ("MW") (generator nameplate rating), of Valmy. NV Energy also has 50 percent ownership and is the operator of the Valmy facility. Idaho Power and NV Energy work jointly to make decisions regarding any environmental investment,

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[1] For planning purposes, Idaho Power uses the net dependable capability of 262 MW.

plant retirement, or conversion. The plant is connected via a single 345 kilovolt transmission line to the Idaho Power control area at the Midpoint substation. Idaho Power has the northbound capacity and NV Energy has the southbound capacity of this line.

Coal for the plant is shipped via railroad from various mines in Utah, Wyoming, and Colorado. The power plant uses a variety of emissions control technologies, including state-of-the-art fabric filters that remove more than 99 percent of particulate emissions. Additionally, a Dry Sorbent Injection ("DSI") system has been installed on Unit 1 to reduce acid gas emissions and flue-gas scrubber technology is utilized on Unit 2 for the reduction of sulfur dioxide emissions.

I. VALMY OPERATIONS AND INVESTMENTS SINCE 2011

Q. Company witness Matthew Larkin states in his direct testimony that the current depreciable life at the Valmy plant reflects a 2031 end-of-life for Unit 1 and a 2035 end-of-life for Unit 2. What resource planning analyses did the Company prepare based on the 2031 and 2035 end-of-life assumptions for Valmy approved in the last depreciation study?

A. A 2031 end-of-life for Unit 1 and a 2035 end-of-life for Unit 2 was used in the Idaho Power prepared Coal Unit Environmental Investment Analysis for the Jim

Bridger and North Valmy Coal-Fired Power Plants ("2013 Coal Study"). This analysis guided Idaho Power's Valmy-related decisions until the preferred portfolio selected as part of the 2015 Integrated Resource Plan ("IRP") concluded that a 2025 end-of-life assumption for Valmy would provide a more favorable economic outcome as compared to the previous operating life assumptions.

The analysis performed for the 2013 Coal Study examined future investments required for environmental compliance at existing coal units and compared those investments to the costs of two alternatives: (1) replacing such units with combined cycle combustion turbine units or (2) converting the existing coal units to natural gas. The 2013 Coal Study was included as an exhibit to my testimony in Case No. IPC-E-13-16.[2]

Q. What was the result of the analysis for Valmy in the 2013 Coal Study?

A. At the time the study was prepared, it was determined that continued operation of Unit 1 until 2031 and Unit 2 through 2035 was economic, with the only notable environmental investment required at Valmy being to install DSI for compliance with the Mercury and Air Toxic Standards ("MATS") regulation on Unit 1. Valmy is not subject to the

[2] Idaho Power's Application for a Certificate of Public Convenience and Necessity for the Investment in Selective Catalytic Reduction Controls on Jim Bridger Units 3 and 4.

Regional Haze Best Available Retrofit Technology ("RH BART") regulations; therefore, no additional controls were required for compliance with the RH BART regulations. Idaho Power concluded that installation of the DSI system was a low-cost approach to retain a diversified portfolio of generation assets for customers and that continued operation of Unit 1 would provide fuel diversity, helping to mitigate risk associated with natural gas prices. Thus, the Company continued to include Valmy in its generation portfolio for the 2013 IRP and future resource planning.

Q. Please describe the operations of Valmy as identified in the preferred portfolio analyzed in the 2013 IRP.

A. Although Idaho Power analyzed ceasing operations at Valmy in 2021 and 2025 as part of the 2013 IRP, the preferred resource portfolio included continued operations of the Valmy coal facility in full compliance with environmental regulations through the 2013 IRP planning period (2013-2032). Consistent with the assumptions applied in the 2013 Coal Study, continued coal operations were expected to require advanced financial commitment in 2012 for the installation of DSI emission control systems, approximately three years prior to their installation and operation.

Q. Did Idaho Power commit financially and subsequently install the DSI emission control systems required at Valmy?

A. Yes. In 2012, Idaho Power committed financially to the DSI investments required on Unit 1 to meet the MATS regulation. Installation of the required emission control systems was complete in the spring of 2015.

Q. With the DSI emission control system investments completed on Unit 1, are both units at Valmy in compliance with all known environmental regulations?

A. Yes. However, subsequent to the 2013 Coal Study, it was determined that because of the existing condition of the scrubber on Unit 2, the scrubber would need to be upgraded to meet the acid gas portion of the MATS regulation. The scrubber upgrade on Unit 2 was completed in 2015. With existing investments, Valmy is in compliance with all current environmental regulations.

Q. Are there any future environmental regulations that could affect Valmy?

A. At this time there are three environmental regulations that have the potential to affect Valmy in the future: the National Ambient Air Quality Standards ("NAAQS"), Regional Haze, and the Federal Environmental Protection Agency's Clean Air Act Section 111(d)

("111(d)"). All impact areas for NAAQS are in attainment and the state of Nevada is well below the Reasonable Progress glide slope under the Regional Haze regulation so no additional controls are anticipated at this time. Finally, although there is still uncertainty around the effect of final regulation related to 111(d), it is anticipated that Valmy will be able to meet all targets set by the final rule.

Q. Idaho Power's last general rate case used a 2011 test year as a basis for plant values, which included $148 million in Valmy-related plant. However, Mr. Larkin indicated that current Valmy plant balances as of July 31, 2016, are approximately $217 million. Please explain what is driving the approximately $70 million increase in the Valmy balances from the 2011 test year to July 31, 2016.

A. There have been a number of investments required at Valmy over the last four and a half years to ensure the plant remains operational in a safe, efficient, and reliable manner, including investments required to ensure environmental compliance as well as a number of investments for routine maintenance and repair.

Q. Have you prepared an exhibit detailing the investments made since the last general rate case?

A. Yes. Exhibit No. 4 details the investments made at Valmy since the last general rate case, including the investment by year and a classification as to whether the investment was for environmental compliance, the safe and economic operation of the plant, or for reliability purposes. Exhibit No. 4 also includes a description and justification for each of the investments.

