

The P_GENV4 and P_CAPV6 Models—Reconnaissance Level Analysis of Hydropower Effects in the Platte River Basin.



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The P_GENV4 and P_CAPV6 Models—Reconnaissance Level Analysis of Hydropower Effects in the Platte River Basin.

THE P_GENV4 AND P_CAPV6 MODELS

The P_GENV4 and P_CAPV6 models are Windows 9x and NT executable programs developed by the Economics Group at the U.S. Bureau of Reclamation's Denver Technical Service Center for the Great Plains Regional Office. These models are coded in Borland's Delphi 5.0, a rapid application development (RAD) programming framework.

INTENDED USE

The P_CAPV6 and P_GENV4 models are intended for reconnaissance level analysis of the direct hydropower effects which might result from the alternatives considered in the Platte River EIS. The P_GENV4 model is used to calculate the difference in monthly generation and economic value of the electricity produced between the base case and an alternative. The P_CAPV6 model is used to estimate the dependable capacity for the base case and an alternative and to determine the resulting difference in dependable capacity, if any.

RECONNAISSANCE LEVEL ANALYSIS

For purposes of the Platte River EIS, a rapid and very simplistic "reconnaissance level" analysis of direct hydropower effects was undertaken. In this context, the term "direct" refers to hydropower effects resulting from potential changes in the basin's hydrology. Although other changes in the power system might be expected to occur, such as changes in generation at interconnected thermal units, these "indirect" effects are not quantified or evaluated in this analysis.

HYDROLOGIC PERIOD

The hydrologic data on which hydropower analysis is based span the 48 year period from 1947 to 1994. These data reflect the drought periods of the 1950's and 1989-1991 and also capture periods of bountiful precipitation in the 1970's and 1983-1984. These data have been adjusted to reflect current condition gains and losses and are reflective of anticipated hydrologic conditions in the study area.

METHODOLOGY

The P_GENV4 model is used to analyze the difference in generation between the base case and any alternative and to estimate the resulting change in economic value, if any. The methodology used by the P_GENV4 program is relatively straightforward. First, monthly generation data for each of the modeled hydropower plants are estimated by the underlying hydrology model for the base case and a change case. These generation data are read by the P_GENV4 program and the difference in generation between the base case and the change case is calculated. Finally, the change in economic value is calculated by multiplying the difference in generation times the monthly avoided costs (prices) of electricity.

The P_CAPV6 model is used to estimate dependable capacity and the difference in dependable capacity, if any, between the base case and an alternative. The dependable capacity is calculated for a summer marketing season (April through September) and a winter marketing season (October through March) using two different methods. These are called the “Minimum Median” and the “90% Exceedence” methods.

Dependable capacity is calculated using the minimum median method in the following manner. First, the monthly capacity for each of the 48 years \times 12 months in the analysis period is computed by the appropriate hydrology model. The median capacity for each month is then calculated. The minimum of these median capacities for the summer marketing season (April to September) and the winter marketing season (October to March) are identified. These values are reported as the minimum median dependable capacity for each marketing season.

Dependable capacity is also calculated using a 90% exceedence method similar to that described in Western Area Power Administration (1986, 1993). First, monthly capacity for each of the 48 years \times 12 months in the analysis period is calculated by the relevant hydrology model. These data are categorized into the winter marketing season (October to March) and the summer marketing season (April to September). For each month, the capacity value which corresponds to the 90 percent exceedence level is calculated. The maximum exceedence value in each marketing season is reported as the 90 percent exceedence level dependable capacity.

The capacity values which underlie the dependable capacity calculations are computed somewhat differently in the two basins. In the North Platte, the capacity for each plant in the system is calculated by the NPWUM Model using the methods described in Bureau of Reclamation (1997). For the Central Platte, the capacity at the Kingsley Dam hydropower plant (50 MW nameplate capacity) is calculated using the method supplied by Killgore (1996). The capacity at the other 4 hydropower plants in the Central Platte is approximated by their average hourly generation during the month as estimated using the OPStudy Model (Fish and Wildlife Service 2000). The Kingsley capacity and the capacity for the other 4 units are then aggregated and output by the model.

KNOWN ANALYSIS LIMITATIONS

The reconnaissance level approach used is relatively simple and readily applied but has several limitations. First, both models employ a monthly time step. As a result, intra-month effects such as pulse flows, cannot be characterized. In contrast, more rigorous modeling frameworks (e.g. Harpman 1999, Edwards, Flaim and Howitt 1999) are designed to characterize hourly generation and capacity effects. Naturally, their implementation is both more complex and resource intensive. Second, it is explicitly assumed in this analysis that the marginal cost of operating each hydropower plant in the basin is \$0.00/MWhr. This assumption is primarily maintained for simplicity reasons. In fact, published sources of marginal cost data for hydropower plants do exist (e.g. National Performance Review Power Management Laboratory 1997), but neither this analysis nor many other modeling frameworks (commercial or otherwise) employ these data.

ECONOMIC ANALYSIS ASSUMPTIONS

For purposes of the Platte River EIS, a 13 year period of analysis is used. It is assumed that program implementation will occur January 1, 2002 and the “first increment” of the program will conclude on December 31, 2014. This analysis is based on calendar year data (January through December) although, as noted in the section on input files, some of the hydrologic input data was furnished in water years defined as October 1 through September 30. The currently available hydrology data spans the 48 year period from 1947 through 1994. Finally, the variable cost of operating a hydropower plant is assumed to be \$0.00/MWhr.

DATA AND DATA SOURCES

The avoided cost data used in this analysis represent the estimated cost of incremental changes in capacity and energy for each month in the period of analysis. These avoided cost data were estimated using the AURORA model (Electric Power Information Solutions 1999) a proprietary production-cost and market simulation model. The AURORA model was used to estimate the hourly market clearing electricity price and calculate the total cost of operating the WECC and MAPP systems at a variety of market nodes within these systems. Although the AURORA model produces hourly price estimates, mean monthly avoided cost data were employed for this reconnaissance level analysis. For the Central Platte, the mean monthly avoided costs for the Eastern (MAPP) Regional node were used for this analysis. For the North Platte, the mean monthly avoided costs for the 4-Corners node were used for this analysis. The mean monthly avoided costs (prices) for each year in the North Platte analysis may be found in Appendix 2. The mean monthly avoided costs (prices) for each year in the Central Platte analysis may be found in Appendix 1.

OPERATION OF THE P_GENV4 MODEL

Double clicking on the P_GENV4 icon will start the program and display the opening window shown in Figure 1.

Analysis location. In the upper left-hand corner of the opening window is a radio button box entitled, “Analysis Location.” By clicking on the appropriate radio button, the user can specify the scope of the analysis undertaken. The P_GENV4 program uses this information to filter the files shown in the file selection dialog, to determine the format of the input files, to control the details of the calculations and to specify the form of the output files.

Input Data Files. On the lefthand side of the opening window is a group box labeled “Input Data Files.” By using the file selection buttons in this group box, the user can select the base case generation file, the alternate (alt.) case generation file and the avoided cost (price) file that will be used in the analysis. Pressing the buttons triggers a standard Windows 9x file selection dialog. Note there is only limited error checking associated with the file selection process. If the user selects the wrong file or an inappropriately formatted file, a run-time error may result.

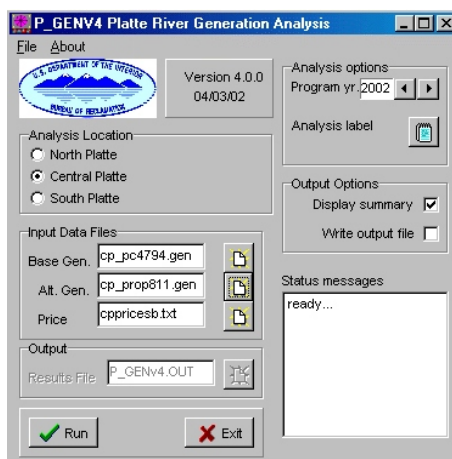


Figure 1. P_GENV4 opening window.

Analysis options. In the upper right-hand corner of the opening window is a group box entitled, “Analysis options.” There are two options in this group. The program year (yr) spinner button allows the user to select the year of the EIS program for analysis. The P_GENV4 program uses the user-indicated year to select the appropriate avoided costs for use in the analysis and to write an identifying label to the output file. Clicking on the button labeled, “Analysis label,” opens an edit dialog. The user can optionally enter a short phrase or description in this box which will be printed in the output file to assist in identifying and describing the results.

Output Options. On the right-hand side of the opening window is a group box entitled, “Output Options.” In this version of the program, the “Display summary” option is checked by default. If this option remains checked, a summary output window will be displayed when the program is run. If the “Write output file” box is checked, an output file will be written to disk and the “Results File” edit dialog is enabled, allowing the user to specify a name for the output file.

Output. The group box labeled “Output” allows the user to select the name of the output file, if one is indicated for the analysis (see “Output Options”). If the write output file box is checked, an extensive output file will be written to disk. This output file will be written to the filename indicated in the “Results File” box. The default output file name is P_GENV4.OUT. If the filename is not changed by the user, all results are written to the default output file. If this file already exists, a dialog box will appear and ask the user if they wish to overwrite the existing file. If the user indicates “yes,” the file is overwritten. If the user indicates “no,” they are prompted to enter a new output file name.

Running the program. When the user has selected the desired input data files, analysis options and output options, they should click on the “Run” button to operate the program. Either the summary window will be displayed, an output file will be written, or both from the successful completion of the program.

Status messages. In the lower right hand side of the opening screen is a memo box entitled, “Status messages.” Initially, this box should say, “ready...” When the program is run, a number of status messages will scroll by very rapidly in this box. These messages indicate the progress of the analysis. This information is primarily valuable for finding and detecting errors should they occur.

Output file. The P_GENV4 program can optionally write a relatively voluminous report to the user specified output file. Appendix 7 illustrates an example output file. This output file can be read in any text editor such as WORDPAD.

Summary output window. If the “Display output” option is checked when the program is run, a window will be displayed which summarizes the results of the analysis. This is illustrated in Figure 2.

