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IDAHO PUBLIC
UTILITIES COMMISSION

BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF THE APPLICATION OF AVISTA CORPORATION FOR THE AUTHORITY TO INCREASE ITS RATES AND CHARGES FOR ELECTRIC AND NATURAL GAS SERVICE TO ELECTRIC AND NATURAL GAS CUSTOMERS IN THE STATE OF IDAHO)	CASE NO. AVU-E-08-01 CASE NO. AVU-G-08-01 DIRECT TESTIMONY OF GREG A. PAULSON

FOR AVISTA CORPORATION

(ELECTRIC AND NATURAL GAS)

I. INTRODUCTION

Q. Please state your name, employer and business address.

A. My name is Greg A. Paulson and I am employed as the Manager of Customer Service, Analytics and Technology, for Avista Utilities, at 1411 East Mission Avenue, Spokane, Washington.

Q. Would you describe your educational background and professional experience?

A. I am a 1991 graduate of Montana State University with a degree in Mechanical Engineering. I completed Washington State University's Project Management Certificate program in 2007. I joined the Company in 2004. In the past 4 years I have performed duties as a Metering Automation Engineer and project manager for the Company's Idaho Advanced Meter Reading (AMR) project. I have recently accepted the position of Manager of Customer Service.

Q. What is the scope of your testimony in this proceeding?

A. My testimony will describe implementation of AMR for Avista's customers in the State of Idaho. The Company requests recovery of capital expenditures related to the deployment of AMR in Idaho. Per Commission Order No. 30229, I will address the status of the current AMR program, cost recovery proposal, time of use capability and demand response.

Q. Are you sponsoring any exhibits in this proceeding?

A. Yes. I am sponsoring Exhibit No. 12, Schedules 1 and 2, which were prepared under my direction.

Q. Please provide a list of acronyms/definitions that pertain to the verbiage contained within this testimony.

A. The following is a list of acronyms and their definitions contained within this testimony:

AMR - Advanced Meter Reading - The components necessary to read a meter remotely using technology to retrieve meter-reading data through a handheld device, a mobile collection system, or a one-way communication network.

AMI - Advanced Metering Infrastructure - Industry terminology to better reflect the transition from AMR to systems with expanded capabilities of two-way communication networks. AMI systems measure, collect, and analyze energy usage information from advanced metering devices through various communication media. The infrastructure includes hardware, software, communications equipment, customer associated systems and data management software.

Mobile Collection System - Mobile Wireless Unit used to collect consumption readings from electric and natural gas meters.

Manual Meter-Reading System - The software package and handheld equipment that facilitates a manual meter reading process. This consists of the handheld devices that are used to collect the existing meter-reading data and the software to feed the information to the Customer Service System.

PLC - Power-Line-Carrier - A system by which communications are transmitted and received over distribution level power lines.

Radio-Based Technology - A system by which communications are transmitted and received via radio frequencies.

TWACS™ - Two-Way Automated Communication System - The AMR system Avista installed in lower electric meter density areas of our service territory. The system uses power-line-carrier technology to communicate with the meter.

II. BACKGROUND

Q. What was the Company's proposal for AMR in its last general rate proceeding?

A. In 2004, in the Company's last general rate case filed with the Idaho Public Utilities Commission (IPUC), Case Nos. AVU-E-04-01 and AVU-G-04-01, the Company proposed to install AMR devices on all Idaho electric and natural gas meters over a four-year period commencing January 2005. The project included the installation of additional electronics for existing meters as well as other communication infrastructure, and finally computer hardware and software investment.

Due primarily to the multi-year nature of this project, the Company proposed to treat the AMR investment costs in the following manner: All capital investment would follow Avista's standard capitalization policy and would be capitalized to a regulatory asset, FERC account

182, and remain there until the entire AMR project became operational, or used and useful. At completion, the project would be placed into the appropriate FERC plant accounts, depreciation would begin and the investment would receive appropriate rate base treatment in regulatory filings.