Q. Does Idaho Power perform a review of the planned capital projects prior to any investments being made at Valmy?

A. Yes. For all planned capital projects, Idaho Power receives from the plant operator, NV Energy, a description of the project, the factors driving the need for the project, and a recommendation for the work to be performed.

Q. Were all of the projects comprising the approximately $70 million in investment that occurred between the 2011 test year and July 31, 2016, necessary for either environmental compliance, the safe and economic operation of the plant, or for reliability purposes?

A. Yes.

Q. Please describe the investments made for environmental compliance since 2011.

A. The investments made for environmental compliance include DSI installation and coal pipe replacement on Unit 1, the scrubber upgrade on Unit 2, the coal crusher belt feeder project, dust collector upgrade, caustic tank building replacement, evaporation pond liner replacement, bed demineralizer replacement, and the coal combustion residual compliance project.

Q. What investments were made for the safe, reliable, and economic operation of the plant?

A. To maintain the safe and reliable operation of the plant, the cooling towers on both units were replaced, the circulating water lines were recoated, the mechanical/electrical shop was redesigned for increased productivity, and the cathodic protection system was upgraded. In addition, Unit 1 required the replacement of the reheat tube and secondary tube sections of the boiler and the sootblower system. Similarly, it was essential that Unit 2 undergo a rebuild of the bottom ash hydrobin, a burner and primary air duct replacement, a generator phase end turn design betterment project, steam valve hardening, and a primary superheat lower loop replacement. The capital investments made at Valmy since the last rate case were prudent and essential for continued operation of the plant.

II. VALMY'S POSITION IN IDAHO POWER'S GENERATION PORTFOLIO

Q. Please describe the preferred portfolio identified in the Company's 2015 IRP as it relates to Valmy operations.

A. Idaho Power analyzed a variety of retirement dates for Valmy as part of the Company's 2015 IRP. Results consistently indicated favorable economics associated with two significant resource actions: the Boardman to Hemingway ("B2H") transmission line and the early retirement of Valmy. The preferred portfolio selected for the 2015-2034 planning horizon contained both actions in the year 2025, with completion of the B2H transmission line preceding the end-of-year coal plant retirement.

Q. What were the factors driving the 2025 Valmy end-of-life in the 2015 IRP preferred portfolio?

A. The preferred portfolio selected as part of the 2015 IRP process contained no other resource additions through the end of the 2020s. In addition to the absence of resource needs, the resource sufficiency through the early 2020s shielded the preferred portfolio from risk exposure associated with the following near-term uncertainties identified: planned but yet-to-be-built Public Utility Regulatory Policies Act of 1978 (PURPA) solar facilities, 111(d)'s proposed regulations, the completion date of B2H, and the alignment of Valmy's early retirement date with NV Energy.

Q. What was the action plan for Valmy's 2025 end-of-life date as identified in Idaho Power's 2015 IRP?

A. The 2015-2018 action plan recognized in the 2015 IRP included ongoing permitting, planning studies, and regulatory filings associated with the B2H transmission line during all four years, and indicated, in 2016, Idaho Power would work with NV Energy to synchronize depreciation dates and determine if a date could be established to cease coal-fired operations. This filing will synchronize depreciation rates between the two companies.

Q. How have changes in market energy prices in recent years impacted the value of Idaho Power's surplus energy or "off-system" sales?

A. In 2011, the average price Idaho Power received for off-system sales was $22.71 per MW compared to 2015 when the average price Idaho Power received for off-system sales was only $11.82 per MW. Moreover, year-to-date 2016, Idaho Power's average price for off-system sales is only $8.76 per MW.

Q. How does the decrease in the average price for off-system sales impact Valmy operations?

A. The significant decrease in market prices has resulted in a decrease in the number of hours Valmy operates economically, as the dispatch cost is now typically higher than the market price. The following chart details the decrease in Idaho Power's capacity factor at Valmy over the last eight years as a result of the decrease in market prices. NV Energy is experiencing a similar trend in its share of Valmy generation.

Year	Idaho Power's Dispatched Capacity Factor
2008	76%
2009	72%
2010	64%
2011	29%
2012	27%
2013	49%
2014	41%
2015	15%

Rather than a resource used to generate off-system sales, Idaho Power has been relying on Valmy to meet the Company's peak energy needs, preserving the balanced portfolio needed to reliably serve Idaho Power customers during all types of system conditions. For example, when extreme cold weather or extreme hot temperatures occur in the West raising market prices, Valmy is available to provide reliable energy and capacity to serve Idaho Power's customers. Absent Valmy's generation, the Company would be required to rely on market purchases on non-firm transmission, which may not be available to serve the load.

Q. If Valmy is currently being used to help Idaho Power reliably serve load, why is the Company proposing a 2025 end-of-life?

A. As shown in the preferred portfolio of Idaho Power's 2015 IRP, the economics of Valmy's operation are impacted in the long term, as new resources such as B2H or other operating facilities are available to maintain the balanced portfolio required to serve load reliably.

Q. Absent B2H, is it feasible to discontinue operations prior to 2025?

A. No. As previously stated, Idaho Power relies on Valmy to meet peak energy needs and to preserve the balanced portfolio needed to reliably serve customers during all types of system conditions. When extreme cold weather or extreme hot temperatures occur in the West, Valmy is providing reliable energy and capacity to serve customers. The Company's peak-hour load and resource balance analysis included on page 96 of the Company's 2015 IRP demonstrates that Idaho Power would have peak-hour capacity deficits beginning in 2020 if Valmy were retired in 2019. A copy of the 2015 peak-hour analysis is provided as Exhibit No. 5. As can be seen in Table 7.5 of Exhibit No. 5 under the line labeled "Valmy Retire Units 1 and 2 Year-End 2019," peak-hour deficits without Valmy generation capacity grow from 24 MW in 2020 to 236 MW by 2024.

Q. Please provide an example of how Valmy is currently being used to balance Idaho Power's portfolio and reliably serve customers.