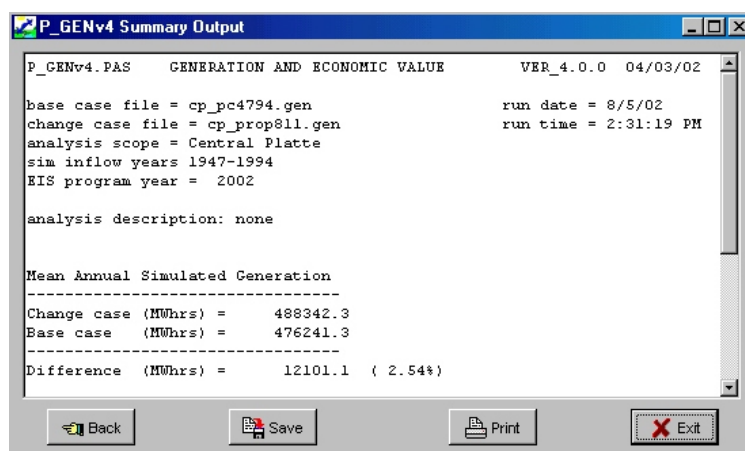


Figure 2. P_GENv4's summary output window.

The user may print the summary output to a file or send it to a local or network printer by clicking on the appropriate button and using standard Windows dialogs.

OPERATION OF THE P_CAPV6 MODEL

Double clicking on the P_CAPV6 icon will start the program and display the opening window shown in Figure 3.

Analysis location. In the upper left-hand corner of the opening window is a radio button box entitled, “Analysis Location.” By clicking on the appropriate radio button, the user can specify the scope of the analysis undertaken. The P_CAPV6 program uses this information to filter the data files shown in the file selection box (see “Input Data Files), determine the format of the input files, control some of the calculations and specify the form of the output files.

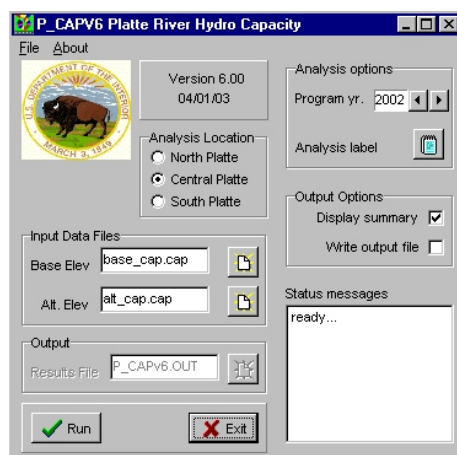


Figure 3. P_CAPV6 opening window.

Input Data Files. On the left-hand side of the opening window is a group box labeled “Input Data Files.” By using the file selection buttons in this group box, the user can select the base case generation file, the alternate (alt.) case generation file and the price file which will be used in the analysis. Pressing the buttons triggers a standard Windows 9x file selection dialog. Although the files are “filtered” to aid in identifying and selecting the correct ones, there is little error checking associated with the file selection process. If the user selects the wrong file or an inappropriately formatted file, a run-time error may result.

Analysis options. In the upper right-hand corner of the opening window is a group box entitled, “Analysis options.” There are two options in this group. The program year (yr) spinner button allows the user to select the year of the EIS program which will be used for analysis. The P_CAPV6 program uses the indicated year to write a label to the output file. The program year is not used for any calculations in this version of the P_CAPV6 program. Clicking on the button labeled, “Analysis label,” opens a single line edit dialog. The user can optionally enter a short phrase or description in this box which will be printed in the output file to assist in identifying and describing the results.

Output Options. On the right-hand side of the opening window is a group box entitled, “Output Options.” In this version of the program, the “Display summary” option is checked by default. If this option remains checked, a summary output window will be displayed when the program is run. If the “Write output file” box is checked, an output file will be written to disk and the “Results File” edit box is enabled allowing the user to specify a user defined name for the output file.

Output. The group box labeled “Output” allows the user to select the name of the output file, if one is indicated for the analysis (see “Output Options”). If the write output file box is checked,

an extensive output file will be written. This output file will be written to the filename indicated in the “Results File” box. The default output file name is P_CAPV6.OUT. If the filename is not changed by the user, all results are written to the default output file. If this file already exists, a dialog box will appear and ask the user if they wish to overwrite the existing file. If the user indicates “yes,” the file is overwritten. If the user indicates “no,” they will be prompted to enter a new output file name.

Running the program. When the user has selected the desired input data files, analysis options and output options, they should click on the “Run” button to operate the program. Either the summary window will appear, an output file will be written, or both will result from the successful completion of the program.

Status messages. In the lower right hand side of the opening screen is a memo box entitled, “Status messages.” Initially, this box should say, “ready...” When the program is run, a number of status messages will scroll by very rapidly in this box. These messages indicate the progress of the analysis. This information is primarily valuable for finding and detecting errors.

Output file. Assuming the write output file has been checked, a comprehensive report is written to an output file (see “Output options”). Appendix 8 illustrates an example output file. This output file can be read in any text editor such as WORDPAD.

Summary output window. If the “Display output” option is checked when the program is run, a window will be displayed which summarizes the results of the analysis. This is illustrated in Figure 4.

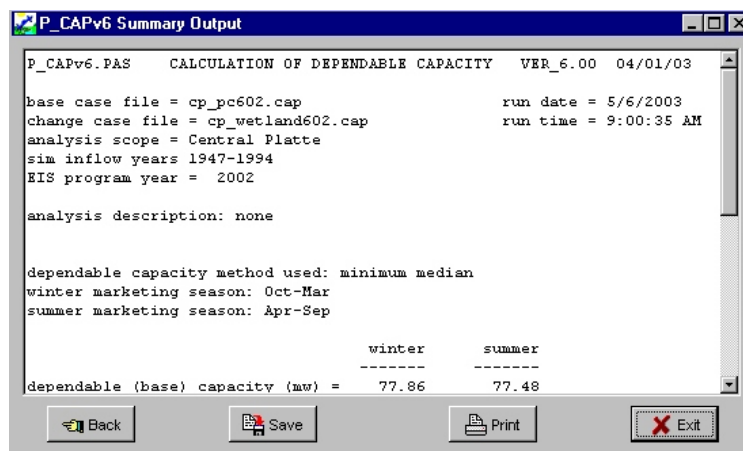


Figure 4. P_CAPV6's summary output window.

The user may print the summary output to a file or send it to a local or network printer by clicking on the appropriate button and using standard Windows dialogs.

KNOWN PROGRAM DEFICIENCIES

While P_CAPV6 and P_GENV4 models have proven to be satisfactory for the analyses undertaken thus far, but they do have some known deficiencies. First, both models are insufficiently developed and are functionally inconsistent with the Microsoft Win 9x and NT logo requirements. Among other things, the models do not (currently) have an installation/de-installation program, do not use the windows system registry and do not have a help system. Although this may or may not be important for its intended uses, if general release of this program is contemplated, further thought should be devoted to this topic. As noted elsewhere and perhaps of more import to its intended use, the P_CAPV6 and P_GENV4 models have only limited error trapping capability. This is particularly evident with respect to file input/output. As a result, under certain circumstances it is possible to produce run-time errors which result in rather abrupt and unforeseen program terminations. The current versions of the P_CAPV6 and P_GENV4 programs are limited to the use of short (DOS) filenames and will not correctly use long (Windows 9x) filenames. Consequently, the programs and their required data files *must* be in the same directories for use. This shortcoming may be rectified in subsequent versions of these programs.

DATA FILE SPECIFICATIONS

As with all computer programs, the input data files are anticipated to be in a particular format. For instance, the P_GENV4 program expects certain data to be located in particular locations of the generation data file. If the generation data are not in the expected location, or an unexpected alphabetic character is encountered when a floating point value is anticipated, a run-time or computational error will result.

Avoided Cost (Price) files.

Avoided cost files are used by the P_GENV4 program. These files are denoted by their three character filename extension which is *.txt. Use of this filename extension allows the file selection dialog to filter out all other files. This aids in identifying and selecting the correct data files. The avoided cost files used in the North Platte analysis contain estimates of the monthly market clearing price for electricity in dollars per megawatt hour (\$/Mwhr) for Platte River hydropower plants located upstream of the Wyoming border. There are data for each calendar year (January - December) for the period 2001 to 2020 as shown in Appendix 2. The avoided cost files used in the Central Platte analysis contain estimates of the monthly price in dollars per megawatt hour (\$/Mwhr) for Platte River hydropower plants located downstream of the Wyoming border. There are data for each calendar year (January - December) for the period 2001 to 2020 as illustrated in Appendix 1.

The format of the avoided cost files is identical for both the North Platte and Central Platte. Each avoided cost file has an 11 line header, which is not used by the model but must be present. The data starts in line 12 of the data file. The first column in the data file is the year. The year column must be present but is not used by the modeling program. The next 12 columns of data are the avoided costs in \$/MWhr for the months of January through December.

Central Platte generation file.

Generation files are used by the P_GENV4 program. The Central Platte generation files are denoted by their three character filename extension which is *.gen. Use of this filename extension allows the file selection dialog to filter out all other files. This aids in identifying and selecting the correct data files. The generation files used in the Central Platte analysis contain the total monthly generation in gigawatt hours (Gwhrs) for all of the hydropower plants on the Platte River located downstream of the Wyoming border. There are monthly data for each calendar year (January - December) for the simulation period 1947 to 1994. These generation data are calculated by the Central Platte OPSTUDY Model and are extracted from Table 26 of that model's output file (filename=*.TAB).

The Central Platte generation files have an 8 line header, which is not used by the model but must be present. The data starts in line 9 of the data file. The first column of data in the file is the year. The year column must be present but is not used by the modeling program. The next 12 columns of data are the generation in Gwhrs for the months of January through December. The last column of data is the total generation for the year. This column is not used by the program but must be present in the data file. An example Central Platte generation file can be found in Appendix 3.

North Platte generation file.

Generation files are used by P_GENV4. The North Platte generation files are denoted by their three character filename extension which is *.rgn. Use of this filename extension allows the file selection dialog to filter out all other files. This aids in identifying and selecting the correct data files. The generation files used in the North Platte analysis contain the total monthly generation in gigawatt hours (Gwhrs) for all of the hydropower plants on the Platte River upstream of the Wyoming border. There are monthly data for each water year (October - September) for the simulation period 1947 to 1994. These generation data are calculated by the North Platte River Utilization Model (NPRUM) and are extracted from Table 19 of the NPRWUM output file (filename=RESOP.TXT).

The North Platte generation files are comma “,” delimited and have a 1 line file header, which while not used, must be present in the data file. The data starts in line 2 of the data file. The first column of data in the file is the water year. The water year column must be present but is not used by the modeling program. The next 12 columns of data are the generation in Gwhrs for the months of October through September. The last column of data is the total generation for the water year. This column is not used by the program but must be present in the data file. An example North Platte generation file can be found in Appendix 4.

