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BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of the Application of
PACIFICORP for Approval of an IRP Based
Avoided Cost Methodology for QF Projects
Larger than 1 Megawatt

DOCKET NO. 03-035-14

PREFILED REBUTTAL TESTIMONY OF HUTCH HENRIE

The UAE Intervention Group hereby submits the Prefiled Rebuttal Testimony of Hutch
Henrie.

DATED this 8th day of September, 2005.

Gary A. Dodge,
Attorney for UAE Intervention Group

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing was served by email this 8th day of September, 2005, to the following:

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PREFILED REBUTTAL TESTIMONY

Of

HUTCH HENRIE

On behalf of UAE Intervention Group

In the Matter of the Application of PACIFICORP for Approval of an IRP Based Avoided Cost
Methodology for QF Projects Larger than 1 Megawatt

Docket No. 03-035-14

September 8, 2005

1 **Q. Please state your name and business address.**

2 **A.** My name is Hutch Henrie. My business address is 215 S. State, Suite 200, Salt
3 Lake City, Utah 84111.

4 **Q. For whom do you work?**

5 **A.** I am a Consultant in the firm of Energy Strategies, LLC, a professional energy
6 consulting firm.

7 **Q. Please describe your educational background.**

8 **A.** I received a B.S. in Economics from Westminster College in 2001.

9 **Q. Please describe your professional experience and background.**

10 **A.** I have provided regulatory and technical support on a variety of energy projects at
11 Energy Strategies since I joined the firm in 2001.

12 **Q. On whose behalf are you testifying?**

13 **A.** I am filing testimony on behalf of the Utah Association of Energy Users
14 Intervention Group (UAE). In this case, UAE's interest is primarily the
15 development of reasonable avoided cost rates that could foster development of
16 efficient qualifying facility cogeneration projects (QFs) at industrial locations,
17 while maintaining ratepayer neutrality.

18 **Q. What is the purpose of your testimony?**

19 **A.** I am responding to direct testimony filed by the Division of Public Utilities (DPU
20 or Division) and the Committee of Consumer Services to the effect that the
21 differential revenue requirement (DRR) model used by PacifiCorp (the Company)
22 in this docket, GRID, should be adopted for purposes of setting avoided cost rates

1 and that the model has been sufficiently tested and validated to warrant such
2 adoption. I am the person at Energy Strategies who has been primarily
3 responsible for actual operation and manipulation of the GRID model used in this
4 docket. My testimony recounts our experiences in operating, analyzing, and basic
5 use of GRID, and provides some notes of caution and recommendations.

6 **Q. Can you please summarize your testimony?**

7 **A.** I explain some of the complexities and limitations associated with use of the
8 GRID model. I explain that the GRID model is not the answer if the Commission
9 wants an avoided cost model that is simple, transparent and understandable. I
10 suggest that, if the Commission nevertheless uses the GRID model to set avoided
11 cost prices in this docket, significant additional time and energy should be devoted
12 to the workings of the model in order to verify and validate its many assumptions
13 and outputs.

14 I also point to some unreasonable and unsupported assumptions used in
15 the model that we have identified to date, including failure to model non-firm
16 transmission, use of unsupported market liquidity assumptions, failure to optimize
17 resource portfolio in the QF run, unknown implications of the zero-cost resource
18 assumption, incomplete validation efforts and untested functions. Finally, I
19 recommend that the Commission explicitly acknowledge these (and other)
20 limitations of the model and direct the parties to continue to address and rectify
21 them in the future.

22 **Q. Are you able to operate the GRID model?**

1 **A.** Yes. After spending many hours with the model, I now know how to operate it at
2 a basic level. I should emphasize, however, that in my opinion, it would take
3 detailed, hands-on training by PacifiCorp and/or hundreds of hours of effort to
4 become sufficiently proficient with the GRID model to fully understand all of its
5 assumptions and calculations and to perform a valid and meaningful verification
6 of the model.