A. In the summers of 2015 and 2016, Idaho Power's loads exceeded 2900 MW, resulting in market purchases between 300 to 500 MW to cover load while Valmy was economically displaced by the market purchases and operating at minimum levels. As the temperatures and load continued to rise, wind generation decreased and Idaho Power was unable to import additional market purchases to cover the load due to transmission constraints. During these hot afternoon time periods, Valmy was dispatched at or near capacity. Another example occurred in the fall and winter of 2014 and 2015. Valmy was dispatched during the Langley Gulch power plant maintenance outages as Fall Chinook spawning flows restricted hydro generation and there was not sufficient transmission capacity to reliably serve load with market purchases. Idaho Power will continue to rely on Valmy during similar circumstances in the future as load increases in the Company's service territory and until the addition of new resources that are available during peak hours or can provide additional transmission capacity.

III. CESSATION OF VALMY OPERATIONS

Q. Have Idaho Power and NV Energy agreed to a date to cease coal-fired operations at Valmy?

A. No. However, Idaho Power and NV Energy continue discussions working towards a mutually agreed upon closure date. Synchronized depreciation dates for ratemaking purposes will help in establishing a date to cease coal-fired operations.

Q. In his testimony, Company witness Mr. Larkin discusses the use of a 2025 depreciable end-of-life date by NV Energy for both units at the Valmy plant. Would it be feasible for Idaho Power to continue to utilize Valmy beyond 2025 if NV Energy was no longer an ownership partner?

A. No. If NV Energy establishes a closure date of 2025, Idaho Power's continued utilization of Valmy beyond 2025 would require negotiation with NV Energy to modify or terminate the existing Agreement for the Ownership of the North Valmy Power Plant Project ("Ownership Agreement"). In addition, the Agreement for the Operation of the North Valmy Power Plant Project ("Operation Agreement") would require nullification as it identifies NV Energy as the operator of Valmy. Absent the acquisition of a new operating partner or Idaho Power acquiring or developing the skills and experience to operate a coal-fired plant, it would be impractical for Idaho Power to continue operating the plant after 2025 without NV Energy.

Q. Has Idaho Power performed any additional analyses associated with the Valmy end-of-life date since the 2015 IRP was completed?

A. Yes. In 2016, Idaho Power assessed the continued use of the 2025 end-of-life assumption for Valmy using an updated evaluation of the present value revenue requirement of operating period alternatives.

Q. How did the Company analyze the potential revenue requirement impact of modifying the Valmy end-of-life date?

A. To determine the potential revenue requirement impact, Idaho Power analyzed the present value revenue requirement of two operating period alternatives: (1) the 2025 end-of-life for both units and (2) the existing 2031 and 2034[3] staggered end-of-life assumptions. The operating period alternatives used under the revenue requirement scenarios consisted of the following two components: (1) net present value ("NPV") revenue requirement associated with the existing investment, additional run rate capital, fixed operation and maintenance ("O&M") expenses, and forecasted taxes and insurance and (2) the total variable portfolio costs using the AURORA model from the 2015 IRP, updated with the most recent load forecast, natural gas forecast, and Valmy coal price forecast, utilizing the

[3] Although the actual current depreciable life of Valmy Unit 2 is through the end of 2035, the 2015 IRP planning period did not extend beyond 2034; therefore, this IRP-based analysis reflects a 2034 retirement. Extending the analysis to 2035 would likely result in an increase in the cost difference.

resource assumptions from the preferred portfolio. The results of this analysis are presented as Exhibit No. 6.

Q. Please describe the results of the revenue requirement impact of the two operating period alternatives presented in Exhibit No. 6.

A. Idaho Power's analysis results presented in Exhibit No. 6 indicate that the NPV of the revenue requirement associated with a 2025 end-of-life is $103 million less than the revenue requirement of a 2031/2034 retirement date.

Q. Did Idaho Power conduct updated present value revenue requirement analyses that assessed the economics of ceasing operations sooner than 2025?

A. No. While Idaho Power's forecast indicates Valmy is expected to be a necessary, but relatively infrequent, contributor to system reliability, resulting in a low capacity factor between now and 2025, the current Ownership Agreement and Operation Agreement between Idaho Power and NV Energy do not provide for provisions to cease coal-fired operations at the plant if the plant owners do not align on end-of-life dates. In addition, as described in Mr. Larkin's testimony, the rate impact associated with an accelerated depreciation schedule ending in 2019 would be materially higher. In an attempt to mitigate this customer rate impact, the Company has concluded that a 2025 end-of-life date strikes a reasonable balance between reliability, economics, and customer rate impacts.

Q. Please describe the routine capital expenditures Idaho Power anticipates will be necessary to safely and reliably operate Valmy through the plant's end-of-life date of 2025.

A. The incremental investments expected through Valmy's end-of-life are for upgrades and replacements of plant infrastructure required to keep the plant operational, safe, and reliable. Both units are on a three-year outage cycle that requires each unit to be taken down once every three years for unit inspection and selected refurbishment. In 2018 and 2019, the units are scheduled for their next outages so incremental investments are expected to be higher these years. These outages, which should be the last large ones performed, will help ensure the units are operational and can continue to provide reliable service through 2025.

Q. Will Idaho Power perform the same review of future incremental investments prior to any work being done as the review performed for investments made since the Company's last general rate case?

A. Yes. The Company will receive a description of the factors driving the need for the project and a recommendation for the work to be performed from the plant operator, NV Energy. The estimated cost of each project will then be compared to the expected life of the asset as well as the Valmy end-of-life date to determine prudency of the planned investment. In addition, Idaho Power and NV Energy will work together to identify ways to reduce O&M as both partners prepare for future low production from the plant through its end-of-life.