In the IPUC's Order No. 29602, in Case Nos. AVU-E-04-01 and AVU-G-04-01, dated October 8, 2004, at page 51, the Commission supported the Company's plans to install AMR and authorized the Company-requested deferral accounting treatment requested by the Company for its related investment.

<u>III. PROJECT SUMMARY</u>

Q. What is the current status of the Company's AMR in Idaho?

A. In 2005, the Company began a four-year project to convert all natural gas and electric meters to AMR in the State of Idaho. As of this filing, nearly 180,000 natural gas and electric meters have been automated. Over 139,000 natural gas and electric meters were automated using radio-based technology and 40,000 were automated utilizing power line carrier (PLC) technology. Currently, approximately 27,000 electric and natural gas meters utilizing radio-based technology are read automatically by a radio-based network and 112,000 are read through a mobile collection system. Of the 112,000 meters that are being read on the mobile collection system, all electric and the majority of the natural gas meters will be converted to a radio-based network in 2008. There are a small number of natural gas meters that reside in areas where Avista does not have electric service or reside in the PLC areas that will continue to be read by the mobile collection system. Electric meters on the PLC system are read automatically, and do not require a meter reader or mobile unit to collect the meter reading. Exhibit No. 12, Schedule 1 is a map of the Company's Idaho AMR installations.

Q. Please explain how the mobile collection system works.

A. The mobile collection system works by having a meter reader drive an automobile equipped with a wireless mobile collection system that gathers consumption data from radio-based meters. A mobile collection system can gather up to 10,000 reads per day in dense areas. In contrast, traditional meter reading would typically read between 500 - 700 meters per day in this same area. Although the mobile collection system does not provide interval data, it does offer the benefits of increased operational efficiencies and enhanced employee safety.

Q. Please describe the Company's meter deployment of AMR in Idaho.

A. Prior to beginning the deployment of the Idaho AMR project the Company solicited a competitive bid for contract installations of electric and gas meters. Tru-Check was the successful bidder, and had previously been awarded the installation contract for an AMR project that the Company conducted in its Oregon service territory. Tru-Check was responsible for installation of more than 95% of the meters associated with the project. Meters with special requirements such as commercial and three phase meters were handled by the Company. Tru-Check provided onsite project managers and hired installers from the local areas. Installers were put through extensive training and then were evaluated through Tru-Check's quality assurance plan. Tru-Check provided a service to handle any claims made by customers during the installation process. To date only one commission complaint was received associated with the project that installed over 180,000 meters.

Q. How did you communicate the meter change with customers?

A. A comprehensive communication plan was developed internally and shared with the IPUC Staff for review prior to implementation.

Q. Please summarize the Company's perspective on AMR and AMI.

A. As the Company has progressed with its four-year deployment of AMR in our Idaho service territory, there have been many advances in the AMR industry, as well as increased interest in Advanced Metering Infrastructure (AMI)[1] from utilities across the nation. Many large utilities across the nation are deploying <u>pilot</u> AMI systems and working on proposals for large scale deployment of AMI systems. There are a number of utilities that are still focused on deployment of AMR systems because of the value proposition represented by AMR systems. AMI systems tend to be more capital intensive and the corresponding benefits of these systems are continuing to develop. In conjunction with the focus on AMI systems, the functionality of AMR systems continue to be enhanced and offer additional functionality. An example is the progression from a drive-by reading system to a network system that provides the

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1 ***Definition of Advanced Metering Infrastructure (as defined by Utility AMI group)***
An advanced metering infrastructure is a comprehensive, integrated collection of devices, networks, computer systems, protocols and organizational processes dedicated to distributing highly accurate information about customer electricity and / or gas usage throughout the power utility and back to the customers themselves. Such an infrastructure is considered "advanced" because it not only gathers customer data automatically but does so securely, reliably, and in a timely fashion while adhering to published, open standards and permitting simple, automated upgrading and expansion. A well-deployed advanced metering infrastructure enables a variety of utility applications to be performed more accurately and efficiently including time-differentiated tariffs, demand response, outage detection, theft detection, network optimization, and market operations.

means to read the meters more frequently than once per month.