7 **Q.** **What makes operation and validation of the GRID model so complicated?**

8 **A.** Perhaps I can illustrate some of the complications of operating the GRID model,
9 even at a basic level, by briefly explaining the process one must go through to
10 operate the model and manipulate inputs and assumptions:

- 11 ○ The GRID model is loaded on a locked computer processor provided by
12 the company. The processor cannot be connected to a printer, a computer
13 network or the internet.
- 14 ○ Accompanying the PC is GRID Software Documentation: GUI Guide – A
15 Guide to the Graphical User Interface; Data Import/Export Net Power Cost
16 Guide – A Guide to GRID Data Inputs & Outputs; and Algorithm Guide –
17 A guide to GRID Scenario Processing. This thick and complicated
18 “novel” provides a general guide through the operational steps of using
19 GRID, import/export of data files, and a technical explanation of the
20 computational processes of GRID.
- 21 ○ The following chart shows the seven major sections of GRID:

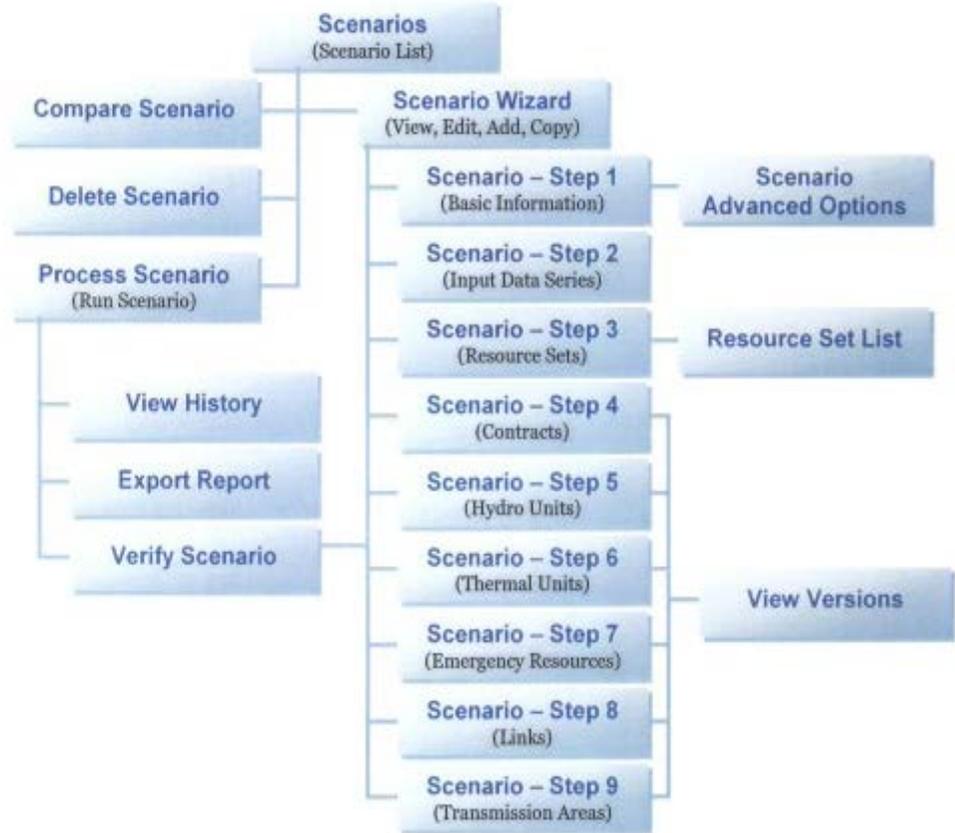
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- 5 ○ Within each of these sections are several steps and processes that a user must
- 6 understand to know how each section is used in the operation of GRID.
- 7 ○ The major section in GRID is “Scenarios;” this is where a user is directed through
- 8 the following nine GRID Steps:



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- Within each of the nine steps the user is able to look at the various inputs, resources and conditions available for a given project. The inputs are user defined (i.e., Contracts, Hydro Units, Thermal Units, Data Series, etc.) and configuration options, which are used together to create a unique run of the model.
- The learning curve involved in the basic operation of GRID is STEEP and SHORT, but the learning curve for manipulating GRID and understanding the effects of changing inputs is STEEP and LONG. A basic understanding of the sections and the steps within each section will not even get one started on making changes to GRID, nor will it give one an understanding of the Input data series files to which each one of these sections/steps refers.

- 1 ○ After reviewing each of the sections and the steps involved in the Scenarios
2 section, assuming the user made no changes to the inputs, the user can click the
3 “Process” button and then the “Run” button and GRID will run through the
4 scenario pre-determined by the Company. Several hours later, GRID will show a
5 list of possible files to export; if the export screen shows up then the user has
6 successfully run one of four Company GRID model runs. This process will need
7 to be repeated a total of four times to run the 20 year GRID model. After each run
8 the user must export from GRID the prepackaged set of zipped CSV files that
9 need to be imported into the Net Power Cost Excel workbooks provided by the
10 company.
- 11 ○ Once the user has gone through the steps of importing the prepackaged set of
12 GRID output files into the Net Power Cost Excel workbooks, the user will be able
13 to look at the Base case NPC run, the AC NPC run, the Delta between the two,
14 and several other summary and data tabs. Reviewing and analyzing the data
15 within the Net Power Cost workbooks can take many hours to fully understand,
16 decipher, and verify.
- 17 ○ The files that GRID refers to for inputs, resources and conditions are in the form
18 of CSV files. These files are within GRID and must be exported out of GRID to
19 make changes to the inputs used in GRID.
- 20 ○ The list of files that are used for inputs, resources and conditions in GRID in
21 Scenario – Step2 (input data series) are:
- 22 • Hydro Start Year

