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IDAHO PUBLIC UTILITIES COMMISSION

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**BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION**

THOMPSON RIVER CO-GEN, LLC	)	
a Colorado Company,	)	CASE NO. AVU-E-05-7
	)	
COMPLAINANT,	)	
vs.	)	
	)	
AVISTA CORPORATION dba AVISTA	)	DIRECT TESTIMONY
UTILITIES, a Washington Corporation,	)	OF
	)	GEORGE H. PERKS
<u>RESPONDENT.</u>	)	

FOR AVISTA CORPORATION

1 **I. INTRODUCTION**

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

3 A. My name is George H. Perks. I am employed as Manager, Generation - Joint  
4 Projects, by Avista Corporation and my business address is 1411 East Mission Avenue,  
5 Spokane, Washington.

6 **Q. Please state your educational background and professional experience.**

7 A. I graduated from the MEBA School of Marine Engineering in 1971 with an  
8 Unlimited Steam and Diesel License and spent one year on board as an apprentice for the  
9 power plant operation on-board a cargo ship transporting materials world-wide. I was  
10 employed by Pacific Power and Light between 1971 and 1975 at the Centralia Steam Electric  
11 Plant as a Control Room Operator. My responsibilities included final construction review,  
12 system check-out and plant start-up and ongoing operation of the two 660 MW Coal fired  
13 units at the site.

14 I was engaged in various business enterprises during the period 1976 through 1981.  
15 Those work experiences included employment at Quali-Cast Steel, a specialty stainless steel  
16 foundry in Chehalis, Washington, serving initially as Marketing Consultant to the Marine  
17 group and later as Foundry Manager of Production Control. Beginning in 1979, I was  
18 employed as Plant Manager for Graystone Corporation for their concrete operations during  
19 the construction of the Applegate hydroelectric facility near Medford, Oregon. The plant  
20 included generation and boiler systems as well as concrete batching and mixing equipment.

21 I began my career at Avista Corp. in 1981 as plant manager for the Kettle Falls  
22 generating station, a 50 MW biomass-fired generating project. In that capacity I was  
23 responsible for project design review, equipment selection, construction oversight, staffing,

1 project start-up, and all facets of operation and maintenance of the project. The project was  
2 completed in 1983. In 1988, I transferred to a position in Spokane as Project Development  
3 Manager for WP Energy, a Washington Water Power subsidiary, and was involved in the  
4 siting, permitting, design review, and equipment selection for a 60 MW biomass-fired project  
5 at Williams Lake, British Columbia. Shortly after taking that position in Spokane, I became  
6 the Company's Owner-Representative for both the Centralia coal-fired power plant and for  
7 the Colstrip coal-fired power plant.

8 Beginning in 1999, I served as the Site Manager for Avista Power, a Company  
9 subsidiary, to oversee the construction of the combined cycle combustion turbine project  
10 located near Rathdrum, Idaho. In that role I was involved in all phases of the project,  
11 including equipment specification and selection, initial site work, construction and start-up in  
12 2001.

13 In 2001, I took on corporate oversight duties for the Coyote Springs 2 project,  
14 assisting with design, construction and start-up of the project. I assumed an increased level  
15 of involvement in the project oversight at the time that the Company and its project partner at  
16 the time, Mirant, were faced with the issues and impacts of the Enron bankruptcy which  
17 required replacing the general contractor and crews at the work site. I was involved in all  
18 aspects of the start-up of the Coyote Springs 2 project.

19 Since 2002, I have served as Manager, Generation - Joint Projects, where, in addition  
20 to duties described above, my responsibilities have included managing the Company's  
21 interests in the Colstrip generating project and the Coyote Springs 2 generating project. As  
22 part of those responsibilities, I provide operational oversight, capital project review,  
23 maintenance, safety, scheduling and operational coordination. I am also involved in the

1 assessment of thermal projects which the Company may consider as part of resource  
2 acquisition plans as outlined in its recent Integrated Resource Plan.