Central Platte capacity file.

Capacity files are used by P_CAPV6. These files are denoted by their three character filename extension which is *.cap. Use of this filename extension allows the file selection dialog to filter out all other files. This aids in identifying and selecting the correct data files. The capacity files used in the Central Platte analysis contain the estimated maximum generation capability for all of the units in the Central Platte Basin for each calendar year (January - December) for the simulation period 1947 to 1994. These data are used by the model to calculate the dependable capacity for the Central Platte System. These capacity data are calculated by the Central Platte OPSTUDY Model and are extracted from Table 147 of the OPSTUDY output file (filename=*.TAB).

The Central Platte capacity files have an 8 line header, which is not used by the model but must be present. The data starts in line 9 of the data file. The first column in the data file is the year. The year column must be present but is not used by the modeling program. The next 12 columns of data are the capacity values for the months January through December. The last column of data is the total for the year. This column is not used by the program but must be present in the data file. Appendix 5 illustrates an example Central Platte capacity file.

North Platte capacity file.

Capacity files are used by P_CAPV6. The North Platte capacity files are denoted by their three character filename extension which is *.rcp. Use of this filename extension allows the file selection dialog to filter out all other files. This aids in identifying and selecting the correct data files. The capacity files used in the North Platte analysis contain the maximum generation capability for all of the hydropower plants in the North Platte System. These data are in megawatts (MW). These capacity data are calculated by the North Platte River Utilization Model (NPRUM) for each water year (October through September) in the simulation period 1947-1994. The aggregate data for all of the plants in the system are extracted from Table 51 of the output produced by the NPRUM model (filename=RESOP.TXT).

The North Platte capacity files are comma “,” delimited and have a 1 line file header, which while not used, must be present in the data file. The data starts in line 2 of the data file. The first column of data in the file is the water year. The water year column must be present but is not used by the modeling program. The next 12 columns of data are the capacity in MW for the months of October through September. The last column of data is the total for the water year. This column is not used by the program but must be present in the data file. Appendix 6 contains an example North Platte capacity file.

RUN-TIME ERRORS & SUPPORT

The most common causes of run-time errors when using the P_CAPV6 and P_GENV4 models are (a) a missing input file, (b) the selection of the wrong input file, or (c) the use of a file which is incorrectly formatted. To date, no other sources of run-time errors have been documented.

Although every effort has been made to find and fix programming errors, there is no way to guarantee that these, or any other programs, are bug-free.

In the event you encounter a *repeatable* run-time error, the first thing to do is systematically ensure that the input data files used for analysis are present, properly formatted and do not contain extraneous alphabetic characters in fields where numeric characters are expected. If the problem persists: (1) record the last message which appears in the status message box, (2) transmit this information along with a description of the error messages and the input data files being used to:

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(303) 445-2733 [voice]
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APPENDIX 1. CENTRAL PLATTE PRICE FILE

filename=cppricesb.xls

D_Harpman

10/9/01

Average Monthly Energy Prices in the Central Platte River Basin (\$/Mwhr)

Source:AURORA Simulated Prices for the Eastern Region MAPP Node as modeled by David Harpman (USBR)using the default database on 02/20/2001

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|-------|
| * | | | | | | | | | | | | |
| 2001 | 30.76 | 23.68 | 23.10 | 18.97 | 25.44 | 37.90 | 48.05 | 40.82 | 31.98 | 25.36 | 25.50 | 37.19 |
| 2002 | 32.01 | 24.76 | 23.94 | 20.09 | 24.23 | 38.16 | 58.08 | 43.80 | 31.90 | 24.93 | 25.89 | 35.83 |
| 2003 | 25.75 | 19.83 | 17.70 | 9.72 | 30.66 | 45.99 | 73.24 | 56.87 | 40.95 | 15.92 | 22.59 | 29.07 |
| 2004 | 25.58 | 19.85 | 17.56 | 10.22 | 31.52 | 45.68 | 77.46 | 61.43 | 41.01 | 16.59 | 21.44 | 29.21 |
| 2005 | 23.13 | 18.87 | 16.83 | 10.16 | 32.80 | 48.53 | 73.33 | 59.01 | 40.00 | 17.39 | 21.13 | 25.93 |
| 2006 | 24.48 | 19.33 | 17.68 | 10.76 | 37.99 | 53.25 | 76.59 | 63.54 | 41.88 | 18.91 | 21.87 | 27.00 |
| 2007 | 23.76 | 19.09 | 17.28 | 11.16 | 35.98 | 60.90 | 80.87 | 64.50 | 43.85 | 20.20 | 21.79 | 27.27 |
| 2008 | 23.93 | 18.57 | 17.18 | 11.15 | 36.87 | 65.81 | 81.85 | 70.43 | 45.84 | 20.48 | 22.04 | 27.26 |
| 2009 | 25.16 | 19.39 | 17.67 | 11.49 | 37.50 | 66.41 | 88.93 | 74.29 | 46.67 | 21.83 | 23.48 | 28.32 |
| 2010 | 28.09 | 22.06 | 19.69 | 12.48 | 38.47 | 75.17 | 104.53 | 88.23 | 50.81 | 24.35 | 25.70 | 31.92 |
| 2011 | 29.27 | 22.59 | 20.41 | 13.03 | 40.09 | 76.44 | 116.10 | 91.94 | 52.13 | 25.22 | 27.10 | 33.44 |
| 2012 | 28.74 | 22.00 | 20.24 | 12.92 | 40.50 | 74.59 | 113.73 | 83.64 | 50.20 | 25.03 | 27.32 | 33.35 |
| 2013 | 27.32 | 20.38 | 18.96 | 12.55 | 39.24 | 73.04 | 118.42 | 85.18 | 50.47 | 23.48 | 25.53 | 32.04 |
| 2014 | 27.77 | 21.07 | 19.47 | 12.64 | 40.56 | 77.69 | 122.06 | 93.28 | 53.61 | 24.13 | 25.92 | 32.95 |
| 2015 | 27.54 | 20.79 | 18.87 | 12.80 | 40.30 | 80.38 | 118.57 | 90.96 | 56.44 | 24.12 | 26.24 | 32.66 |
| 2016 | 31.31 | 23.22 | 21.08 | 13.71 | 42.84 | 91.20 | 139.41 | 98.44 | 57.98 | 27.77 | 29.34 | 36.61 |
| 2017 | 31.57 | 23.02 | 21.31 | 13.98 | 45.06 | 98.51 | 157.84 | 113.14 | 59.04 | 27.99 | 30.11 | 36.90 |
| 2018 | 33.67 | 23.86 | 21.38 | 14.31 | 45.50 | 100.05 | 157.91 | 108.72 | 63.98 | 28.61 | 29.59 | 38.62 |
| 2019 | 34.32 | 24.64 | 22.49 | 14.91 | 48.33 | 104.65 | 166.78 | 113.39 | 64.64 | 30.36 | 30.96 | 39.94 |
| 2020 | 35.67 | 25.42 | 23.62 | 15.36 | 50.30 | 109.09 | 172.81 | 121.31 | 71.63 | 29.16 | 32.06 | 42.06 |

APPENDIX 2. NORTH PLATTE PRICE FILE

filename= nppricesb.xls

D_Harpman

10/09/2001

Average Monthly Energy Prices in the North Platte River Basin (\$/Mwhr)

Source: AURORA Simulated Prices at the WECC 4-Corners Node as modeled by Earl Ekstrand (USBR) using the default database on 02/20/2001

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|
| * | | | | | | | | | | | | |
| 2001 | 89.06 | 75.73 | 71.51 | 60.69 | 62.80 | 79.39 | 110.16 | 119.40 | 107.27 | 82.77 | 81.91 | 84.14 |
| 2002 | 60.53 | 52.88 | 48.36 | 41.69 | 43.83 | 55.37 | 79.10 | 82.56 | 75.23 | 59.15 | 59.15 | 61.02 |
| 2003 | 47.91 | 40.37 | 37.14 | 32.18 | 35.62 | 44.55 | 63.51 | 65.33 | 59.07 | 46.48 | 47.48 | 49.49 |
| 2004 | 41.03 | 34.81 | 32.37 | 28.03 | 30.84 | 38.52 | 61.01 | 63.50 | 55.42 | 40.96 | 41.59 | 42.62 |
| 2005 | 39.67 | 34.05 | 31.46 | 27.10 | 30.03 | 37.63 | 65.97 | 69.12 | 56.91 | 39.19 | 39.77 | 40.41 |
| 2006 | 40.89 | 34.73 | 31.95 | 27.67 | 30.64 | 38.50 | 73.81 | 76.45 | 60.05 | 40.22 | 40.87 | 41.68 |
| 2007 | 42.03 | 35.70 | 33.68 | 29.13 | 31.81 | 39.51 | 80.47 | 91.43 | 70.80 | 41.92 | 42.42 | 42.92 |
| 2008 | 44.20 | 37.72 | 34.95 | 31.17 | 33.68 | 41.86 | 94.28 | 108.05 | 79.71 | 44.07 | 43.05 | 44.71 |
| 2009 | 45.91 | 38.94 | 36.40 | 32.88 | 35.79 | 45.95 | 123.20 | 134.72 | 96.31 | 46.75 | 46.14 | 46.94 |
| 2010 | 46.88 | 40.18 | 36.97 | 34.04 | 37.09 | 49.16 | 125.97 | 137.97 | 92.88 | 47.51 | 47.11 | 48.93 |
| 2011 | 49.07 | 41.87 | 38.47 | 35.91 | 38.62 | 50.58 | 127.85 | 140.97 | 94.32 | 49.45 | 49.49 | 50.36 |
| 2012 | 50.51 | 43.52 | 40.43 | 37.07 | 39.89 | 51.09 | 135.11 | 139.99 | 91.35 | 51.37 | 50.49 | 51.65 |
| 2013 | 52.28 | 44.84 | 41.62 | 38.61 | 40.72 | 53.27 | 139.97 | 145.22 | 94.17 | 52.28 | 51.21 | 53.26 |
| 2014 | 52.72 | 45.44 | 42.95 | 39.73 | 43.67 | 54.05 | 142.31 | 145.95 | 94.06 | 53.10 | 51.98 | 54.02 |
| 2015 | 54.56 | 47.19 | 44.15 | 40.93 | 44.81 | 55.58 | 143.95 | 149.76 | 96.68 | 52.92 | 53.07 | 56.05 |
| 2016 | 55.46 | 47.62 | 45.66 | 44.14 | 46.11 | 56.41 | 141.98 | 151.34 | 94.28 | 54.38 | 54.21 | 56.84 |
| 2017 | 57.11 | 49.18 | 46.62 | 44.19 | 50.65 | 56.31 | 140.09 | 149.24 | 92.56 | 55.96 | 55.27 | 58.42 |
| 2018 | 61.78 | 52.49 | 49.79 | 45.59 | 55.60 | 59.86 | 158.35 | 173.08 | 103.20 | 58.86 | 58.23 | 61.48 |
| 2019 | 61.63 | 53.87 | 50.49 | 47.17 | 52.51 | 61.62 | 156.67 | 171.50 | 102.05 | 59.13 | 57.86 | 61.61 |
| 2020 | 63.75 | 55.40 | 51.70 | 50.26 | 59.58 | 66.86 | 152.77 | 166.38 | 98.43 | 59.31 | 59.69 | 64.28 |

