Greenwell, Aaron D (PSC)

From: Shelton, Nancy K. [nkshelton@tva.gov]
Sent: Thursday, June 23, 2005 11:15 AM
To: adgreenwell@ky.gov
Subject: FW: TVA Response for Adm. Case No. 2005-00090
Attachments: KY psc total response.doc

Aaron,

Please let me know if you need anything else.

Response sent to them electronically on 6/23.
Aaron D

Nancy
-----Original Message-----
From: Shelton, Nancy K.
Sent: Friday, May 13, 2005 2:42 PM
To: 'Amato, Robert A (PSC)'
Subject: TVA Response for Adm. Case No. 2005-00090

Bob, I have attached TVA's answers to the Administrative Order 2005-00090. If you need additional information, please let me know. I wanted to get this to you today, however, there are a few questions that have not been completely answered. Please let me know where there is vital information lacking.

Have a great weekend.

Nancy

Nancy Shelton
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1. Provide a summary description of your utility's resource planning process. This should include a discussion of generation, transmission, demand-side, and distribution resource planning.

Generation Planning An effective resource planning process results in a plan that broadly identifies the long-and short-term actions a utility anticipates undertaking to meet future demands for energy services and to achieve its objectives. The resource planning process evaluates both supply-side options and customer service options. Supply-side options refer to various methods for generating or acquiring additional electrical energy. Generating options to meet new peaking, intermediate and base-load needs include combustion turbines, advanced nuclear, renewable, and advanced combustion facilities. Other options that would give TVA greater flexibility in its generation planning are purchasing competitively priced power from other suppliers (i.e. independent power producers, cogeneration), buying options on future power delivery, and entering business partnering arrangements. Customer service options encompass a wide range of technologies, programs, pricing strategies, and other activities that change the way consumers use electricity.

Transmission Planning We have a 10 year planning horizon for our transmission system. We follow the NERC guidelines for system response to various system disturbances.

Demand-Side Planning As part of resource planning, TVA tracks historical results from, and projects future impacts of, programs in the following areas of demand-side management:

INDUSTRIAL INITIATIVES
TVA provides assistance that focuses on providing solutions to energy-related problems in the manufacturing environment for their direct-served and distributor-served industrial customers. TVA works with clients to help them identify and solve problems related to their use of energy in areas such as: manufacturing processes; environmental issues; and plant operations. The targeted segments, such as the automotive, machinery, forest products and food processing industries are selected because of the large presence of such industries in the TVA service area, their high energy usage, or the availability of solutions for their existing problems. The TVA industrial marketing managers rely primarily on in-house expertise, but sometimes bring in consultants to assist these industrial clients.

COMMERCIAL INITIATIVES
TVA works with Tennessee Valley commercial and institutional customers to provide solutions to their energy-related problems and to encourage the selection of energy efficient equipment. For example, TVA is working with schools, governments, offices, retail, healthcare, and other commercial segments to provide information on the various energy options available to

them. As part of that effort, TVA provides feasibility studies conducted by independent private sector professional engineers to compare different types of systems on a life-cycle-cost basis. Also, if the customer is interested in closed loop geothermal heat pumps, TVA will provide test bores and thermal conductivity tests at the proposed project site to assist with the design of the ground heat exchanger. Furthermore, TVA sponsors continuing education for Tennessee Valley architects and engineers on the proper design and application of geothermal heat pumps. In the TVA service area, there are approximately 225 geothermal systems installed or in design as the result of TVA's promotion of this energy efficient technology. Demand for TVA assistance to commercial customers on energy-related problems continues to grow.

RESIDENTIAL INITIATIVES

TVA and its 158 public power distributors have a long history of residential energy-efficiency programs for the Valley. These programs are marketed under the brand name energy right®.

About 150 distributors participate in the various initiatives from the energy right® Program. These initiatives are described below:

New Homes Plan promotes all-electric, energy-efficient new homes. All homes built energy right® must meet a minimum rating in overall energy efficiency. Homes built at least 15 percent better than the minimum rating qualify as energy right® Gold while those built 30 percent better qualify as energy right® Platinum.

Heat Pump Plan promotes the installation of high efficiency heat pumps greater than 12 SEER in homes and small businesses. Installation, performance, and weatherization standards have been established to ensure the comfort of the customer and the proper operation of the system. A Quality Contractor Network has been established for maintaining high installation standards. Through a third-party lender, TVA provides ten year financing for residential heat pumps with repayment through the consumer's electric bill.

Water Heater Plan promotes the installation of energy-efficient electric water heaters in homes and small businesses.