- 1 • Hydro End Year
- 2 • Adjusted Load by Jurisdiction
- 3 • Clark Load Forecast
- 4 • Delivery Point
- 5 • Demand
- 6 • Demand Charge
- 7 • Energy Charge
- 8 • Fuel Price
- 9 • Hydro Weekly Shape
- 10 • Incremental Cost
- 11 • Market Capacity
- 12 • Monthly Hydro
- 13 • Monthly Weighting Factors
- 14 • Planned Outage
- 15 • Price Forecast
- 16 • Short Term Firm
- 17 • South Idaho Forecast
- 18 • State Bubble Map
- 19 • Thermal Heat Rate
- 20 ○ In order to view or manipulate data in any of these files, one must export the files
- 21 from GRID, unzip the files and open them. On the PC provided by the Company,

1 the CSV files open in Excel. If a user were to save the zipped files to a disk and
2 open them on a personal PC they may not open automatically in Excel. Some
3 difficulties can arise while exporting CSV files from GRID into Excel. For
4 example, Excel cannot handle the amount of data in some of the CSV files. If one
5 tries to look at the Price Forecast file, an error message in Excel would say: "File
6 was not loaded completely;" this is because there are too many rows of data. In
7 order to view the full file one must go through several steps in Excel to import the
8 complete file to Excel or import the CSV file into Access or WordPad.

- 9 ○ Within each of the Input Data Series files one must decode each column's
10 meaning. Some of them are self explanatory but others take time to understand.
11 To fully understand the meaning of all the data points within these files one must
12 refer to the GUI. Once the terminology and the meaning are understood (e.g.,
13 what a 14 or a 12 means as a data point), one can begin changing some of the
14 Input Data Series assumptions.
- 15 ○ After Scenario - Step 2, the user moves on to the resources sections of GRID.
16 Each GRID resource has different assumptions imbedded in it. In order to
17 understand all such assumptions one must refer to the GUI for definitions of the
18 Resource Specification Fields (ten plus fields). One must then go through each
19 resource individually and determine what specifications have been applied to each
20 resource. This can take many hours because of the amount of resources involved
21 in the 20-year model.
- 22 ○ To understand the effects of changing a certain input, one must export the file that

1 contains the input to be changed, make the proposed change, re-import the data
2 file and then re-run GRID. To understand the impact of each change, one must
3 make one change at a time; each run takes about four hours of computer operating
4 time to complete.

5 **Q. What do you think the Commission should understand about the**
6 **complexities of the GRID model as it considers the issues raised in this case?**

7 **A.** I think the main things that the Commission should understand about the
8 complexities and limitations of the GRID model (aside from questionable or
9 unsupported assumptions, some of which are discussed below) are the following:

- 10 ○ The model is complicated, not user-friendly, and not transparent. The only way
11 one can get any kind of meaningful understanding of the model or why it produces
12 the results it produces is to spend literally hundreds, if not thousands, of hours, or
13 hire someone who has invested the necessary time and resources to understand
14 GRID.
- 15 ○ If the Commission wants to use a model for avoided cost pricing that is simple,
16 transparent and understandable, the GRID model is not the answer.
- 17 ○ If the Commission elects to use the GRID model to set avoided cost prices despite
18 its many complications and challenges, significant additional time and energy
19 should be devoted to the workings of the model. Given the limited time and
20 resources available to review and understand the model, I question whether
21 anyone, no matter how competent or dedicated, can honestly claim to have
22 verified and validated all of the myriad of assumptions and inputs embedded in

1 the model or to fully understand the implications of all such assumptions and
2 inputs.