Q. What technology or type of AMR devices did the Company install for its electric meter system?

A. The Company utilized a combination of AMR technologies in its Idaho service territory commonly known as a "hybrid" AMR system. We installed radio-based technology in areas with higher meter densities, and a PLC based technology in areas with lower densities. We continue to use telephone-based technologies for selected industrial accounts. A number of factors determined where each technology was utilized including geography, distribution configuration, installation costs and the presence of natural gas. All electric meter technologies have the capability to provide hourly or more frequent interval data. Meters utilizing a radio-based technology were initially read monthly through a mobile device. In selected areas (Sandpoint and Moscow) we have installed a fixed radio communication network to fully evaluate the network technology and the future uses of the interval data available from the system. The Company will continue the deployment of this fixed radio communication network in the remaining areas of Idaho currently being read by the mobile collection system in 2008 with the exception of a small number of natural gas meters as mentioned previously. The

PLC electric meters that were installed are also capable of providing interval data and are also being evaluated for future uses of the interval data.

Q. What technology or type of AMR devices did the Company install for its natural gas meter system?

A. The Company installed radio-based technology on all natural gas meters and they are being read monthly by a mobile device. Since natural gas meter installations are inherently different than electric meter installations, some options available for electric meters were not economically viable or applicable for natural gas meters. This is particularly true in rural areas where it would require the deployment of two separate technologies. By installing radio-based endpoints and reading the meters by a mobile device, the identified savings in meter reading expenses can be realized. Where practical, natural gas meters will be read by the fixed radio communication network.

Q. What other AMR systems did the Company review prior to selecting the deployed technology?

A. Prior to the initiation of the Idaho AMR project, Avista had evaluated several advanced metering systems. Avista had installed over 74,000 radio and 350 PLC based AMR devices throughout Washington, Oregon and California including 1,700 within the State of Idaho. Our supplier for radio-based equipment had been Itron, based in Liberty Lake, Washington. We had utilized Hunt Technologies for PLC based technology.

Due to the past performance of the Itron radio-based equipment and the ability of their systems to be deployed in a drive-by environment that could later be converted to a fixed radio-based network, their equipment was selected for the higher meter density areas of our service territory. For the lower meter density areas of our service territory we evaluated PLC technology and selected Aclara's TWACS™ system.

<u>IV. AMR FUNCTIONS AND BENEFITS</u>

Q. Describe the benefits that were realized by the Company and its customers due to the implementation of AMR.

A. From 1995 to 2003, meter reading expenses in Idaho increased an average of 4.8% each year. In addition to direct meter reading savings compared to manual meter reading, this technology provides the foundation for later adoption of retail electric energy pricing that may vary by hour of the day or day of the week. This type of pricing can ultimately be used to provide customers economic incentives to curtail usage during critical energy periods. The electric meter equipment Avista installed will provide interval metering data, as well as indications of tampering and information on outage conditions. These additional functionalities of the system are continually being evaluated in an effort to determine how best to integrate into our existing business systems. An example is the ongoing development of a means to integrate the PLC system meters into our existing outage management system in an effort to improve our outage and restoration processes.

This equipment is not intended to provide aggregated demands for tariff calculations; however, it will enhance Avista's ability to provide consolidated billing statements for customers with multiple accounts.

AMR helps eliminate the need for estimated reads, reduces the volume of phone calls associated with estimated reads and the need for investigations related to such calls. Customer billing will be more accurate because estimates and misreads will be reduced. The actual metering accuracy will not be affected by this automated system and will continue to be monitored through our periodic sampling program.

Additionally, information obtained through a networked AMR system will be of value in determining more efficient specifications for distribution equipment used to serve Avista's customers.