APPENDIX 3. EXAMPLE CENTRAL PLATTE GENERATION FILE

filename=cp_proposed.gen

STUDY NO. Proposed Date: 03/09/2000 Time: 11:50 AM

CENTRAL PLATTE EIS OPSTUDY MODEL VERSION 2000.02.12

USED FOR FSR ANALYSIS

TABLE 26. TOTAL HYDRO GENERATION (MKWH)

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| * | | | | | | | | | | | | | |
| 1947 | 33.4 | 58.2 | 63.8 | 59.4 | 63.7 | 48.1 | 62.4 | 72.6 | 58.0 | 59.9 | 36.2 | 55.2 | 670.7 |
| 1948 | 49.9 | 54.3 | 70.5 | 60.2 | 57.9 | 62.5 | 63.2 | 59.1 | 47.4 | 52.1 | 37.8 | 23.1 | 638.1 |
| 1949 | 23.5 | 53.8 | 29.1 | 41.4 | 50.6 | 38.2 | 51.6 | 65.4 | 51.3 | 62.3 | 37.2 | 30.6 | 535.0 |
| 1950 | 42.1 | 46.6 | 65.4 | 59.6 | 55.8 | 66.4 | 50.2 | 58.4 | 45.5 | 57.7 | 40.9 | 19.4 | 608.1 |
| 1951 | 20.7 | 48.3 | 64.4 | 57.9 | 43.3 | 40.6 | 46.2 | 60.2 | 49.2 | 58.7 | 42.7 | 32.8 | 564.7 |
| 1952 | 26.0 | 58.3 | 74.7 | 56.3 | 42.0 | 60.1 | 73.2 | 61.2 | 58.1 | 42.6 | 41.1 | 21.6 | 615.2 |
| 1953 | 22.2 | 54.5 | 63.3 | 55.1 | 54.4 | 60.9 | 66.3 | 56.6 | 47.6 | 33.4 | 37.4 | 20.0 | 571.6 |
| 1954 | 21.8 | 40.2 | 59.6 | 42.9 | 40.0 | 51.7 | 60.0 | 38.2 | 36.5 | 16.1 | 19.1 | 17.8 | 444.1 |
| 1955 | 17.7 | 30.6 | 22.2 | 20.1 | 29.2 | 30.6 | 55.2 | 54.6 | 35.4 | 14.1 | 14.8 | 12.8 | 337.3 |
| 1956 | 12.8 | 27.2 | 16.9 | 17.1 | 35.7 | 44.9 | 53.6 | 51.2 | 39.5 | 17.6 | 13.8 | 11.2 | 341.7 |
| 1957 | 13.1 | 24.1 | 15.7 | 15.9 | 41.0 | 38.3 | 48.7 | 52.4 | 29.6 | 17.2 | 29.6 | 24.1 | 349.7 |
| 1958 | 33.1 | 40.1 | 34.5 | 33.0 | 40.7 | 37.6 | 39.4 | 63.7 | 55.3 | 38.2 | 37.2 | 23.8 | 476.7 |
| 1959 | 27.9 | 53.6 | 31.6 | 46.6 | 46.4 | 57.6 | 54.7 | 57.2 | 53.7 | 16.0 | 32.2 | 24.4 | 501.9 |
| 1960 | 25.3 | 27.8 | 30.0 | 34.5 | 34.4 | 57.4 | 57.1 | 59.0 | 38.4 | 21.1 | 19.7 | 20.7 | 425.5 |
| 1961 | 17.7 | 25.0 | 33.8 | 38.8 | 33.0 | 42.4 | 62.3 | 51.2 | 35.0 | 33.1 | 39.3 | 37.1 | 448.6 |
| 1962 | 36.3 | 41.9 | 36.7 | 46.9 | 32.5 | 38.3 | 39.0 | 58.0 | 56.5 | 51.9 | 37.6 | 25.2 | 500.9 |
| 1963 | 27.8 | 36.5 | 56.8 | 44.8 | 38.8 | 53.0 | 65.8 | 52.2 | 34.5 | 20.1 | 23.1 | 16.9 | 470.3 |
| 1964 | 20.2 | 33.6 | 23.2 | 37.9 | 38.6 | 50.5 | 57.5 | 53.1 | 38.8 | 16.7 | 22.5 | 17.6 | 410.1 |
| 1965 | 17.2 | 29.5 | 24.2 | 18.7 | 23.7 | 37.6 | 45.7 | 49.5 | 24.7 | 34.4 | 36.9 | 34.1 | 376.3 |
| 1966 | 31.1 | 40.2 | 54.4 | 49.8 | 39.7 | 55.3 | 63.1 | 47.9 | 40.4 | 37.8 | 39.1 | 27.4 | 526.3 |
| 1967 | 21.4 | 53.8 | 40.4 | 42.3 | 37.8 | 31.5 | 47.9 | 62.1 | 38.1 | 36.3 | 32.4 | 25.9 | 469.9 |
| 1968 | 25.4 | 49.3 | 36.3 | 37.4 | 39.0 | 51.7 | 62.4 | 52.0 | 49.0 | 36.4 | 33.7 | 30.4 | 502.9 |
| 1969 | 21.8 | 54.0 | 32.7 | 44.2 | 42.3 | 44.9 | 43.8 | 63.8 | 35.1 | 29.5 | 32.8 | 32.3 | 477.1 |
| 1970 | 39.9 | 45.1 | 61.2 | 44.3 | 42.2 | 49.1 | 61.9 | 60.2 | 56.3 | 45.4 | 36.1 | 31.2 | 572.9 |
| 1971 | 30.1 | 51.5 | 56.4 | 59.4 | 53.5 | 63.3 | 69.9 | 72.3 | 60.5 | 53.4 | 50.4 | 52.9 | 673.7 |
| 1972 | 54.8 | 53.2 | 65.1 | 58.5 | 52.7 | 62.7 | 68.8 | 58.4 | 56.7 | 33.0 | 33.9 | 20.1 | 618.0 |
| 1973 | 25.4 | 37.1 | 46.6 | 59.4 | 88.5 | 82.7 | 68.2 | 73.6 | 52.3 | 66.0 | 61.6 | 62.5 | 724.0 |
| 1974 | 51.0 | 58.3 | 63.7 | 74.2 | 60.4 | 62.1 | 79.1 | 65.0 | 57.6 | 48.1 | 56.0 | 31.6 | 707.3 |
| 1975 | 25.8 | 55.5 | 64.4 | 54.6 | 52.6 | 44.4 | 68.4 | 63.1 | 52.8 | 46.8 | 37.7 | 23.5 | 589.5 |

| | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| 1976 | 27.5 | 54.5 | 49.5 | 55.6 | 51.3 | 59.0 | 67.2 | 61.6 | 56.0 | 21.3 | 22.8 | 18.1 | 544.2 |
| 1977 | 19.1 | 35.7 | 29.9 | 34.6 | 36.5 | 47.6 | 64.8 | 49.0 | 36.5 | 18.9 | 21.5 | 18.1 | 412.1 |
| 1978 | 17.9 | 31.4 | 18.2 | 43.5 | 38.3 | 45.0 | 64.2 | 56.0 | 42.9 | 18.7 | 21.6 | 18.1 | 415.9 |
| 1979 | 19.1 | 36.3 | 26.1 | 43.0 | 34.5 | 37.6 | 32.5 | 59.0 | 45.2 | 18.1 | 33.7 | 34.2 | 419.3 |
| 1980 | 36.4 | 43.2 | 41.2 | 45.2 | 41.8 | 37.8 | 74.1 | 63.3 | 54.0 | 51.3 | 39.1 | 24.3 | 551.6 |
| 1981 | 28.8 | 54.1 | 40.6 | 40.5 | 36.5 | 46.7 | 51.6 | 39.7 | 37.1 | 26.3 | 22.5 | 17.3 | 441.7 |
| 1982 | 18.6 | 30.0 | 27.7 | 43.0 | 38.9 | 45.9 | 55.0 | 53.1 | 35.5 | 23.8 | 22.2 | 18.7 | 412.4 |
| 1983 | 39.2 | 40.6 | 43.2 | 44.9 | 53.9 | 84.8 | 89.3 | 65.8 | 57.5 | 63.3 | 58.7 | 60.8 | 701.9 |
| 1984 | 51.3 | 57.3 | 66.9 | 62.5 | 90.9 | 85.6 | 80.1 | 72.2 | 43.9 | 62.8 | 61.5 | 62.3 | 797.4 |
| 1985 | 48.4 | 53.7 | 67.1 | 57.9 | 43.7 | 58.6 | 69.7 | 53.9 | 48.0 | 52.7 | 44.3 | 25.1 | 623.1 |
| 1986 | 37.8 | 41.7 | 63.1 | 59.4 | 60.7 | 70.2 | 72.5 | 70.0 | 52.0 | 61.6 | 54.7 | 63.0 | 706.8 |
| 1987 | 48.0 | 52.0 | 62.3 | 52.6 | 43.4 | 39.7 | 50.1 | 67.1 | 54.8 | 60.6 | 53.5 | 43.2 | 627.2 |
| 1988 | 44.5 | 50.8 | 60.6 | 57.5 | 46.9 | 63.8 | 50.7 | 60.8 | 48.0 | 58.3 | 48.2 | 23.5 | 613.5 |
| 1989 | 24.2 | 56.1 | 32.0 | 47.2 | 44.0 | 52.5 | 49.1 | 60.5 | 35.7 | 26.6 | 23.1 | 18.8 | 469.8 |
| 1990 | 18.8 | 29.9 | 29.4 | 28.1 | 12.4 | 46.2 | 63.4 | 51.0 | 16.7 | 16.6 | 20.5 | 17.7 | 350.6 |
| 1991 | 20.4 | 31.9 | 36.3 | 18.6 | 12.1 | 37.3 | 62.8 | 56.9 | 18.7 | 9.5 | 15.3 | 12.8 | 332.5 |
| 1992 | 18.5 | 39.9 | 34.3 | 27.3 | 20.3 | 35.5 | 31.9 | 49.8 | 23.4 | 16.9 | 19.5 | 18.1 | 335.2 |
| 1993 | 31.0 | 39.9 | 33.4 | 26.4 | 14.9 | 28.9 | 26.0 | 24.5 | 22.5 | 53.9 | 31.7 | 22.4 | 355.6 |
| 1994 | 27.9 | 55.1 | 32.5 | 44.5 | 44.3 | 51.1 | 45.3 | 59.1 | 36.9 | 29.0 | 22.6 | 18.1 | 466.5 |