Q. Please summarize your testimony.

A. Significant changes to the ongoing economics of Valmy operations have occurred between 2010 and 2014. Market prices have decreased considerably, resulting in a decrease in the number of hours Valmy operates economically as the dispatch cost is now typically higher than the market price. Idaho Power relies on Valmy to meet peak energy needs and to preserve the balanced portfolio needed to reliably serve customers during all types of system conditions. However, Idaho Power's 2016 assessment of Valmy indicated that a 2025 shutdown date is preferable with respect to reliability and revenue requirement impacts. Consistent with the action plan recognized in the 2015 IRP, Idaho Power will continue working with NV Energy to synchronize the depreciation date of Valmy and determine if a mutually agreeable date can be established to cease coal-fired operations. It is not the expectation of Idaho Power that any date agreed upon by the Company and its operating partner would extend Valmy operations beyond 2025.

Q. Based on the analysis presented in your testimony, do you believe December 31, 2025, reflects the most reasonable end-of-life assumption for the Valmy plant based on what is known today?

A. Yes, I do.

Q. Does this complete your testimony?

A. Yes, it does.

ATTESTATION OF TESTIMONY

STATE OF IDAHO)
) ss.
County of Ada)

I, Tom Harvey, having been duly sworn to testify truthfully, and based upon my personal knowledge, state the following:

I am employed by Idaho Power Company as the Resource Planning and Operations Director in the Power Supply Department and am competent to be a witness in this proceeding.

I declare under penalty of perjury of the laws of the state of Idaho that the foregoing pre-filed testimony and exhibits are true and correct to the best of my information and belief.

DATED this 21st day of October 2016.

Tom Harvey

Tom Harvey

SUBSCRIBED AND SWORN to before me this 21st day of October 2016.

CHRISTA S. BEARRY NOTARY PUBLIC STATE OF IDAHO

Christa S. Bearry

Notary Public for Idaho
Residing at: Boise, Idaho
My commission expires: 02/04/2021

BEFORE THE

IDAHO PUBLIC UTILITIES COMMISSION

CASE NO. IPC-E-16-24

IDAHO POWER COMPANY

HARVEY, DI
TESTIMONY

EXHIBIT NO. 4

VALMY INVESTMENTS SINCE LAST GENERAL RATE CASE (CASE NO. IPC-E-11-08)

Project	2011	2012	2013	2014	2015	2016	Total	Purpose	Project Description/Justification
Unit 2 Cooling Tower Replacement	$80,324	$104,931	$113,989	$4,504,556	$2,450,464	$93,878	$7,348,142	Safety / Reliability	The Unit 2 cooling tower was operational in 1985 and was designed for a 20 - 25 year life. Safety Metric: The existing cooling tower structure was nearing the end of its service life and the wood in the tower was deteriorating. Wood supports for access ways, piping, and the hot deck were rotted and became unsafe. Reliability Metric: The cooling tower was operating at 67% of its performance due to degradation of the tower affecting the condensers performance to cool the exhaust from the turbine, causing a derate in back pressure. O&M Metric: The rotting of the wood structure resulted in an increase of maintenance costs to replace affected areas.
Unit 1 DSI Installation	$0	$1,661,173	$624,036	$3,992,239	$495,356	$42,554	$6,815,359	Environmental	Both units must meet the Mercury and Air Toxics Standard (MATS) 4-16-2015. This project / scope covers the Hydrochloric Acid (HCl) mitigation to comply with MATS Rule for the unit to run beyond 4-16-2015. Technology selected was Dry Sorbent Injection (DSI) - Hydrated Lime is injected in the backend of the boiler to remove HCl. HCl limit is .0020 lb/ MMBtu. This project was required for the unit to meet the MATS standard.
Unit 2 Scrubber Upgrade	$0	$21,178	$1,014,212	$2,257,179	$3,062,885	$248,467	$6,603,920	Environmental	The Valmy Unit 2 Dry Flue Gas Desulphurization (DFGD) system began service in 1985. It was based on technology developed and designed by Rockwell International. The system was not capable of optimum operation. This was due to problems with the original design, obsolete and worn-out equipment, the complexity of the system design and a lack of plant staffing to properly operate and maintain the system in its current condition. These problems fell into four main categories: safety issues, environmental problems, process issues related to the design complexity and a high cost of operation when compared to more recently designed and built DFGD systems. After started, this project was modified to increase the SO2 removal from the original design of 70% to roughly 85% to ensure compliance with the Mercury and Air Toxics Standard (MATS). This project included: 1) the replacement of the Lime Slurry and Recycled Ash Slurry three way valve with Pinch valves, 2) the replacement of the valves below the inlet strainers with new 1-1/2" pinch valves, 3) fabrication and installation of access safety platforms missed by engineering but are required for operations and maintenance, 4) upgrading the gland seals on the recycled ash and Lime Slurry Pumps, 5) relocating the two Lime Slurry Pumps for operations and maintenance, 6) replacing the day bin vibrator, 7) resolving the slurry pluggage issues at the atomizers by extending the hard piping to the atomizers and replacing the atomizer hoses, 8) replacement of lime and recycle ash slurry loop pressure transducers and isolation rings, 9) cleaning, inspection and modification of the atomizer slurry feed systems, 10) cleaning and inspection of atomizers and slurry distribution wheels, 11) vessel flue gas exit temperature thermocouple modifications, 12) replacement of all Orbinox valves to Clarkson valves, 13) installing new flushing water strainer, 14) installing pressure gauge isolation seals, 15) tuning of slaking water inlet temperature sparger and controls, 16) refining Flushing Sequences Logic, 17) installing new level indicators at the recycled ash day bins, and 18) removing and replace drains at the atomizer deck.
Unit 2 Scrubber Atomizer Upgrade	$0	$18,148	$1,355,170	$1,226,229	$3,505,849	($102,237)	$6,003,158	Environmental	The V2 Scrubber was placed into service in 1985, using three (3) separate vessels. Each vessel contains three (3) spray machines for a total of nine (9) spray machines. The machines are used for the removal of SO2 from the flue gas in order to comply with the Title 5 mandate. Each spray machine consists of a 300HP water cooled motor turning at 3600 rpm, coupled to a 10,000 rpm gearbox with a flex shaft and an atomizer wheel. The equipment condition deteriorated and became unreliable and inefficient. Costs to maintain the equipment significantly increased. (12) Atomizer Machines were purchased from Alstom Power. (9) are in continuous use and (3) were purchased as spares. Along with the purchase of the Atomizers, all (9) turning vanes and Atomizer Housings and associated controls were replaced. After started, this project was modified to increase the SO2 removal from the original design of 70% to roughly 85% to ensure compliance with the Mercury and Air Toxics Standard (MATS). This project was a complement to the previous project to ensure compliance with the Mercury and Air Toxics Standard (MATS).