A networked AMR system could also provide information to help manage operations during outages and may prevent extended customer outages. Additional software (which has not been installed, but can be added later) could allow customers on-line access to hourly load profile data, which would allow them the opportunity to better manage their electric consumption. Since all residential electric meters have been updated with new solid state meters, customers will now be able to easily read kWh consumption values directly from the meter's liquid crystal display (LCD) readout.

Q. What other advantages are associated with AMR technology?

A. Deploying AMR technology could provide opportunity for operational savings by reducing or eliminating both regular and after-hours service calls due to reconnecting or disconnecting service at the meter. In the case of an after-hours reconnect, the service can be remotely activated within minutes as opposed to hours in the more remote areas, thus providing faster response to customers and eliminating the need to send a service person to the premise on overtime.

Increased employee safety is also an advantage. Dangerous pets, treacherous driving conditions, obstructed and unsafe meter access and potentially confrontational customer contacts can be greatly reduced by utilizing this technology.

Q. Does this system provide the capability for future Time-of-Use or critical peak pricing?

A. Yes. As described above, this technology provides the capability for the remote capture of electric interval meter readings in intervals of one hour or less. The significance of capturing interval readings is that it provides the foundation for later adoption of retail energy pricing that may vary by hour of the day or day of the week. This type of pricing can ultimately be used to provide economic incentives to customers to curtail usage during critical energy periods.

Although this project scope did not include the necessary modifications to our billing system to implement a time of use or critical peak rate structure, the meters that have been installed are capable of providing the field data necessary to support this type of system in the future.

Q. Does AMR technology allow the Company to evaluate Demand Response programs?

A. Yes. Data gathered from the AMR technology deployed will allow evaluation of the Company's Demand Response programs. The Company's approved tariff Schedule 96 "Energy Load Management Programs - Pilot" offers residential and commercial demand response programs in portions of Sandpoint and Moscow for a two-year period.

Internet protocol thermostats, direct control units and related technology are being installed to reduce energy usage at peak times of the year and to allow the Company to gain experience with customer acceptance, program design, operational components, and cost-effectiveness.

V. COSTS

Q. What was the cost to install this system in Idaho?

A. The total capital expenditures to install this system in Idaho are projected to be $28.8 million by the completion of full system deployment at the end of 2008. Please refer to Table 1 below that provides a breakdown of the costs associated with the AMR system deployment on a yearly basis.

Table 1

	2005	***2006***	***2007***	***2008***	***Total*****
Total Meters	112,144	23,627	43,996	Balance*	
Cost	*$6,914,502*	*$5,930,636*	$5,028,807	$3,007,370	**$20,881,315**
Allocation of Fixed Company O/H	*$1,273,844*	*$689,056*	$511,433	$300,737	**$2,775,070**
AFUDC	*$221,447*	*$1,041,305*	$1,772,994	$2,070,068	**$5,105,814**
Idaho Capital Expenditures	$8,409,793	$7,660,997	$7,313,234	$5,378,175	**$28,762,199**

*Remaining Fixed Network Installations and Remaining Commercial Meters
**Total amount represents costs through 2008. The Company anticipates an additional cost in 2009 to optimize the system.

Q. Does the Company expect to incur additional costs in 2009 and how will they be accounted for?

A. The Company plans to deploy the remaining infrastructure for the fixed radio communication network in 2008. Based on the technology that was available in the early deployment of the project it is anticipated that there will be network optimization[2] activities to insure that the system is reading all meters. Due to the iterative nature of deploying the infrastructure, it is anticipated that there will be additional costs incurred in 2009 to optimize the system. These costs will be capitalized to plant in service as they become used and useful and will be accounted for and recovery sought in future rates.