APPENDIX 4. EXAMPLE NORTH PLATTE GENERATION FILE

| filename=np_landhab.rgn | | | | TABLE 19. TOTAL POWER GENERATION, GWH Land Habitat Alternative | | | | | | | | | |
|-------------------------|--------|-------|-------|--|-------|--------|-------|--------|--------|--------|--------|-------|--------|
| 1947, | 53.9, | 28.8, | 27.1, | 27.1, | 25.2, | 29.3, | 39.7, | 104.1, | 126.9, | 156.0, | 136.1, | 37.1, | 791.2 |
| 1948, | 56.5, | 30.1, | 28.4, | 28.6, | 27.1, | 28.6, | 53.5, | 107.5, | 144.4, | 130.3, | 116.1, | 55.2, | 806.4 |
| 1949, | 23.9, | 29.4, | 31.8, | 31.5, | 29.8, | 31.3, | 35.6, | 111.3, | 143.8, | 147.8, | 139.5, | 35.8, | 791.5 |
| 1950, | 28.7, | 38.5, | 25.9, | 28.9, | 34.6, | 27.5, | 39.2, | 132.7, | 152.3, | 120.7, | 101.6, | 34.3, | 764.9 |
| 1951, | 41.3, | 36.1, | 26.5, | 29.6, | 32.9, | 23.2, | 36.1, | 134.2, | 137.4, | 78.8, | 118.2, | 32.7, | 727.0 |
| 1952, | 44.8, | 35.8, | 25.8, | 29.9, | 33.2, | 45.0, | 34.6, | 148.0, | 151.5, | 138.7, | 123.3, | 74.9, | 885.5 |
| 1953, | 46.1, | 34.3, | 32.8, | 34.1, | 31.9, | 32.0, | 51.8, | 64.5, | 139.5, | 122.5, | 107.0, | 33.9, | 730.4 |
| 1954, | 16.4, | 21.6, | 22.3, | 22.2, | 25.5, | 22.4, | 43.0, | 64.0, | 35.5, | 101.3, | 113.1, | 24.7, | 511.9 |
| 1955, | 15.8, | 20.8, | 23.1, | 21.3, | 19.6, | 21.2, | 40.9, | 58.0, | 37.5, | 50.9, | 112.4, | 27.7, | 449.1 |
| 1956, | 15.5, | 20.3, | 22.1, | 20.8, | 19.5, | 21.4, | 42.8, | 89.1, | 90.7, | 124.8, | 119.7, | 21.5, | 608.1 |
| 1957, | 14.9, | 19.4, | 19.9, | 19.8, | 18.1, | 21.1, | 24.5, | 81.8, | 124.0, | 93.7, | 136.6, | 49.6, | 623.4 |
| 1958, | 21.7, | 27.2, | 28.7, | 27.3, | 26.2, | 27.3, | 44.7, | 131.7, | 128.9, | 52.3, | 116.7, | 64.3, | 697.0 |
| 1959, | 19.8, | 21.1, | 22.9, | 25.1, | 23.9, | 26.4, | 44.9, | 68.7, | 128.3, | 52.3, | 123.7, | 50.1, | 607.1 |
| 1960, | 15.5, | 22.1, | 22.4, | 21.6, | 21.1, | 28.7, | 49.5, | 63.2, | 131.5, | 116.4, | 63.4, | 25.1, | 580.5 |
| 1961, | 14.6, | 18.9, | 19.3, | 19.2, | 17.6, | 23.2, | 30.5, | 49.3, | 53.4, | 86.9, | 99.9, | 22.2, | 455.0 |
| 1962, | 16.2, | 19.2, | 21.9, | 21.8, | 19.6, | 19.7, | 63.0, | 98.8, | 117.3, | 90.9, | 115.3, | 41.9, | 645.6 |
| 1963, | 18.3, | 21.0, | 21.6, | 22.4, | 21.5, | 24.9, | 50.6, | 79.0, | 120.4, | 132.0, | 85.4, | 31.5, | 628.4 |
| 1964, | 17.1, | 19.5, | 19.9, | 19.3, | 18.0, | 19.0, | 35.9, | 79.4, | 68.1, | 125.7, | 102.9, | 60.9, | 585.7 |
| 1965, | 13.8, | 19.0, | 15.0, | 15.2, | 12.7, | 12.6, | 45.1, | 66.6, | 56.7, | 141.4, | 126.2, | 33.1, | 557.4 |
| 1966, | 17.5, | 29.2, | 24.9, | 26.7, | 24.0, | 27.2, | 46.2, | 76.2, | 126.6, | 103.5, | 108.1, | 64.5, | 674.6 |
| 1967, | 15.6, | 19.2, | 22.2, | 19.1, | 17.5, | 21.5, | 39.7, | 65.0, | 55.0, | 111.0, | 86.7, | 87.0, | 559.4 |
| 1968, | 15.4, | 20.1, | 21.0, | 21.4, | 21.0, | 23.3, | 45.1, | 83.1, | 112.8, | 140.0, | 120.8, | 34.6, | 658.7 |
| 1969, | 17.7, | 20.7, | 21.3, | 24.5, | 23.5, | 21.2, | 54.3, | 97.5, | 125.8, | 131.8, | 96.1, | 77.7, | 712.2 |
| 1970, | 16.7, | 22.2, | 23.9, | 23.9, | 20.7, | 23.4, | 46.0, | 92.8, | 72.4, | 147.3, | 131.4, | 35.9, | 656.6 |
| 1971, | 25.0, | 30.2, | 32.6, | 30.7, | 29.3, | 33.1, | 66.3, | 98.6, | 76.4, | 70.8, | 138.1, | 37.7, | 668.6 |
| 1972, | 60.5, | 35.7, | 30.2, | 30.2, | 29.1, | 30.6, | 39.3, | 80.4, | 136.8, | 131.4, | 125.2, | 34.2, | 763.5 |
| 1973, | 57.9, | 33.0, | 28.4, | 28.4, | 26.5, | 28.4, | 52.7, | 152.9, | 152.2, | 152.9, | 122.6, | 32.8, | 868.6 |
| 1974, | 96.0, | 60.4, | 30.2, | 28.2, | 88.0, | 72.9, | 50.3, | 148.4, | 151.8, | 137.6, | 138.2, | 34.0, | 1036.0 |
| 1975, | 56.2, | 30.6, | 28.4, | 28.4, | 26.5, | 28.4, | 39.4, | 141.2, | 127.2, | 159.7, | 149.0, | 50.3, | 865.2 |
| 1976, | 59.1, | 31.5, | 28.4, | 28.4, | 26.9, | 28.4, | 41.9, | 91.0, | 141.9, | 146.4, | 112.1, | 54.4, | 790.3 |
| 1977, | 38.1, | 34.9, | 25.6, | 43.0, | 32.9, | 29.7, | 48.5, | 66.6, | 137.7, | 131.6, | 47.2, | 41.7, | 677.5 |
| 1978, | 21.0, | 21.4, | 22.0, | 22.0, | 23.7, | 24.9, | 53.1, | 84.8, | 136.1, | 156.6, | 120.1, | 35.7, | 721.3 |
| 1979, | 24.2, | 22.0, | 23.5, | 28.4, | 27.7, | 25.6, | 58.2, | 135.6, | 131.7, | 132.6, | 149.6, | 37.7, | 796.9 |
| 1980, | 24.7, | 27.3, | 32.4, | 33.0, | 30.0, | 29.6, | 61.4, | 89.5, | 144.6, | 147.2, | 106.8, | 35.4, | 762.0 |
| 1981, | 32.9, | 35.2, | 26.6, | 30.8, | 32.9, | 25.6, | 61.9, | 58.5, | 142.7, | 120.7, | 48.2, | 74.3, | 690.2 |
| 1982, | 21.7, | 21.9, | 25.6, | 27.5, | 24.6, | 25.0, | 46.9, | 128.8, | 69.9, | 89.2, | 133.5, | 44.6, | 659.3 |
| 1983, | 23.8, | 34.5, | 34.1, | 32.8, | 31.1, | 30.2, | 45.5, | 54.1, | 153.0, | 161.2, | 139.4, | 36.6, | 776.2 |
| 1984, | 101.4, | 68.9, | 34.1, | 26.7, | 20.4, | 103.3, | 33.9, | 152.8, | 151.9, | 159.7, | 134.7, | 40.7, | 1028.5 |
| 1985, | 101.9, | 68.5, | 34.4, | 30.2, | 28.4, | 31.7, | 53.8, | 145.6, | 147.7, | 143.0, | 143.5, | 35.0, | 963.6 |
| 1986, | 58.1, | 31.3, | 27.1, | 27.1, | 25.3, | 31.0, | 69.7, | 132.7, | 152.2, | 161.4, | 120.4, | 35.8, | 872.2 |
| 1987, | 62.5, | 57.9, | 36.8, | 30.2, | 21.7, | 25.8, | 46.4, | 85.4, | 99.7, | 133.4, | 97.5, | 32.4, | 729.7 |
| 1988, | 37.2, | 38.4, | 27.2, | 31.1, | 35.2, | 25.7, | 50.6, | 102.7, | 138.6, | 144.6, | 152.6, | 34.1, | 818.2 |
| 1989, | 17.5, | 23.5, | 29.4, | 32.5, | 30.5, | 36.3, | 55.1, | 66.0, | 134.9, | 127.4, | 93.7, | 25.8, | 672.6 |
| 1990, | 19.7, | 21.2, | 21.8, | 22.4, | 24.2, | 27.0, | 45.9, | 52.4, | 62.8, | 124.4, | 120.9, | 29.4, | 571.9 |
| 1991, | 17.7, | 20.8, | 21.7, | 24.7, | 21.4, | 24.2, | 39.7, | 67.1, | 59.7, | 135.9, | 111.4, | 32.0, | 576.5 |
| 1992, | 16.0, | 20.9, | 21.5, | 21.5, | 21.9, | 24.3, | 42.7, | 63.2, | 108.9, | 49.7, | 106.9, | 52.4, | 549.7 |
| 1993, | 15.2, | 19.9, | 21.0, | 23.5, | 20.4, | 23.1, | 38.4, | 94.9, | 103.9, | 142.9, | 120.3, | 31.8, | 655.2 |