Project	2011	2012	2013	2014	2015	2016	Total	Purpose	Project Description/Justification
Valmy Coal Crusher Belt Feeder Project	$0	$378,222	$3,709,529	$46,342	$0	$0	$4,134,093	Environmental / Economic	The crusher tower arrangement and equipment created unnecessary dust generation which could have caused violations of the Nevada Department of Environmental Protection dust elimination requirements. The vibratory feeders were not equipped with effective seals to the feeder skirtboard, which caused particulate spillage and dust emissions. The ring-granulator-style crushers generate significant dust when crushing, and also act as a fan to push dust out of the skirtboard and headbox openings when operating empty. Also, the system throughput was compromised due to sizing of the existing feeders/crushers; the 400 rating requires both feeders /crushers be operated to match downstream belt capacity of 800 TPH. Upgrading the feeders and crushers to a higher rate provides additional operating flexibility. Existing crusher discharge chute work was not well configured and prone to pluggage. In order to significantly improve reliability, the new arrangement eliminated the single flop gate bottleneck present in the current transfer arrangement. These upgrades were also required per Nevada Department of Environmental Protections request for dust elimination.
Unit 2 Sootblower System Replacement	$0	$144,858	$3,527,234	$79,877	$0	$0	$3,751,969	Reliability	The current condition of the Unit 2 sootblower system was rated from poor to very poor. The issues ranged from current overloading to excessive amounts of condensate to excessive slagging (wall slagging). These conditions were contributing to increasing tube erosion and decreased efficiency due to slagging issues. To ensure reliable operations of the boiler, this project was needed for reliability.
Unit 1 Cooling Tower Replacement	$2,974,603	$219,234	$1,437	$13,197	$0	$0	$3,208,471	Safety / Reliability	The unit 1 cooling tower was operational in 1981 and was designed for a 20 - 25 year life. Safety Metric: The existing cooling tower structure was nearing the end of its service life and the wood in the tower was deteriorated. Wood supports for access ways, piping, and the hot deck were rotted and became unsafe. Reliability Metric: The cooling tower outlet water temperature never met the design parameter thus affecting the condensers performance to cool the exhaust from the turbine, causing high back pressure. O&M Metric: The rotting of the wood structure was resulting in an increase of maintenance costs to replace affected areas.
Unit 1 Reheat Tube Replacement	$3,165,809	$25,449	$0	$0	$0	$0	$3,191,257	Reliability / Economic	Unit 1 experienced an increase of forced outages to repair failed tubes; 2010 Unit 1 inspection outage required over 100 pad welds to patch thin tube wall areas, but the reheat section needed replacement during the 2011 outage. Per the NVE Generation Engineering inspection - recommendation was to replace all reheat sections otherwise failures will continue to occur with escalating frequency up to potentially an average of one per month.
North Valmy Dust Collector Upgrade	$723,834	$922,915	$987,841	$354,106	$135,968	($1,662)	$3,123,002	Environmental	The current Valmy coal dust collection systems were original installation, circa late 1970's/early 1980's, designed to meet combustible dust control standards of that time. OSHA in 2008 upgraded the standards for combustible dust control and issued Instruction CPL 03-00-008 (3/11/2008) that contained policies and procedures for inspecting work places that create or handle combustible dusts. This program focused on specific industries that have frequent combustible dust incidents and the National Emphasis Program is to inspect those facilities that generate or handle combustible dusts which pose a deflagration or other fire hazard when suspended in the air. Along with OSHA's directive and the potential to burn different sources of coal, the old dust collection systems needed to be upgraded to meet those requirements.
Unit 2 Bottom Ash Hydrobin Rebuild	$0	$0	$0	$83,458	$3,024,866	($275,518)	$2,832,806	Reliability / Economic	The Valmy Unit 2 bottom ash dewatering and recycle system was deteriorated and become unreliable and was at risk of total failure. An inspection by the OEM, Allen Sherman Hoff was completed in 2010 and repeated in 2012 with both inspections identifying a number of serious issues. If the plant did not complete the highest priority repairs, the system would have become very unreliable and resulted in significant load reductions and emergency repair costs. Additional work identified after the project started is: concrete foundation repairs, replacing corroded underground electrical conduits, thickness inspections and repairs to the lower cone sections of two dewatering bins, additional Non Destructive Examination (NDE) testing, power outage and weather delays and repairs to 6 inch and 8 inch knife gate valves.