Q. How do the current costs of the AMR system compare to the estimates developed in 2003?

A. Exhibit 12, Schedule 2 provides a reconciliation of the estimated cost of $28.8 million to the preliminary cost estimate of $16.3 million. This exhibit identifies the adjustments necessary to reflect an "apples-to-apples" comparison to the preliminary estimate, and to reflect cost

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[2] Network Optimization - In the early stages of AMR deployment, only low power output radio frequency meters were available. In later stages of the deployment the power output of the radio frequency meters was increased substantially. Experience has shown that when deploying a network over the low power meters, network optimization will have to occur. The optimization may take the form of moving or adding network components. In other cases, the only alternative may be to replace the low power radio frequency meters with high power versions.

changes due to design changes during implementation over the past four years. The comparison shows that the adjusted current estimate is 13.8% higher than the 2003 preliminary cost estimate.

Q. Please explain the adjustments reflected on Exhibit 12, Schedule 2.

A. As noted in the Company's direct testimony of David D. Holmes in the 2004 filing, the preliminary estimate was based on 2003 dollars. It was also noted that the selection of appropriate technologies and vendors, as well as refinement of cost estimates would take place in 2004. Specific adjustments reflected on the exhibit are as follows:

- Customer growth from 2003 to the end of the project in 2008.
- Additional PLC meters required instead of radio-based.
- Solid-state electric meters versus retrofitting electromechanical meters.
- Actual fixed Company overhead costs that would have been absorbed through other capital projects if AMR had not been deployed, and which were not reflected in the preliminary 2003 estimate.
- Actual AFUDC which was not reflected in the preliminary 2003 estimate.
- 2005-2008 actual costs vs. 2003 nominal dollars reflected in the preliminary estimate.

Q. Please provide further elaboration on the changes during the course of deploying AMR?

A. One of the changes was the increase in the number of customers in our Idaho service territory from the initial estimate in 2003 to the end of the project in 2008. The initial projections were based on a customer base of approximately 171,000. As of this filing the customer base is approximately 194,000.

Another change that caused higher project costs was the number of meters that were deployed on the PLC system. Preliminary projections were approximately for 28,000 meters. After more detailed system analysis was performed in regard to substation configurations and operational considerations, the number of PLC meters deployed exceeded 40,000. The PLC system components are inherently more costly than the radio-based systems, but are the only viable solution in these lower meter density areas, for reasons explained above.

Another component that caused higher project costs was the determination to utilize solid state meters versus retrofitting electromechanical meters with a radio-based or PLC module. Just prior to the beginning of the project, an industry-wide transition was being made away from electromechanical meters to solid state meters. In an effort to guard against technological obsolescence, Avista also made the transition to solid state meters.

Q. Are there benefits surrounding the decision to adopt solid state metering in Idaho?

A. Yes, these meters are more customer-friendly by incorporating a digital display that is much easier to read rather than a series of dials. Solid state meters also provide a single self-contained unit that eliminates moving parts. The most significant benefit was avoiding technological obsolescence as discussed previously. During the course of this project deployment, the market for electromechanical meters has diminished significantly. Very few if any current deployments of AMR/AMI are utilizing retrofit electromechanical meters.

Q. What is the overall impact of AMR to Idaho customers in this filing?

A. Including the capital costs associated with AMR through the end of 2008 in rates will translate into an additional electric revenue requirement of $3,636,000, and is part of the overall revenue request increase of $32,328,000 in this case. It will also translate into an additional natural gas revenue requirement of $1,091,000, and is part of the overall revenue request increase of $4,725,000 in this case. This is reflected in Company witness Ms. Andrews' testimony and exhibits.

Q. What are the reductions in expense associated with the AMR installation?

A. The reduction in meter reading staff and related transportation expenses are a result of the installation of the AMR system. Annual meter reading costs (FERC account 902) declined approximately $545,000 for electric service and $323,000 for natural gas service from 2004 to 2007.