1994, 18.6, 21.6, 28.0, 25.1, 21.5, 24.5, 43.9, 97.9, 137.4, 113.9,
115.3, 31.7, 679.3

APPENDIX 5. EXAMPLE CENTRAL PLATTE CAPACITY FILE

filename=cp_chanmain602.cap
 STUDY NO. ChanRest Date: 08/16/2002 Time: 11:59 AM
 CENTRAL PLATTE EIS OPSTUDY MODEL VERSION 2002.02.26
 USED FOR DEIS ANALYSIS
 TABLE 147. CENTRAL PLATTE DEPENDABLE CAPACITY (MW)

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
| * | | | | | | | | | | | | | |
| 1947 | 83.501564 | 103.112839 | 100.378105 | 105.916992 | 104.303192 | 102.497589 | 106.032188 | 107.733406 | 96.884384 | 104.599312 | 102.646042 | 96.202690 | 1213.808228 |
| 1948 | 95.088211 | 109.972794 | 109.917236 | 106.638779 | 104.970520 | 96.333473 | 100.500763 | 85.415901 | 81.537727 | 103.624260 | 81.190941 | 80.848160 | 1156.038696 |
| 1949 | 76.265091 | 98.845329 | 86.116623 | 91.891457 | 97.650665 | 98.002586 | 100.055199 | 105.846962 | 89.621780 | 109.552261 | 104.077271 | 91.405952 | 1149.331177 |
| 1950 | 94.175209 | 107.721428 | 109.911934 | 101.778282 | 99.122856 | 98.589493 | 90.695351 | 93.016655 | 83.704414 | 110.977112 | 94.889465 | 81.458710 | 1166.041016 |
| 1951 | 81.228935 | 92.336678 | 111.970718 | 99.607162 | 73.399933 | 85.487480 | 91.614357 | 97.890030 | 108.510429 | 88.559448 | 116.009232 | 104.540054 | 1151.154419 |
| 1952 | 98.495636 | 113.016174 | 110.577148 | 107.572128 | 97.645302 | 102.722000 | 104.884071 | 106.231453 | 97.478386 | 107.277962 | 85.231010 | 82.670769 | 1213.802002 |
| 1953 | 83.244377 | 90.936264 | 95.348419 | 98.832718 | 99.747581 | 97.313530 | 101.911064 | 89.505859 | 93.458595 | 72.187973 | 75.139404 | 68.995483 | 1066.621338 |
| 1954 | 70.477577 | 77.694786 | 78.424446 | 84.112389 | 80.242737 | 94.232315 | 86.061150 | 82.284760 | 72.083488 | 50.698738 | 53.785789 | 53.623409 | 883.721558 |
| 1955 | 54.454269 | 58.507893 | 55.839512 | 61.250328 | 88.040718 | 62.643974 | 82.849289 | 80.370728 | 71.162209 | 41.377178 | 45.501591 | 46.444759 | 748.442505 |
| 1956 | 47.719349 | 49.225204 | 48.352264 | 52.001823 | 88.504990 | 63.550282 | 80.073433 | 73.374413 | 66.076439 | 34.362473 | 41.166523 | 40.182724 | 684.589966 |
| 1957 | 43.611046 | 44.806015 | 43.337482 | 45.826164 | 80.323288 | 83.835869 | 90.686287 | 89.977188 | 75.992760 | 59.676311 | 65.525314 | 61.438656 | 785.036377 |
| 1958 | 70.046944 | 78.230270 | 72.937927 | 73.526695 | 92.072281 | 94.322685 | 86.894890 | 102.342216 | 96.940453 | 98.827919 | 76.846649 | 71.520790 | 1014.509827 |
| 1959 | 70.805878 | 82.289841 | 77.760307 | 79.818466 | 75.906311 | 88.778587 | 96.622292 | 95.246613 | 79.021225 | 73.060303 | 72.466621 | 67.817245 | 959.593689 |
| 1960 | 68.625595 | 77.096962 | 76.961998 | 79.921127 | 71.990585 | 78.503242 | 87.377464 | 96.732224 | 95.607941 | 57.366917 | 56.727497 | 60.855991 | 908.767578 |
| 1961 | 57.535595 | 72.041100 | 61.067890 | 77.017647 | 73.004654 | 90.222702 | 96.245216 | 87.758865 | 61.974915 | 63.611732 | 83.908524 | 75.852173 | 900.241028 |
| 1962 | 73.683037 | 92.069038 | 78.122353 | 76.500420 | 74.014313 | 90.359276 | 83.967484 | 86.368042 | 88.988213 | 98.513550 | 78.057945 | 73.031456 | 993.675110 |
| 1963 | 73.503586 | 89.273453 | 86.972038 | 89.412277 | 98.496147 | 83.158913 | 88.861839 | 80.200119 | 65.807709 | 75.006981 | 74.646194 | 67.036133 | 972.375427 |
| 1964 | 67.448898 | 76.986160 | 76.173363 | 80.898186 | 91.472725 | 79.835983 | 84.119324 | 83.840080 | 68.968277 | 52.115459 | 53.718822 | 53.110157 | 868.687439 |
| 1965 | 53.996613 | 56.395760 | 57.452801 | 73.564751 | 74.380196 | 86.268799 | 91.046135 | 97.018517 | 89.807236 | 81.568825 | 86.193573 | 82.454941 | 930.148193 |
| 1966 | 75.133759 | 93.002029 | 100.297424 | 100.459183 | 97.009117 | 76.904144 | 91.264503 | 81.388092 | 78.080223 | 53.964741 | 59.764774 | 59.976017 | 967.243958 |
| 1967 | 59.761295 | 67.780037 | 65.334267 | 80.937088 | 94.295952 | 89.443703 | 102.134483 | 92.890251 | 94.079712 | 78.759865 | 76.348549 | 73.539917 | 975.305176 |
| 1968 | 78.935745 | 88.416481 | 80.349640 | 91.447685 | 96.786903 | 93.986832 | 100.724274 | 98.697273 | 86.391678 | 98.388550 | 84.133453 | 76.669876 | 1074.928467 |
| 1969 | 74.282814 | 85.186569 | 77.021210 | 94.322975 | 104.343231 | 95.935547 | 100.823883 | 96.775299 | 81.613251 | 79.313072 | 87.520866 | 87.388756 | 1064.527466 |
| 1970 | 89.794708 | 98.163017 | 101.691643 | 92.688774 | 105.253899 | 98.192429 | 99.512154 | 104.189140 | 91.484985 | 103.563400 | 82.977386 | 74.906181 | 1142.417725 |
| 1971 | 77.754219 | 95.584892 | 92.781883 | 106.572166 | 106.963684 | 102.202042 | 98.933250 | 107.257896 | 108.588402 | 88.544594 | 102.654121 | 93.531342 | 1181.368530 |
| 1972 | 90.140343 | 105.360718 | 109.780403 | 107.005836 | 99.264687 | 100.750702 | 106.902481 | 90.987709 | 95.021904 | 106.714149 | 80.854385 | 73.938820 | 1166.722168 |
| 1973 | 78.315887 | 90.722130 | 86.331451 | 107.587692 | 110.238533 | 105.722992 | 102.208977 | 107.083092 | 112.213356 | 110.131020 | 113.803307 | 111.390099 | 1235.748657 |
| 1974 | 109.512627 | 116.181839 | 110.796951 | 109.147301 | 102.135521 | 93.455193 | 105.312637 | 106.981682 | 101.863838 | 107.901596 | 95.112633 | 81.255081 | 1239.656982 |
| 1975 | 82.469795 | 94.263641 | 91.145737 | 99.130211 | 101.576683 | 92.930557 | 102.761024 | 102.343025 | 87.101624 | 101.603081 | 76.539429 | 77.175034 | 1109.039795 |
| 1976 | 79.841255 | 89.297974 | 83.348679 | 86.247627 | 96.787689 | 94.968605 | 95.263817 | 96.135727 | 95.863510 | 71.386787 | 59.034927 | 56.318825 | 1004.495422 |
| 1977 | 55.765739 | 69.527672 | 71.570961 | 77.309959 | 69.772018 | 88.306541 | 94.860802 | 86.919289 | 62.275421 | 58.832878 | 72.521217 | 57.699306 | 865.361877 |
| 1978 | 58.829823 | 62.362602 | 60.249821 | 79.972343 | 79.515770 | 94.012840 | 94.919876 | 93.262817 | 78.800781 | 57.920338 | 56.520378 | 54.647614 | 871.015015 |
| 1979 | 57.236317 | 70.053749 | 71.846603 | 79.463882 | 71.160667 | 93.010124 | 96.609962 | 97.485748 | 84.620979 | 75.327675 | 81.268265 | 85.484764 | 963.568726 |
| 1980 | 83.095772 | 98.281174 | 95.472420 | 95.754990 | 99.738159 | 100.332832 | 103.228165 | 100.669746 | 88.669228 | 100.511856 | 75.763985 | 70.649933 | 1112.168213 |
| 1981 | 73.966309 | 79.084534 | 77.419662 | 81.910919 | 69.940277 | 91.528542 | 92.788536 | 76.748329 | 72.671486 | 64.665176 | 75.202621 | 68.279922 | 924.206299 |
| 1982 | 69.125267 | 76.493973 | 80.521179 | 79.269936 | 69.666260 | 75.862373 | 94.597328 | 82.090271 | 80.957657 | 57.014160 | 66.759987 | 61.004929 | 893.363342 |
| 1983 | 76.172035 | 86.167580 | 82.448921 | 100.441696 | 107.983871 | 107.481178 | 109.354248 | 108.754051 | 109.550438 | 110.025780 | 116.060570 | 109.775040 | 1224.215332 |
| 1984 | 109.759216 | 115.501328 | 110.769180 | 110.089394 | 112.747246 | 108.811615 | 107.443916 | 107.645973 | 107.440079 | 110.332977 | 114.095497 | 111.480309 | 1326.116699 |
| 1985 | 109.137161 | 115.828049 | 109.800339 | 107.739937 | 95.110939 | 104.108635 | 99.410172 | 89.697189 | 83.371819 | 97.519394 | 88.858574 | 93.450554 | 1194.032837 |
| 1986 | 97.644592 | 109.504761 | 110.851486 | 107.848961 | 104.361229 | 104.619530 | 106.177406 | 102.048660 | 101.194748 | 88.560005 | 108.945709 | 111.017372 | 1252.774414 |
| 1987 | 98.679527 | 109.785934 | 110.451180 | 107.832726 | 99.266739 | 97.442032 | 101.616158 | 99.795082 | 99.950455 | 111.564178 | 102.623405 | 89.407501 | 1228.414917 |
| 1988 | 90.155075 | 106.176041 | 107.191429 | 105.635330 | 91.621407 | 101.312065 | 100.797005 | 90.707260 | 74.161148 | 108.320259 | 89.144440 | 75.091858 | 1140.313232 |
| 1989 | 74.465927 | 109.641472 | 101.839165 | 83.791725 | 95.818619 | 79.756622 | 84.140945 | 83.847832 | 60.505619 | 74.563950 | 57.094048 | 55.421810 | 960.887695 |
| 1990 | 59.434677 | 69.043976 | 65.821869 | 81.996140 | 58.042633 | 85.289566 | 90.374352 | 79.281723 | 62.131367 | 52.489880 | 51.117538 | 51.170658 | 806.194336 |
| 1991 | 50.600815 | 71.636765 | 62.479618 | 51.886719 | 54.101551 | 82.300720 | 89.529922 | 84.117920 | 62.710194 | 39.926720 | 47.113426 | 44.673191 | 741.077576 |