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

4 A. My testimony will address the ability of a thermal-fired power project to  
5 generate continuously for a month, under normal design conditions, once that project has  
6 demonstrated that it can operate continuously at a given net output level for a period of 16  
7 hours during the initial testing phase. I will also discuss the meaning of the term “boiler-  
8 limited” as it relates to coal-fired generation projects and its applicability to the determination  
9 of the TRC project capacity. I conclude that, based on a review of the data provided to  
10 Avista (including relevant plant output data during its “testing” phase), the TRC project is  
11 capable of producing in excess of 10 aMW under normal design conditions for any given  
12 month.

13 I am sponsoring an exhibit listed in the following table for identification, which was  
14 prepared under my direction:

15

<i>Exhibit No.</i>	<i>Description</i>
210	TRC Daily Average Net Output From January 1, 2005 Through September 30, 2005

16

17

18 **Q. What opportunities have you had to develop an understanding of the**  
19 **TRC project?**

20 A. I was able to visit the TRC project on January 20, 2006. Mr. Barry Bates, a  
21 project owner, gave a tour of the facility to Company Witness Lafferty and myself. I have

1 also reviewed the testimony and exhibits of TRC witnesses in this case, and the results of  
2 discovery conducted to date. Finally, I have reviewed extensive project test data and air  
3 permit information provided by the Montana Department of Environmental Quality (MDEQ).

4 **Q. Can you better describe your site visit to the TRC project?**

5 A. Yes. Along with Company Witness Lafferty, we visited the project site in  
6 order to get a better understanding of the project equipment and its operating characteristics.  
7 The project was not operating at the time of our visit, having shut down on October 1, 2005  
8 to allow TRC to address air permit issues. I reviewed the coal and wood fuel delivery  
9 systems. I was shown the steam turbine and electric generator installation. I also had an  
10 opportunity to see the condensate and circulating cooling water systems, including cooling  
11 towers. I was able to review the boiler and boiler auxiliary equipment, including forced and  
12 induced draft fans, over-fire air equipment, traveling grate, and boiler feedwater pumps. We  
13 were able to see the relevant emissions control equipment. Finally, I visited the control  
14 room, which contains the plant control systems. I am familiar with the technology employed  
15 at the plant, given my prior experience with both coal-fired and wood-fired generating  
16 projects.

17 **Q. In Witness Thompson's pre-filed direct testimony, he discusses the**  
18 **meaning of a "boiler-limited" project. Would you please comment on TRC witnesses'**  
19 **assessment of the boiler-limited nature of the TRC project?**

20 A. Yes. On page 10 of Mr. Thompson's testimony, he states that "[b]oiler  
21 limitations refer to the amount of thermal energy output that can be created from the boiler  
22 portion of a Project." Mr. Thompson further states, at page 10, that boiler limitations "limit  
23 the continuous output to a level less than the design of the generator." TRC Witness Mr.

1 Busch suggests, at page 6 of his testimony, that at the time TRC decided to install the steam  
2 turbine and generator, TRC understood that the boiler did not have the capacity to meet the  
3 full capability of the 16.5 MW steam turbine. Mr. Busch goes on to explain, at page 6, that

4 “TRC believed that an acceptable level of turbine performance  
5 could be achieved, though exact performance would not be  
6 known until actual operation. The turbine has achieved sound  
7 and sustainable performance through initial operations  
8 although, as expected, generation levels are substantially less  
9 than plated ratings.”

10 The impact of any “boiler limitations” on the project generation net output, however,  
11 can best be observed from actual test data already supplied by TRC, which I have reviewed.  
12 The generation net output test data demonstrates that the TRC project capacity exceeds 10  
13 aMW. This is true even though the generation net output of the TRC project appears to be  
14 limited to an amount that is below the turbine and generator nameplate ratings due to the  
15 amount of steam energy that is capable of being produced by the boiler.