In order to determine the estimated impact of AMR to Idaho customers over the expected service life of the equipment, it has been assumed that traditional meter reading costs would have escalated at an average of 3.5% per year going forward from 2009, the rate year for the AMR proposal in this case. In other words, from an avoided cost perspective, had AMR not been installed in Idaho, the Company assumed that a 3.5% average cost escalation for traditional meter reading practices will have continued into the future in order to reflect labor and transportation cost increases. Given this assumed escalation over time, the cost savings associated with the elimination of traditional meter reading practices approximate $16.5 million over 20 years for electric service and approximate $6.7 million over 15 years for natural gas service. The Company assumed that the expected life of the solid state electric meters is 20 years, therefore the expected meter reading savings related to the electric AMR system were calculated over 20 years. The Company also assumed that the expected life of the ERT modules installed on gas meters will have an average life expectancy of 15 years, therefore the meter reading savings related to the gas AMR system were calculated over 15 years as well.

Q. Has the Company reflected cost savings already realized with AMR in its pro forma case?

A. Yes. The savings in meter reading expense due to reduced labor and transportation were all realized by the 2007 test year.

Q. Do these cost savings reflect other non-quantified benefits discussed previously?

A. No, they do not. There have been a variety of non-quantified benefits as described above. These include:

- provides the foundation for later adoption of retail electric energy pricing that may vary by hour of the day or day of the week;
- provides interval metering data;
- will provide indications of tampering and information on outage conditions;
- enhances Avista's ability to provide consolidated billing statements for customers with multiple accounts;
- eliminates the need for estimated reads;
- improves accuracy of customer billing because estimates and misreads will be reduced;
- information obtained will be of value in determining more efficient specifications for distribution equipment used to serve Avista's customers;
- helps to manage operations during outages and may prevent extended customer outages;
- reduces or eliminates both regular and after-hours service calls due to reconnecting or disconnecting service at the meter;
- provides safer environment for our customers and employees; and
- allows evaluation of the Company's Demand Response programs.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

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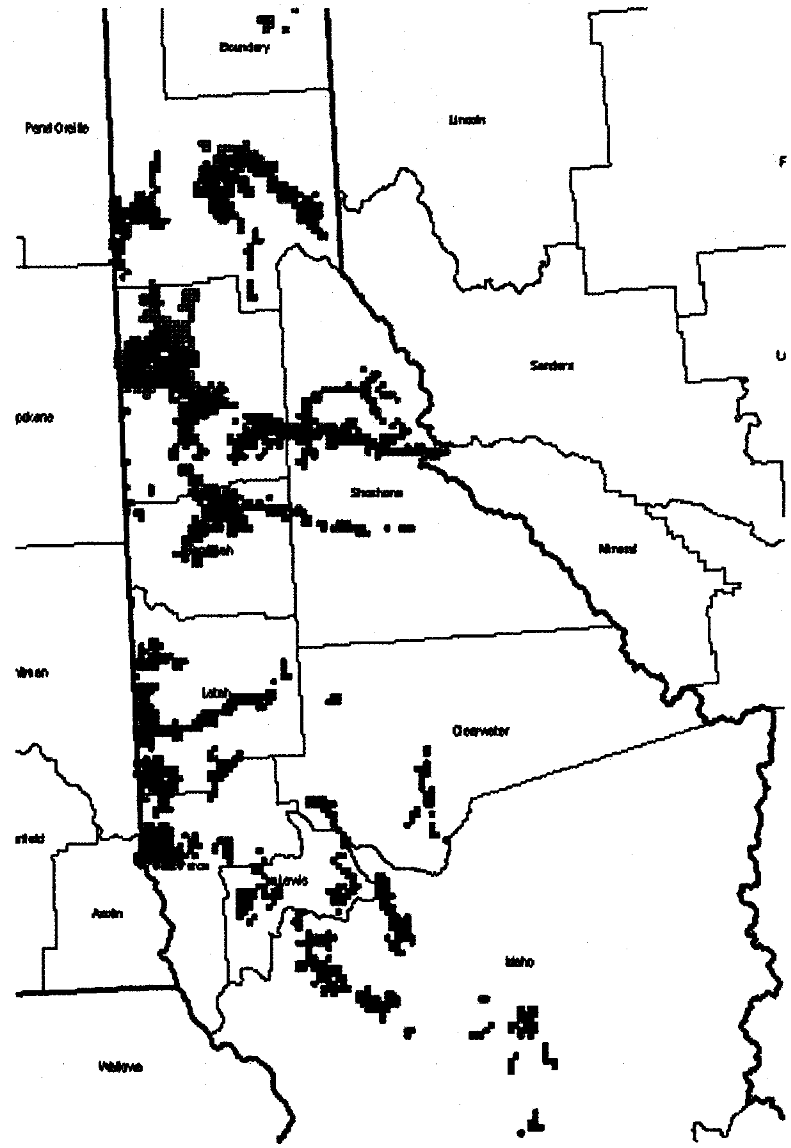
IN THE MATTER OF THE APPLICATION	)	CASE NO. AVU-E-08-01
OF AVISTA CORPORATION FOR THE	)	CASE NO. AVU-G-08-01
AUTHORITY TO INCREASE ITS RATES	)	
AND CHARGES FOR ELECTRIC AND	)	
NATURAL GAS SERVICE TO ELECTRIC	)	EXHIBIT NO. 12
AND NATURAL GAS CUSTOMERS IN THE	)	
STATE OF IDAHO	)	GREG A. PAULSON
	)	