New Manufactured Homes Plan promotes the installation of electric heat pumps in new manufactured homes.

In Concert With The Environment (in partnership with Nexus Energy Software) is a comprehensive environmental and energy education program directed to middle school and junior high school students. Student participants receive an energy survey to complete for their households. Results from the survey indicate the home's estimated annual and monthly energy usage by

appliance and gives a number of energy, environmental and water recommendations for the student and their family to implement.
energy right Home e-valuation® (in partnership with Nexus Energy Software) allows residential customers to play an active role in saving energy in their homes. After completing an energy survey, customers receive a personalized report that breaks down the home's annual and monthly energy usage by appliance, and gives a number of energy recommendations as well as information about distributor products and services.

energy right Home e-Valuation Online (in partnership with Enercom) is a web-based home energy audit for residential customers to complete interactively via the Web. Customers complete the survey and receive a detailed analysis of their energy use based on their answers and average TVA rates.

These industrial, commercial, and residential programs accounted for an estimated 57.4 MW of demand reduction in FY 2004.

Direct load control (DLC)
TVA and 13 of its power distributors are involved in a Direct Load Control program. This program involves power distributors installing radio controlled switches on their customers' air-conditioners and water heaters. During peak demand periods TVA is allowed to curtail the power to this equipment. The power distributors receive a bill credit from TVA for each operable switch. The participating power distributors are allowed to determine the type of incentive given to their customers. Currently, TVA can curtail approximately 50 MW of load upon demand.

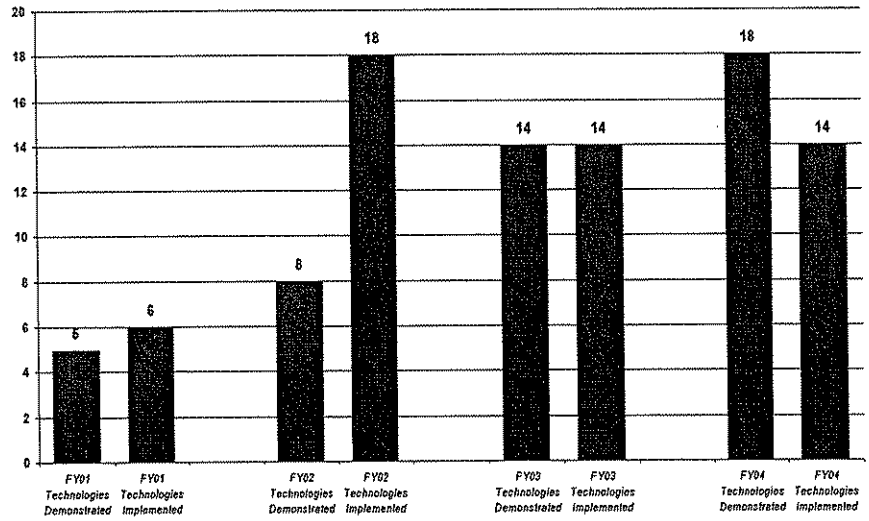
GREEN POWER SWITCH® (GPS)
TVA and 12 public power companies launched GPS on Earth Day, April 22, 2000. GPS was the first program of its kind offered in the Southeast and provided consumers with an economical opportunity to participate in TVA's development of renewable energy resources. The program originally included supply from wind and solar energy sources. The program was expanded in FY 2001 to include electricity generated from methane gas at a landfill in Murfreesboro, Tennessee, and a waste water treatment plant in Memphis, Tennessee. The landfill gas from the Middle Point Landfill Project in Murfreesboro was used as part of the GPS mix from May 2001 through February 2003. TVA recently added 27 MW of wind generation through a power purchase arrangement from newly installed wind turbines in East Tennessee. Future expansion plans include additional wind turbines and solar installations at locations across the Tennessee Valley.

2. Are new technologies for improving reliability, efficiency and safety investigated and considered for implementation in your power generation, transmission and distribution system?

a. If yes, discuss the new technologies that were considered in the last 5 years and indicate which, if any, were implemented.
b. If no, explain in detail why new technologies are not considered.

Yes. See chart and table below.