Project	2011	2012	2013	2014	2015	2016	Total	Purpose	Project Description/Justification
Unit 2 Burner Replacement	$0	$693	$2,330	$74,157	$2,339,126	$9,732	$2,426,039	Reliability / Economic	The Valmy Unit 2 burners were in poor condition and had a history of high failure rate. Advanced Control Technology burners were installed in 2007. The burner components were failing due to excessive wear and overheating. The failures included, the burner inner barrel, diffusers, igniters, and scanners. In addition to the need of replacement for reliability purposes, there was an average of 21,717 lost MWHs per year from 2007-2011 due to burner and igniter issues. This project replaced the burner components with high wear resistant materials, installed heavy duty igniter tubes, scanners, and new igniters. Cooling air was supplied to the scanners.
Unit 1 Sootblower System Replacement	$0	$118,438	$838,112	$1,198,044	($23,995)	$0	$2,130,599	Reliability	Unit 1 experienced premature boiler tube erosion from the sootblowing activities. The cause for the erosion was from excessive moisture in the sootblowing medium. The redesigned system allowed for the extra sootblowing without damage to the boiler tubes. Without a properly functioning sootblower system, the potential for an increase in ash contributes to more accumulation on the tubes reducing the thermal exchange, which would require more frequent cleaning.
Unit 1 Secondary Superheat Replacement	$2,114,142	($29,440)	$0	$0	$0	$0	$2,084,702	Reliability	This project involved the replacement of the secondary superheat assemblies in the Unit 1 Boiler. Since 1998 eighteen (18) documented derates and forced outages have occurred requiring repairs to tube leaks. The Unit 1 boiler inspection conducted in 2008 indicated significant loss in the wall thickness of the tubing and the potential for a substantial increase in tube leaks.
Unit 2 Primary Air Duct Replacement	$0	$0	$0	$22,843	$2,212,396	($289,625)	$1,945,614	Reliability	The North Valmy Unit 2 Primary Air Duct System is part of a system that apportions hot and cold air flow to the pulverizers for drying and transporting pulverized coal to the burners in a measured and controlled way. The duct work, dampers and expansion joints have been altered by pulverizer explosions and emergency repairs to return the unit to service. This has resulted in misdistribution and control of primary air and has led to combustion control problems from burner coking to ductwork puffs. Restoration of the system restored its performance and increased reliability of the unit from forced outages.
North Valmy Caustic Tank Building Replacement	$0	$257,820	$1,210,585	$368,344	$0	$0	$1,836,748	Reliability / Safety / Environmental	This project replaced the building that housed the caustic tanks. In early 2012 the containment basin in the Caustic Tank Building began leaking. The leaking caustic soda caused the ground to heave under the building resulting in significant damage to the structure and the associated systems, including the electrical and piping to the caustic tank. The earth was excavated at the heave to alleviate the uplift pressure on the building. The excavated material was tested with the test results showing an elevated ph of 12.5 indicative of a caustic soda leak.
Evaporation Pond Liner Replacement	$774,302	$1,262,317	($315,770)	$0	$0	$0	$1,720,848	Environmental	The existing pond liner was 30 years old and was exhibiting several areas of delamination that are indicative of material failure. The condition of the existing liner suggests it has reached the end of its useful life and therefore required a new liner system to be installed with upgraded materials. This included a double walled liner with leak detection to ensure environmental compliance.
Mixed Bed Demineralizer Replacement	$0	$30,834	$841,661	$796,332	($35,487)	$0	$1,633,341	Safety / Environmental	This project replaced the mixed bed demineralizer and sulfuric acid and caustic soda tanks. The mixed bed demineralizers were 30+ years old. The sulfuric acid tank and the caustic soda tanks were reaching the end of their designed corrosion life which involved serious leaks from the tanks. Sulfuric acid and caustic soda were becoming a higher priced commodity. The entire system needed to be replaced.
Unit 1 Circulating Water Line Recoat	$0	$0	$0	$48,357	$1,199	$1,486,158	$1,535,714	Reliability / Economic	The circulating water pipe lining was failing and in need of being relined during an extended outage. A failure of the lining could result in pipe corrosion and leaks and could require several days to excavate the line and complete repairs. System leaks required an outage for repair. The cathodic protection system for the plant was replaced in 2013. The poor performance of the system before the replacement most likely resulted in pipe exterior damage. Several other underground pipes have had an increased failure rate in recent years. A total failure of the pipe would result in a six (6) month forced outage.

Project	2011	2012	2013	2014	2015	2016	Total	Purpose	Project Description/Justification
Unit 2 Circulating Water Line Recoat	$0	$0	$0	$28,074	$1,476,360	$18,739	$1,523,174	Reliability / Economic	The circulating water pipe lining was failing and in need of being relined during an extended outage. A failure of the lining could result in pipe corrosion and leaks and could require several days to excavate the line and complete repairs. System leaks required an outage for repair. The cathodic protection system for the plant was replaced in 2013. The poor performance of the system before the replacement most likely resulted in pipe exterior damage. Several other underground pipes have had an increased failure rate in recent years. A total failure of the pipe would result in a six (6) month forced outage.
Mechanical/Electrical Shop Rebuild	$0	$102,137	$1,586,592	($172,626)	($50)	$0	$1,516,053	Economic	The old maintenance shop complex was comprised of several disconnected areas which decreased productivity, restricted the ability to provide optimal plant support, and inhibited the ability to conduct effective staff training. The old welding shop consisted of a small area between the units enclosed by insulation attached to chain link fencing. The combined electrical/instrumentation shop was contained in a small room adjacent to the business center. The lunchrooms were separate, with the largest used to conduct safety meetings/training with standing room only. Productive ongoing training could not be conducted with the entire staff because of inadequate meeting space.
Unit 2 Generation Phase End Turn Design Betterment	$0	$1,420,942	($133,291)	$0	$0	$0	$1,287,652	Reliability / Economic	After an investigative analysis of the generator stator end turns, it was determined that the current phase end-turn connections were too rigid when last rebuilt by REGENCO. The phase end-turn connections must account for different component expansion rates and also avoid the potential issues with natural frequency near the electromagnetic exciting frequency forces of 120 hertz. All the generator stator end turns needed to be resoldered to prevent failure.
Cathodic Protection System	$36,294	$500,521	$634,186	($11,703)	$0	$0	$1,159,298	Reliability / Economic	The original cathodic protection system was installed during a period from 1981 to 1984. The old cathodic protection system was installed as an upgrade in 1991. The plant observed an increase in the rate of underground pipe corrosion, which suggested the existing cathodic protection system failed or was at the end of its useful life. An evaluation was performed for all five systems and the determination was that the majority of the depressed sacrificial anodes have been depleted and new anodes needed to be installed in order to protect the underground piping, fire lines, and tank bottoms. It was also determined that there were several new wells put into service without any cathodic protection. These new well casings needed protection, and required a complete system for each well. Also, the evaluation proposed that the majority of the anodes in the condenser water boxes were depleted and need to be replaced.
North Valmy Coal Combustion Residual Compliance	$0	$0	$0	$0	$1,289,835	($166,324)	$1,123,511	Environmental	The Coal Combustion Residual (CCR) rule was published in the Code of Federal Regulations on April 17, 2015. Valmy had 180 days to comply with the CCR regulations. Valmy has taken a proactive approach to addressing the impacts of potential "ash piles" noted onsite. To continue to be proactive and avoid inadvertently creating CCR impoundment, North Valmy needed to place asphalt and concrete at the bottom ash handling areas of Unit 1 and Unit 2. If this area was not paved, under the CCR rule, these areas would have been considered an "open dump" and a violation of the regulation, and may ultimately have lead to the creation of additional CCR impoundments at Valmy.
Unit 2 Steam Valve Hardening	$0	$0	$0	$0	$1,116,028	$6,720	$1,122,748	Reliability / Economic	Due to high temperatures, the current materials that made up the steam turbine valve internals were subject to formation of an oxide layer that could eliminate the clearance between the moving and stationary parts. This could have caused the valves to bind and bend, causing a forced outage. The valves were also originally designed for base load operation. This project helped increase the availability of the valves during high cycling.
Unit 1 Coal Pipe Replacement	$0	$0	$0	$0	$189,674	$921,442	$1,111,116	Safety / Environmental	The plant was experiencing considerable erosion on its coal piping that leads from the pulverizers to the burners. This erosion resulted in coal leaks that were a housekeeping, dust control (OSHA dust control initiative) and ultimately a fire, health and explosion hazard. Identifying and replacing individual sections of piping has been performed in the past, which was a short term solution to the problem. A total replacement of the piping system including wear resistant pipe and a revised support and hanger system was required.