FOR AVISTA CORPORATION

(ELECTRIC AND NATURAL GAS)

Idaho Installations

- Electric Meters
  - 114,000 - Total Electric Meters
    - 73,500 Radio Frequency
    - 40,500 PLC
  - 66,000 – Total Gas Meters



LEGEND

- ■ Radio Frequency
- ■ Radio Frequency – Gas Only
- ■ Power Line Carrier

Exhibit No. 12
Case Nos AVU-E-08-01 &
AVU-G-08-01
G. Paulson, Avista
Schedule 1, p. 1 of 1

AVISTA UTILITIES
Advanced Meter Reading Project Costs

Estimated Cost of AMR through December 31, 2008	$	28,762,199
Less:		
1) Meter Installations for new Customers		635,000
2) Additional PLC Meters Required Instead of Radio-Based		1,100,000
3) Solid State vs. Electromechanical Meters		600,000
4) Allocation of Fixed Company O/H		2,775,070
5) AFUDC		5,105,814
Total Adjusted Costs	$	18,546,315
2003 Preliminary Estimate	$	16,300,000
6) Difference in Estimate Based on "Apples-to-Apples" Comparison	$	2,246,315
Percent of Preliminary Estimate		13.8%

1) Increase in the number of customers in our Idaho service territory from the initial estimate in 2003 to the end of the project in 2008. The initial projections were based on a customer base of approximately 171,000. As of this filing the customer base is approximately 194,000.

2) Higher project costs due to the number of PLC meters that were deployed on the system. Original projections were approximately for 28,000 meters. After more detailed system analysis was performed in regard to substation configurations and operational considerations, the number of PLC meters deployed exceeded 40,000. The PLC system components are inherently more costly than the radio-based systems, but are the only viable solution in these lower meter density areas, for reasons explained in the testimony. The additional costs include the higher costs of the meters and the labor associated with the installation. Further costs include the number of additional substations requiring the PLC communication equipment.

3) Determination to utilize solid state meters versus retrofitting electromechanical meters with a radio-based or PLC module. Just prior to the beginning of the project, an industry-wide transition was being made away from electromechanical meters to solid state meters. In an effort to guard against technological obsolescence, Avista also made the transition to solid state meters.

4) The preliminary estimate included the cost of installing the system, and did not include an allocation of fixed company overheads.

5) The preliminary estimate included the cost of installing the system, and did not include AFUDC.

6) The preliminary estimate was made using 2003 nominal dollars. Actual costs reflect increases due to inflation since the 2003 preliminary estimate. The Company also noted in its testimony from the last rate case that the estimate was "initial" or preliminary, and noted that, "Specific system design, vendor evaluation and selection will take place in 2004."