3 **Q. Turning now to the merits of the assumptions and inputs used by PacifiCorp**
4 **in its GRID runs, have you identified any significant assumptions that you**
5 **consider to be questionable or unsupported?**

6 **A.** Yes. We have identified several questionable assumptions and limitations that
7 should be remedied before the output of the model can be determined to be fair or
8 reasonable to Utah ratepayers and QF developers. Many others will likely emerge
9 over time. Among the more important ones that we have identified to date are:

- 10 ○ *Unreasonable transmission assumptions.* The transmission constraints built into
11 GRID reflect the Company's firm transmission rights. GRID does not even
12 attempt to account for non-firm transmission, even though I understand that non-
13 firm transmission is often available. This serious GRID limitation will not allow
14 the user to assume any level of available non-firm transmission. It may lead to
15 unreasonable results like turning down coal plants in off peak hours when coal
16 production could be well in the money. This limitation reduces the avoided cost
17 pricing produced by GRID in an unreasonable and unsupportable manner.

18 In a data response, the Division has stated that is not convinced that using
19 non-firm transmission for long term planning and cost calculation is appropriate.
20 UAE rejects the position that non-firm transmission should be ignored even for
21 long-term planning purposes. Even more importantly, however, in attempting to
22 meet the standard of ratepayer neutrality, one simply cannot ignore the fact that

1 non-firm transmission may be available for market sales in off-peak hours. To
2 ignore this reality is to deliberately understate the utility's avoided costs.

- 3 • *Unreasonable market constraints.* PacifiCorp also assumes severe market
4 liquidity constraints in the "Market Capacity" file in the Input Data Series section
5 of GRID. This assumption prevents GRID from making significant amounts of
6 off system sales during specified days and hours over the entire 20 year study
7 period. We are not persuaded that the information provided by PacifiCorp to date
8 supports GRID's market liquidity restrictions. These restrictions serve, again,
9 simply to depress avoided cost prices
- 10 • *Failure to "optimize" QF portfolio.* In the base case GRID run, all IRP resources
11 are in the resource mix, along with a number of assumptions about future
12 purchases, growth stations, etc. When an assumed QF is added to the resource
13 stack, the avoided CCCT plant is eliminated from the resource stack and the
14 GRID model is then re-run. There is no attempt to determine whether the
15 assumed QF resource, upon which pricing is based, would also delay or eliminate
16 the need for other assumed resources. To be consistent in pricing, the QF run
17 should reflect the new optimum resource mix in light of the assumed QF project.
- 18 • *Zero cost resource assumption.* The dispatch and cost implications resulting from
19 the model's assumption of a 525 MW zero-cost resource have not yet been fully
20 evaluated or explained. In the second (QF) GRID run, the QF is dispatched at a
21 100% capacity factor, meaning it will supposedly run 525MW during every hour

1 of every day for 20 years. It does not seem reasonable or plausible to assume such
2 operations.

- 3 • *Incomplete validation.* As discussed above, neither UAE, regulators nor anyone
4 else outside the company has yet had the time to do a complete and satisfactory
5 validation of the model. Moreover, the fact that the Company sent out computers
6 with a version of GRID that did not work even after the Company had filed
7 testimony supporting the output of that version of GRID, leads me to question
8 how the Company validated the model. Absent a thorough validation, reliance on
9 GRID is suspect. To fully validate the GRID model and assumptions, one must
10 go far beyond a few phone conversations with consultants, a handful of alternative
11 modeling runs or observations that the results appear logical.

- 12 • *Untested Functions.* The implications and effects of many of GRID's functions
13 are not yet fully understood. For example, we have not had the time or resources
14 to fully explore and understand the impacts of GRID's Priority function. The
15 description reads:

16 "Also known as the impact order or sort order, this field defines the order in
17 which the time dependent attributes should be evaluated. The higher numbers
18 are evaluated first and take precedence over lower numbers. The numbers do
19 not need to be sequential but they cannot be duplicated. The zero priority is
20 often used in conjunction with a blank Start Date to create a default value."

21 Unfortunately, it would take hours and hours to decipher and understand the
22 impacts of the priority levels that PacifiCorp has applied to each input in GRID.

1 These assumptions could have a significant impact on the GRID output that we
2 have not yet been able to determine.

3 **Q. What do you recommend to the Commission in light of these unreasonable or**
4 **unsupported assumptions?**

5 **A.** I recommend caution in accepting the output of the model without addressing and
6 remedying the impacts of at least the identified unreasonable or unsupported
7 assumptions. If the GRID model is not sufficiently flexible to permit reasonable
8 assumptions, for example as to non-firm transmission or market liquidity, then
9 something outside of GRID should be done to address the limitation. In addition,
10 I recommend that the Commission explicitly acknowledge these limitations and
11 direct the parties to continue to address and rectify them in the future.

12 **Q. Does this conclude your direct testimony?**

13 **A.** Yes it does.