| | | | | | | | | | | | | | |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| 1992 | 50.034782 | 67.719864 | 60.462502 | 51.233788 | 53.485439 | 79.271805 | 86.760757 | 78.595375 | 58.876022 | 51.423462 | 48.716953 | 52.806290 | 739.387085 |
| 1993 | 61.786388 | 67.429321 | 70.955841 | 59.207397 | 51.743061 | 61.478325 | 71.215897 | 71.850655 | 62.958942 | 98.715675 | 56.540611 | 57.770863 | 791.653015 |
| 1994 | 58.608654 | 72.341782 | 68.164375 | 76.884789 | 80.931915 | 85.363251 | 86.607536 | 82.940712 | 64.373520 | 71.574768 | 56.808559 | 53.732018 | 858.331848 |

APPENDIX 6. EXAMPLE NORTH PLATTE CAPACITY FILE

| filename = np_landhab.rcp | TABLE 51. | TOTAL | GENERATION | CAPACITY | " | | | | | | | | |
|---------------------------|-------------|-------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1947, | 118.505211, | 70.084969, | 66.418556, | 66.417648, | 59.102547, | 71.224945, | 79.521980, | 212.654007, | 186.190353, | 227.399994, | 218.391113, | 67.981712, | 1443.893066 |
| 1948, | 121.058937, | 73.915253, | 70.533875, | 72.898293, | 68.901733, | 72.964584, | 115.107025, | 195.206497, | 218.900772, | 204.682373, | 179.556259, | 115.275124, | 1509.000610 |
| 1949, | 55.838821, | 68.952812, | 76.018318, | 76.170555, | 71.846176, | 75.942909, | 88.240952, | 208.871124, | 218.079834, | 226.779968, | 172.476471, | 68.454292, | 1407.672241 |
| 1950, | 115.969696, | 90.780327, | 62.486679, | 72.137245, | 83.184898, | 66.904800, | 92.835571, | 212.645905, | 226.767059, | 203.819443, | 158.283081, | 66.701454, | 1452.516113 |
| 1951, | 101.702400, | 86.309486, | 62.486679, | 72.714668, | 79.421379, | 109.561668, | 92.428505, | 201.978348, | 212.971970, | 183.476044, | 225.539917, | 64.729233, | 1493.320313 |
| 1952, | 58.698196, | 73.181587, | 78.941589, | 79.015373, | 75.196877, | 70.192673, | 86.144104, | 223.988220, | 226.754135, | 221.683182, | 187.210815, | 148.020203, | 1529.027100 |
| 1953, | 108.561089, | 83.149223, | 79.875771, | 83.517654, | 78.288109, | 80.216400, | 121.368813, | 144.369156, | 217.115585, | 219.675262, | 194.743988, | 66.071846, | 1476.953003 |
| 1954, | 37.472813, | 53.066277, | 54.674126, | 54.673214, | 51.541214, | 56.009575, | 101.862633, | 148.380463, | 73.729576, | 145.609009, | 196.642502, | 53.132965, | 1026.794312 |
| 1955, | 37.472813, | 53.066277, | 59.290627, | 54.673214, | 47.330276, | 54.680511, | 95.462044, | 148.746231, | 92.024300, | 103.377106, | 203.310547, | 94.554329, | 1043.988281 |
| 1956, | 37.438950, | 53.049347, | 59.110195, | 54.656284, | 51.447887, | 58.118938, | 109.509972, | 192.486176, | 201.122833, | 222.229675, | 221.232605, | 52.040218, | 1312.442993 |
| 1957, | 37.390221, | 53.024982, | 54.632832, | 54.631920, | 47.288982, | 59.439213, | 73.738663, | 181.857956, | 139.973877, | 225.539917, | 225.126556, | 103.735130, | 1256.380249 |
| 1958, | 49.991962, | 66.410851, | 70.670494, | 67.749123, | 64.912102, | 67.888123, | 114.155190, | 214.468735, | 213.792328, | 209.878632, | 195.392349, | 67.000290, | 1402.310181 |
| 1959, | 42.774063, | 53.066277, | 54.674126, | 54.673214, | 46.931217, | 59.437458, | 110.139381, | 168.650009, | 213.598358, | 216.936935, | 210.310303, | 67.842728, | 1299.034180 |
| 1960, | 38.508553, | 53.049347, | 54.657196, | 54.656284, | 51.447887, | 59.463577, | 135.476700, | 169.260788, | 221.411728, | 218.834198, | 95.298477, | 57.325562, | 1209.390259 |
| 1961, | 37.472813, | 53.066277, | 54.674126, | 54.673214, | 47.330276, | 59.480511, | 80.098862, | 144.601898, | 132.985199, | 182.096100, | 204.107040, | 54.401947, | 1104.988281 |
| 1962, | 42.400356, | 54.855595, | 55.787178, | 55.980553, | 50.662312, | 58.799652, | 141.664230, | 196.662231, | 203.074371, | 217.385986, | 204.257431, | 68.012321, | 1349.542236 |
| 1963, | 39.986622, | 53.066277, | 54.674126, | 54.673214, | 46.931217, | 65.845909, | 116.286697, | 187.112823, | 204.237717, | 224.813187, | 158.283081, | 66.302773, | 1272.213623 |
| 1964, | 42.238953, | 53.049347, | 54.653961, | 54.653370, | 51.447887, | 54.663578, | 80.882042, | 163.673401, | 138.720108, | 223.841721, | 201.858810, | 187.154144, | 1306.837402 |
| 1965, | 42.070030, | 53.024982, | 40.904221, | 40.903633, | 38.264893, | 39.506771, | 92.954041, | 153.073105, | 113.249481, | 225.630325, | 219.335480, | 67.154060, | 1126.071045 |
| 1966, | 38.717022, | 74.187981, | 66.305069, | 65.925201, | 61.029179, | 69.776131, | 108.630424, | 170.221848, | 214.595978, | 191.021057, | 202.995880, | 147.630814, | 1411.036621 |
| 1967, | 41.635269, | 53.049347, | 54.653961, | 54.653370, | 46.914284, | 54.663578, | 81.582932, | 147.641266, | 114.301216, | 224.216110, | 212.150208, | 115.303940, | 1200.765381 |
| 1968, | 38.101620, | 53.049347, | 54.653961, | 54.653370, | 51.444977, | 70.420967, | 111.140747, | 188.021515, | 204.577957, | 226.547455, | 211.530014, | 75.024719, | 1339.166748 |
| 1969, | 43.087109, | 53.049347, | 54.653961, | 66.038918, | 59.149677, | 54.663578, | 131.883667, | 203.084488, | 210.508362, | 222.161835, | 186.635117, | 169.005890, | 1453.921997 |
| 1970, | 42.115723, | 58.550602, | 62.532883, | 62.230022, | 59.828003, | 61.542503, | 113.520767, | 188.107361, | 126.099998, | 227.399994, | 215.303009, | 67.006355, | 1284.237183 |
| 1971, | 60.389919, | 74.445160, | 79.945549, | 75.970039, | 72.348534, | 81.609497, | 145.061783, | 119.585350, | 123.613213, | 121.554657, | 219.466751, | 69.618088, | 1243.608521 |
| 1972, | 156.680542, | 95.485939, | 75.340958, | 75.343491, | 74.287766, | 75.349121, | 79.531326, | 173.693329, | 217.902161, | 203.350433, | 203.156311, | 63.438850, | 1493.560181 |
| 1973, | 125.796715, | 80.832001, | 70.322838, | 70.321930, | 63.006824, | 70.329224, | 120.949387, | 227.399994, | 227.077072, | 227.244995, | 185.892761, | 59.164925, | 1528.338745 |
| 1974, | 202.871246, | 152.927521, | 75.325226, | 71.235855, | 45.118984, | 68.632347, | 135.670731, | 227.399994, | 227.077072, | 216.383148, | 218.216705, | 63.025993, | 1703.884766 |
| 1975, | 124.661186, | 75.080704, | 70.347206, | 70.346291, | 63.031189, | 70.353592, | 92.730835, | 218.374527, | 215.899307, | 226.469955, | 224.966370, | 106.335571, | 1558.596558 |
| 1976, | 127.428154, | 77.489754, | 70.347198, | 70.346291, | 67.165733, | 70.353584, | 93.645874, | 190.970657, | 216.607986, | 224.926498, | 187.383530, | 115.063301, | 1511.728638 |
| 1977, | 86.932961, | 84.357758, | 62.503609, | 69.628471, | 112.631790, | 74.718941, | 85.491676, | 136.330597, | 215.294983, | 219.098297, | 85.012321, | 80.586258, | 1312.587769 |
| 1978, | 49.943233, | 53.024982, | 54.632832, | 54.631920, | 54.067112, | 64.557129, | 119.883316, | 185.222855, | 214.987595, | 226.457031, | 225.539917, | 82.139908, | 1385.087769 |
| 1979, | 59.865101, | 66.875626, | 74.861679, | 74.627975, | 72.013557, | 69.891968, | 137.520309, | 215.383087, | 215.008102, | 223.365860, | 225.539917, | 70.847519, | 1505.800781 |
| 1980, | 60.226418, | 56.929058, | 77.814964, | 80.606163, | 73.833664, | 72.971222, | 144.416031, | 211.447037, | 218.526215, | 222.809052, | 168.624664, | 86.201141, | 1474.405640 |
| 1981, | 83.072334, | 85.025681, | 62.503613, | 76.312469, | 80.059822, | 62.513229, | 145.534790, | 139.552521, | 221.410583, | 209.055847, | 86.812317, | 139.231918, | 1391.085205 |
| 1982, | 54.074154, | 53.024982, | 54.629597, | 62.873821, | 60.813072, | 63.671268, | 107.419762, | 213.082581, | 127.900002, | 227.115814, | 225.682007, | 63.684505, | 1313.971558 |
| 1983, | 56.908421, | 65.790710, | 75.139236, | 73.260391, | 69.537155, | 68.383591, | 105.408852, | 127.712212, | 227.077072, | 227.193329, | 221.759003, | 75.860512, | 1394.030518 |
| 1984, | 199.467865, | 166.487549, | 82.904968, | 79.634880, | 51.864113, | 45.986732, | 82.398979, | 227.399994, | 227.077072, | 226.896225, | 207.515305, | 95.565010, | 1693.198730 |
| 1985, | 203.089249, | 171.747742, | 85.520500, | 75.343491, | 68.511017, | 45.522491, | 130.461563, | 218.954666, | 222.523209, | 222.593781, | 224.790390, | 67.167152, | 1736.225220 |
| 1986, | 126.265358, | 75.849358, | 66.394196, | 66.393280, | 59.078182, | 74.649475, | 153.202606, | 213.794952, | 227.077072, | 227.399994, | 200.850388, | 64.889259, | 1555.844116 |
| 1987, | 199.685989, | 145.555710, | 79.575569, | 75.354424, | 55.903011, | 47.110104, | 71.635979, | 186.803436, | 193.093781, | 207.277390, | 158.283081, | 60.331188, | 1480.609619 |
| 1988, | 84.817146, | 88.536278, | 67.836876, | 75.034096, | 84.539230, | 62.496296, | 111.131958, | 193.172348, | 218.292572, | 224.294327, | 225.539917, | 68.188080, | 1503.879150 |
| 1989, | 41.590652, | 56.970352, | 68.239716, | 78.420731, | 73.914665, | 87.689987, | 124.958282, | 151.104538, | 216.240494, | 219.219025, | 167.833847, | 53.301380, | 1339.483765 |
| 1990, | 41.256222, | 53.066280, | 54.674126, | 54.670303, | 61.397209, | 68.234406, | 112.610687, | 139.011993, | 136.525803, | 217.976089, | 217.714615, | 67.261604, | 1224.399414 |
| 1991, | 42.787918, | 53.049347, | 54.653961, | 60.216824, | 56.967087, | 61.508415, | 101.591339, | 172.990768, | 124.691612, | 223.527542, | 195.918274, | 66.526749, | 1214.429810 |
| 1992, | 40.063213, | 53.066280, | 54.674126, | 54.673214, | 51.461906, | 63.166981, | 104.492531, | 160.670761, | 197.011551, | 220.374298, | 85.912323, | 115.904732, | 1201.472046 |
| 1993, | 37.390221, | 53.024982, | 54.629597, | 54.629009, | 46.889919, | 54.639214, | 128.053406, | 193.218719, | 202.084518, | 226.818726, | 204.772751, | 61.208504, | 1317.359619 |
| 1994, | 43.013863, | 53.066277, | 71.476563, | 67.167519, | 64.147484, | 74.980843, | 121.049278, | 202.525940, | 219.335236, | 212.992645, | 195.242065, | 67.232269, | 1392.229980 |