16 **Q. Do you have any comments on Mr. Busch’s statement, at page 6, that**  
17 **“[t]he turbine has achieved sound and sustainable performance through initial**  
18 **operations although, as expected, generation levels are substantially less than plated**  
19 **ratings.”**

20 **A.** Yes. I disagree with Mr. Busch’s characterization of the project as having  
21 “achieved sound and sustainable performance,” if his intent was to suggest that the TRC  
22 project had operated in other than simply an intermittent “testing and tuning” mode. The  
23 project has been operated only in a testing and tuning mode throughout the operating period  
24 of January 2004 through September 2005, as project operators attempted to make adjustments  
25 and to meet air permit requirements. The TRC project in fact has operated only 134 days out

1 of the 273-day operating period. This represents less than half of the days during the period  
2 from January 1, 2005 through September 30, 2005. The majority of those operating days saw  
3 the project generation output at less than design capability.

4 Consequently, one should not look to the monthly generation data, previously  
5 collected during this testing phase, when making a determination of the ultimate plant  
6 equipment capacity. However, because this is a coal-fired generation project, we can  
7 reasonably use the average daily generation data that was produced, to make a determination  
8 of monthly capacity, as I will explain below.

9 **Q. Would you please describe the generation net output that has been**  
10 **measured at the TRC project to date?**

11 A. Exhibit No. 210 shows the average daily net output data for each of the nine  
12 months of testing for the TRC project. This data was provided by TRC to Avista in response  
13 to our discovery. One can observe that TRC operates on an intermittent and variable output  
14 basis as the project is tested and further tuned. In spite of the up and down variability due to  
15 testing, the TRC project did operate during 38 days at net output levels greater than 10 aMW.

16 **Q. Why is it reasonable to use daily generation output, in the absence of**  
17 **generation data based on sustained monthly operations?**

18 A. A coal-fired thermal unit that has operated at sustained rated load for at least  
19 16 hours at a time can conservatively be considered to have reached equilibrium in areas such  
20 as steam temperature, boiler pressure, fuel feed rates, fuel air ratios, ash removal, feed water  
21 makeup, thermal expansion and other plant parameters. In the TRC case, net output data  
22 shows that the project can maintain "steady-state generation" in the 11 aMW to 12 aMW  
23 range for 48-hour periods.

1           Because the project components have reached an equilibrium point, these levels of  
2 generation are sustainable for monthly periods, when the plant moves beyond testing and  
3 begins commercial operation. Therefore, the daily generation net output data that is already  
4 available is sufficient to make a determination that the monthly generation capacity of the  
5 project is above 10 aMW. Continuous generation above even these levels is simply a  
6 question of reliability rather than capacity.

7           **Q.     What is the current status of the TRC project with respect to its**  
8 **operating permits?**

9           A.     In November 2005, TRC made a request to the MDEQ for modifications to  
10 its air quality permit that would allow for increases in amounts of allowable NOx and S02  
11 emissions. On February 10, 2006, the MDEQ issued a Preliminary Determination on the  
12 TRC air quality permit modification request. The MDEQ did not approve the requested  
13 increases in NOx and S02. Lower levels of NOx and S02 emissions are required as well as  
14 additional emissions control equipment, which is needed in order to reach the required permit  
15 emissions levels. Mr. Dempsey will provide additional testimony concerning TRC emissions  
16 issues. Mr. Dempsey nevertheless concludes that the project capacity will still exceed 10  
17 aMW, notwithstanding the lower emissions limits contained in the MDEQ air quality permit  
18 Preliminary Determination.

19           **Q.     Does that conclude your pre-filed direct testimony?**

20           A.     Yes it does.



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COMPLAINANT,	)	
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AVISTA CORPORATION dba AVISTA	)	EXHIBIT NO. 210
UTILITIES, a Washington Corporation,	)	
	)	GEORGE H. PERKS
<u>RESPONDENT.</u>	)	

FOR AVISTA CORPORATION

TRC Daily Average Net Output From  
January 1, 2005 Through September 30, 2005

**TRC Daily Average Net Output  
January 1, 2005 - September 30, 2005**