Fiscal Year Technology Demonstration and Implementation
TVA Science and Technology Organizations



FY01 Technologies Demonstrated	FY02 Technologies Demonstrated	FY03 Technologies Demonstrated	FY04 Technologies Demonstrated
1. Ultraviolet Germicidal Irradiation (UVGI) Technology 2. Ozonation of Food Products 3. Microturbine at PPI Headquarters 4. Enalasys 5. Avian Power Interruption Mitigation	1. Environmental Profile Pilot Project 2. BioTrans 3. Mini-Sodar Technology for Wind Towers 4. Thermal Conductivity Mapping for Geothermal Heat Pumps 5. Hydrogen Power Fuel Cell 6. Technological Tool for Heightened Operational Reliability (TTHOR) 7. Kleenwell Process to Clean Landfill Wells 8. Photovoltaics with Net Metering Alternative	1. CO/O_2 Analyzer—Extractive Catalytic Combustion 2. OSI Optical Flow Method Sensor 3. Intelligent Sootblowing at Bull Run Fossil Plant 4. Sensor Validation 5. Frostless Heat Pump 6. Bayonet-Type Low Cost Heat Pump Water Heater 7. Tank Inspection Robot Technology 8. Sequoyah U1C11 PRC-01 Resin Technology 9. Flywheel UPS Demonstration 10. Portable Secondary Spill Containment for Tankers 11. Distribution Fault Anticipator 12. Customer Power Quality Database 13. Furnace Fireball Location System 14. National Transmission Technology Research Center	1. Drip Irrigation 2. Phasor Data Concentration 3. Extraction Trench 4. SolarBee 5. FGD Absorber Ring 6. Wind Turbine Continuous Monitoring 7. Portable Bridging for Transmission Line Construction or Maintenance 8. Breakaway Link 9. BioTrans Oil Demonstration at Buffalo Mountain Wind Farm 10. Bottom Ash for Road Surfaces 11. Acoustic Leak Detection System 12. Capturing Undocumented Knowledge 13. Diesel Generator Signature Analysis 14. Risk Evaluation and Prioritization 15. FNET--National Frequency Monitoring Network 16. Atmospheric Tracer Depletion (ATD) Testing at BFN 17. Furnace Exit Gas Temperature Monitor 18. Obstacle Collision Avoidance System
FY01 Technologies Implemented	**FY02 Technologies Implemented**	**FY03 Technologies Implemented**	**FY04 Technologies Implemented**
1. WCF Wetlands 2. Generic NOx Control Intelligent System (GNOCIS) 3. TAG Dump Software 4. Rod-Drop Data Acquisition System 5. Dual Path Unit Ventilator with Geothermal Heat Pump 6. Daycor Corona Detector	1. Substation Predictive Maintenance 2. CAT-1 Transmission Line Monitoring 3. Infrared Inspection Application Guide 4. Ultraviolet Germicidal Irradiation (UVGI) Technology 5. TPS Power Quality Algorithm 6. Aquasonic Control of Algae 7. Color Infrared Digital Imagery Collection 8. Compliant Wireless Network (PQLAN) 9. D-SMES 10. Evaluation of Benefits of Hydro Modernization 11. eScanAC 12. EPRI Segometer 13. Phase Rotation Checking 14. Power System Visualization 15. RMS River Flow Model 16. Selective Catalytic Reduction (SCR) 17. UT/RT Valve Monitoring 18. Water Cannon Assessment	1. KPF Induction Fan Coatings 2. Electronic Slug Arc 3. Technological Tool for Heightened Operational Reliability (TTHOR) 4. LARK-TRIPP: Toxic Release Inventory Estimation Tool 5. Maintenance Optimization Program 6. Structural Fill Demonstration—Lost Ridge Industrial Park 7. Distribution Power Quality Guide 8. Fiberglass Cross Arms Replacement Study 9. Handling Video for Non-Ceramic Insulators 10. Mapping the Results of Thermal Conductivity Testing 11. Online Community Activity Room 12. Common Information Model (CIM) 13. Air Quality Forecasting 14. Intelligent Sootblowing	1. AFV Transit Pilot in the Smokies 2. Spill Prevention, Control and Countermeasures (SPCC) 3. Flywheel-Based Uninterruptible Power Supply (UPS) 4. Tank Inspections with Robotic Technology 5. Ozonation Application with Food Processing 6. Avian Power Interruption Mitigation 7. Vibrating Element Analyzer 8. TVA Switching Simulator 9. Kelman Transport X Oil Sampling 10. NDE Corrosion Inspection of Below Grade Structures 11. Raccoon Mountain Wicket Gate SuperLink 12. Strain Gauge Slag Monitor 13. Acoustic Leak Detection System 14. Boiler Water Wall Inspection Robot

Answer to 2 Continued:

The TVA Transmission Planning department, in cooperation with the Research and Development department are constantly watching the industry for new technology. In the past 5 years TVA has implemented a variety of new sag monitors, a super conducting synchronous condenser. We have also installed, for testing purposes, a section of high temperature super conduction transmission line.