Project	2011	2012	2013	2014	2015	2016	Total	Purpose	Project Description/Justification
Unit 2 Primary Superheat Lower Loop Replacement	$0	$0	$0	$0	$1,057,855	$6,384	$1,064,239	Reliability / Economic	From the North Valmy Unit 2, 2009 boiler inspection for the primary superheat section of the boiler, 36 areas were identified with tubes 50% or less of Minimum Wall Thickness (MWT) and 68 areas were tubes were 60% or less than MWT. In comparing 2010 inspection report with 2009, sootblower lanes of the primary superheat had lost an additional 10% of their wall thickness. The inspection reports indicated the potential for an increase of forced outages. Many of the thinned tubes were replaced in 2010. Follow up inspection in 2012 identified a few additional tubes to be replaced. A capital project in 2013 installed tube shields over the tubes in the sootblower paths. The lower loops were still exposed to flue gas erosion. The inspection in 2014 indicated the tubes in the flue gas path continued to deteriorate. The 2015 planned outage created the opportunity to replace the high wear area tubes with new resistant material.
Unit 1 Pulverizer 'B' Major Rebuild	$623,089	($42,115)	$1,047,583	$438,835	$0	$0	$1,033,696	Reliability / Economic	Pulverizers are utilized to grind coal to fine dust before being transported to burner fronts. This process wears out roll wheel assemblies, table grinding segments, and the interior of the pulverizer equipment. Mill overhauls at Valmy have historically been on an 18 to 24 month cycle. The coal imported to Valmy is high in silica and quartz which causes excessive wear on pulverizer grinding sections. If the pulverizer condition deteriorates the units efficiency is decreased thus increasing the fuel usage and power costs. This project removed and replaced all major components including roll wheels, grinding table segments, yoke, classifier and vanes, reject chute, loading cylinders and cables, labyrinth air seals, pyrite plows, burner shut off valves and seats, rebuilt pulverizer motor, coal feeder belt drive and conveyor reducer and motor, eroded downspouts and chute, rebuilt lube oil system pumps.

Note: The information presented in this exhibit reflects the total capital spend by specific project, for projects over $1 million, including amounts closed to FERC Account 101 - Electric Plant in Service, FERC Account 107 - Construction Work in Progress and any FERC Account 108 - Accumulated Provision for Depreciation removals but excluding AFUDC.

BEFORE THE

IDAHO PUBLIC UTILITIES COMMISSION

CASE NO. IPC-E-16-24

IDAHO POWER COMPANY

HARVEY, DI TESTIMONY

EXHIBIT NO. 5

Tables 7.5 and 7.6 provide the peak-hour capacity deficits for July and December for the coal futures considered. Darker shading in the tables corresponds to larger deficits. Surplus positions are not specified in the tables. Because no deficits exist prior to 2020, the tables include data only for 2020 to 2034.

Table 7.5 **July monthly peak-hour capacity deficits (MW) by coal future with existing and committed supply- and demand-side resources (90th-percentile water and 95th-percentile load)**

Energy Deficits (aMW)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Status Quo	–	–	–	–	–	(14)	(61)	(136)	(175)	(224)	(316)	(352)	(426)	(491)	(523)
Maintain Coal Capacity	–	–	–	–	–	(14)	(61)	(136)	(175)	(224)	(316)	(352)	(426)	(491)	(523)
Valmy Retire Units 1 and 2 Year-End 2019	(24)	(141)	(143)	(176)	(236)	(277)	(324)	(399)	(438)	(487)	(579)	(615)	(689)	(754)	(786)
Valmy Retire Units 1 and 2 Year-End 2025	–	–	–	–	–	(14)	(324)	(399)	(438)	(487)	(579)	(615)	(689)	(754)	(786)
Valmy Retire Unit 1 Year-End 2019 and Unit 2 Year-End 2025	–	(9)	(11)	(44)	(105)	(145)	(324)	(399)	(438)	(487)	(579)	(615)	(689)	(754)	(786)
Valmy Retire Unit 1 Year-End 2021 and Unit 2 Year-End 2025	–	–	(11)	(44)	(105)	(145)	(324)	(399)	(438)	(487)	(579)	(615)	(689)	(754)	(786)
Bridger Retire Unit 1 Year-End 2023 and Unit 2 Year-End 2028	–	–	–	–	(149)	(190)	(236)	(312)	(350)	(576)	(667)	(703)	(777)	(842)	(874)
Bridger Retire Unit 1 Year-End 2023 and Unit 2 Year-End 2032	–	–	–	–	(149)	(190)	(236)	(312)	(350)	(400)	(491)	(527)	(601)	(842)	(874)
Bridger Retire Unit 1 Year-End 2023 and Unit 2 Year-End 2032, Valmy Retire Units 1 and 2 Year-End 2025	–	–	–	–	(149)	(190)	(499)	(575)	(613)	(663)	(754)	(790)	(864)	(1,105)	(1,137)