APPENDIX 7. EXAMPLE P_GENV4 OUTPUT FILE

PROGRAM P_GENV4.PAS CALCULATION OF CHANGE IN GENERATION & VALUE VER_3.01 03/22/00

base case file = np_pc4794.txt run date = 3/24/00
change case file = np_storage.txt run time = 2:42:18 PM
analysis scope = North Platte
sim inflow years 1947-1994
EIS program year = 2002

analysis description: none

MEAN (BASE) GENERATION (MWhrs)

sim inflow years 1947-1994

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | TOT |
|---|---------|---------|---------|---------|---------|----------|----------|----------|---------|---------|---------|---------|----------|
| * | 26833.3 | 25679.2 | 27058.3 | 49597.9 | 98258.3 | 124243.8 | 123700.0 | 111395.8 | 39418.8 | 36570.8 | 29735.4 | 26781.3 | 719272.9 |

MEAN (ALT) GENERATION (MWhrs)

sim inflow years 1947-1994

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | TOT |
|---|---------|---------|---------|---------|---------|----------|----------|----------|---------|---------|---------|---------|----------|
| * | 26418.8 | 26350.0 | 28972.9 | 46306.3 | 94533.3 | 116258.3 | 122316.7 | 115570.8 | 41389.6 | 33012.5 | 29291.7 | 25868.8 | 706289.6 |

MEAN DIFFERENCE (ALT-BASE) IN GENERATION (MWhrs)

sim inflow years 1947-1994

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | TOT |
|---|--------|-------|--------|---------|---------|---------|---------|--------|--------|---------|--------|--------|----------|
| * | -414.6 | 670.8 | 1914.6 | -3291.7 | -3725.0 | -7985.4 | -1383.3 | 4175.0 | 1970.8 | -3558.3 | -443.8 | -912.5 | -12983.3 |

MEAN PERCENT CHANGE [(ALT-BASE)/BASE]*100 IN GENERATION (%)

sim inflow years 1947-1994

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | TOT |
|---|-------|------|------|-------|-------|-------|-------|------|------|-------|-------|-------|-------|
| * | -1.55 | 2.61 | 7.08 | -6.64 | -3.79 | -6.43 | -1.12 | 3.75 | 5.00 | -9.73 | -1.49 | -3.41 | -1.81 |

MEAN MONTHLY ELECTRICITY PRICE 2002 (\$/MWhr)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | TOT |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| * | 29.23 | 27.75 | 26.10 | 20.27 | 19.48 | 25.25 | 30.29 | 35.54 | 31.56 | 27.05 | 28.83 | 31.37 | |

EXPECTED BASE CASE ECONOMIC VALUE 2002 (\$)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | TOT |
|---|--------|--------|--------|---------|---------|---------|---------|---------|---------|--------|--------|--------|----------|
| * | 784338 | 712597 | 706223 | 1005350 | 1914072 | 3137155 | 3746873 | 3959008 | 1244056 | 989241 | 857272 | 840128 | 19896312 |

| EXPECTED CHANGE CASE ECONOMIC VALUE 2002(\$) | | | | | | | | | | | | | |
|--|--------|--------|--------|--------|---------|---------|---------|---------|---------|--------|--------|--------|----------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | TOT |
| * | 772220 | 731213 | 756193 | 938628 | 1841509 | 2935523 | 3704972 | 4107387 | 1306255 | 892988 | 844479 | 811503 | 19642870 |

| EXPECTED DIFFERENCE IN ECONOMIC VALUE 2002(\$) | | | | | | | | | | | | | |
|--|--------|-------|-------|--------|--------|---------|--------|--------|-------|--------|--------|--------|---------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | TOT |
| * | -12118 | 18616 | 49971 | -66722 | -72563 | -201632 | -41901 | 148380 | 62200 | -96253 | -12793 | -28625 | -253442 |

***** end of output *****

APPENDIX 8. EXAMPLE P_CAPV6 OUTPUT FILE

PROGRAM P_CAPV6.PAS CHANGE IN CAPACITY VER_2.04 03/22/00

base case file = np_pc4794.cap run date = 3/24/00
change case file = np_proposed.cap run time = 2:46:51 PM
analysis scope = North Platte
sim inflow years 1947-1994
EIS program year = 2002

analysis description: none

MEAN (BASE) GENERATION CAPACITY (Mw)

sim inflow years 1947-1994

| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|------|------|------|------|------|------|-------|-------|-------|-------|-------|------|
| * | 82.2 | 73.8 | 67.0 | 67.3 | 62.4 | 66.6 | 111.5 | 187.0 | 205.1 | 202.2 | 190.5 | 83.8 |

MEAN (ALT) GENERATION CAPACITY (Mw)

sim inflow years 1947-1994

| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|------|------|------|------|------|------|-------|-------|-------|-------|-------|------|
| * | 72.1 | 71.2 | 65.7 | 66.9 | 62.6 | 66.3 | 114.9 | 183.5 | 198.1 | 211.3 | 191.9 | 92.7 |

MEAN DIFFERENCE (ALT-BASE) IN CAPACITY (Mw)

sim inflow years 1947-1994

| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|-------|------|------|------|-----|------|-----|------|------|-----|-----|-----|
| * | -10.2 | -2.7 | -1.3 | -0.4 | 0.2 | -0.3 | 3.4 | -3.5 | -7.0 | 9.1 | 1.4 | 8.9 |

MEAN PERCENT CHANGE [(ALT-BASE)/BASE]*100 IN CAPACITY (%)

sim inflow years 1947-1994

| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|--------|-------|-------|-------|------|-------|------|-------|-------|------|------|-------|
| * | -12.35 | -3.62 | -1.97 | -0.61 | 0.34 | -0.50 | 3.02 | -1.87 | -3.39 | 4.52 | 0.75 | 10.59 |

dependable capacity method used: 90% exceedance
winter marketing season: Oct-Mar
summer marketing season: Apr-Sep

| | winter | summer |
|-----------------------------------|--------|--------|
| | ----- | ----- |
| dependable (base) capacity (mw) = | 52.90 | 80.22 |
| dependable (alt.) capacity (mw) = | 46.10 | 81.70 |
| difference in dependable cap(mw)= | -6.80 | 1.48 |

***** end of output *****