Table 7.6 **December monthly peak-hour capacity deficits (MW) by coal future with existing and committed supply- and demand-side resources (90th-percentile water and 95th-percentile load)**

Energy Deficits (aMW)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Status Quo	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Maintain Coal Capacity	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Valmy Retire Units 1 and 2 Year-End 2019	–	–	–	–	–	–	(12)	(32)	(59)	(58)	(99)	(129)	(158)	(187)	(165)
Valmy Retire Units 1 and 2 Year-End 2025	–	–	–	–	–	–	(12)	(32)	(59)	(58)	(99)	(129)	(158)	(187)	(165)
Valmy Retire Unit 1 Year-End 2019 and Unit 2 Year-End 2025	–	–	–	–	–	–	(12)	(32)	(59)	(58)	(99)	(129)	(158)	(187)	(165)
Valmy Retire Unit 1 Year-End 2021 and Unit 2 Year-End 2025	–	–	–	–	–	–	(12)	(32)	(59)	(58)	(99)	(129)	(158)	(187)	(165)
Bridger Retire Unit 1 Year-End 2023 and Unit 2 Year-End 2028	–	–	–	–	–	–	–	–	–	(147)	(188)	(218)	(247)	(276)	(254)
Bridger Retire Unit 1 Year-End 2023 and Unit 2 Year-End 2032	–	–	–	–	–	–	–	–	–	–	(12)	(42)	(71)	(276)	(254)
Bridger Retire Unit 1 Year-End 2023 and Unit 2 Year-End 2032, Valmy Retire Units 1 and 2 Year-End 2025	–	–	–	–	–	–	(187)	(207)	(235)	(234)	(275)	(305)	(334)	(539)	(517)

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BEFORE THE

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IDAHO POWER COMPANY

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EXHIBIT NO. 6

North Valmy Generating Station

Revenue Requirement of Valmy Operating Period Alternatives

To determine the potential customer rate impact of modifying the depreciable end-of-life assumption at Valmy to 2025, Idaho Power analyzed the revenue requirement of two operating period alternatives: (1) the 2025 end-of-life for both units, and (2) the existing 2031 and 2035 staggered retirement assumption. The revenue requirement alternatives consist of two components:

1. The net present value ("NPV") revenue requirement associated with the existing investment, additional run rate capital, fixed operation and maintenance ("O&M") expenses, and forecasted taxes and insurance; and

2. The total variable portfolio costs using the AURORA model from the 2015 IRP, updated with the most recent load forecast, natural gas forecast, and Valmy coal price forecast, utilizing the resource assumptions from Portfolio P6(b).

When combining components 1 and 2 above, the Company's analysis indicates that the least-cost result is the end-of-life for both Valmy units at the end of 2025 as compared to 2031/2035, by a differential of approximately $103 million. Figure 1 below provides a summary of the results, while the detailed NPV cash flow analysis is provided as Appendix A to this document.

Figure 1:
NPV Revenue Requirement Analysis Summary
2025 vs. 2031/2034 End-of-Life[1]
($000's)

Scenario	Component 1: Fixed Cost NPV	Component 2: AURORA NPV	Combined NPV
2025 Retirement	$397,342	$4,167,493	$4,564,835
2031/2034 Retirement	$522,715	$4,145,163	$4,667,878
Difference	($125,283)	$22,330	($103,043)

Based on this analysis, from an NPV perspective the net reduction in revenue requirement resulting from a 2025 end-of-life assumption at Valmy as compared to 2031/2034 is approximately $103 million. When evaluating the 2025 and 2031/2034 scenarios, an end-of-life assumption of 2025 would result in NPV revenue requirement savings as compared to the existing operating assumption.

[1] Although the actual current depreciable life of Valmy Unit 2 is through the end of 2035, the 2015 IRP planning period did not extend beyond 2034; therefore, this IRP-based analysis reflects a 2034 retirement. Extending the analysis to 2035 would likely result in an increase in the cost difference.

Appendix A

Idaho Power Company
Valmy Revenue Requirement Comparison
2025 or 2031-2034 Retirement
Forecasted Fixed Costs and Total Power Supply Costs
for the period 2016-2034
$(000)

Discount Rate	6.74%	6.74%		6.74%	6.74%
	Fixed Costs	Aurora		Fixed Costs	Aurora
2016	50,578	$ 293,380		58,943	$ 293,380
2017	48,627	$ 332,194		56,520	$ 332,194
2018	49,774	$ 347,073		57,236	$ 347,073
2019	50,410	$ 349,001		57,504	$ 349,001
2020	53,234	$ 330,816		60,062	$ 330,816
2021	52,812	$ 336,715		58,004	$ 336,715
2022	50,506	$ 343,726		53,712	$ 343,726
2023	51,054	$ 357,713		52,135	$ 357,713
2024	50,911	$ 398,496		50,129	$ 398,496
2025	51,204	$ 414,280		49,440	$ 414,280
2026	51,461	$ 426,509			$ 434,241
2027	51,478	$ 443,502			$ 450,235
2028	51,240	$ 477,128			$ 484,014
2029	51,060	$ 493,717			$ 500,986
2030	49,736	$ 511,211			$ 518,893
2031	48,160	$ 515,699			$ 523,324
2032	38,638	$ 530,706			$ 535,860
2033	37,136	$ 535,206			$ 538,971
2034	36,366	$ 563,041			$ 567,098
Total	$ 924,384	$ 8,000,111		$ 553,684	$ 8,057,016
NPV	$522,715.36	$4,145,162.64		$397,341.99	$4,167,492.87
Total NPV		$4,667,878.00			$4,564,834.86
NPV difference			($103,043)		

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