3. Is your utility researching any renewable fuels for generating electricity?
   a. If so, what fuels are being researched?
   b. What obstacles need to be overcome to implement the new fuels?

a. Yes, TVA is working with a local distributor to demonstrate the use of biodiesel in a Caterpillar generator for distributed generation.

b. The major obstacle is that NOx emissions increase with the use of biodiesel, while all other pollutants decrease. A major element of the project is to demonstrate and evaluate a proprietary catalytic NOx reduction system that will be installed and monitored during test runs. Other renewable fuels that TVA has performed R&D on in the past include biomass residue and digester methane. Both have been implemented in the TVA system.

4. Provide actual and weather-normalized annual native load energy sales for calendar years 2000 through 2004. Provide actual annual off-system energy sales for this same period disaggregated into full requirements sales, firm capacity sales, and non-firm or economy energy sales. Off-system sales should be further disaggregated to show separately those sales in which your utility acts as a reseller, or transporter, in a power transaction between two or more other parties.

TVA System Actual and Weather-Normalized Annual Native Load Energy Sales (GWh)

Calendar Years	Actual	Weather Normalized
2000	158,766	156,714
2001	156,005	157,854
2002	165,584	163,396
2003	165,448	168,097
2004	170,138	171,780

Off system sales are attached in separate files.

5. Provide actual and weather-normalized annual coincident peak demands for calendar years 2000 through 2004 disaggregated into (a) native load demand, firm and non-firm; and (b) off-system demand, firm and non-firm.

TVA System Actual and Weather-Normalized Annual Coincident Peak Demands (MW)

Calendar Years	Actual	Weather Normalized
2000	29,344	28,102
2001	27,368	29,306
2002	29,052	29,052
2003	29,866	29,705
2004	29,966	31,141

Off system information is attached in separate files.

6. Provide a summary of monthly power purchases for calendar years 2000 through 2004 disaggregated into firm capacity purchases required to serve native load, economy energy purchases, and purchases in which your utility acts as a reseller, or transporter, in a power transaction between two or more other parties. Include the average cost per megawatt-hour for each purchase category.

Off system information is attached in separate files.

7. Provide the most current base case and high case demand and energy forecasts for the period 2005 through 2025, if available. If the current forecast does not extend to 2025, provide forecast data for the longest forecast period available. The information should be disaggregated into (a) native load, firm and non-firm demand; and off-system load, both firm and non-firm demand.

TVA System Base Case and High Demand Energy Forecast (GWh)

Calendar Years	Base Case	High Case
2005	174,366	176,025
2006	177,403	180,435
2007	180,696	184,814
2008	181,094	186,005
2009	181,007	186,870
2010	183,171	190,678
2011	180,789	189,769
2012	181,364	191,114
2013	182,154	193,161
2014	185,485	197,790
2015	189,057	202,823
2016	192,926	208,223
2017	196,616	213,393
2018	200,394	218,880
2019	204,283	224,578
2020	208,278	230,535
2021	212,039	236,479

2022	216,024	242,746
2023	220,015	249,067

8. Provide the target reserve margin currently used for planning purposes, stated as a percentage of demand, and a summary of your utility's most recent reserve margin study. If this target reserve margin has changed since 2002, provide the prior target reserve margin and explain the reasons for the change. If the target reserve margin is expected to be reevaluated in the next 3 years, explain the reasons for the reevaluation.

   The target reserve margin currently used for planning purposes is 10%.

9. For the period 2005 through 2025, provide projected reserve margins stated in megawatts ("MW") and as a percentage of demand. Identify projected deficits and current plans for addressing these deficits.

For the period 2005 through 2025, the projected reserve margin is 10%. Currently, there are no projected deficits. Near term deficits are addressed by purchasing power hourly or weekly on the electricity market.

TVA System Projected Reserve Margin (MW)

Fiscal Year	Projected Reserve Margin (MW)
2005	3247
2006	3311
2007	3377
2008	3418
2009	3459
2010	3528
2011	3598
2012	3691
2013	3766
2014	3841
2015	3923
2016	4012
2017	4093
2018	4178
2019	4268
2020	4362
2021	4449
2022	4542
2023	4635
2024	4735
2025	4834

10. Provide the following information for every generation station operated in Kentucky .
    a. Name.
    b. Location (including county).
    c. Number of units.
    d. Date in service for each unit.
    e. Type of fuel for each unit.
    f. Net rating (MW) for each unit.
    g. Emission control equipment in service (list by type).
    h. Date emission control equipment in service.

Name/Unit	Location (City/County)	In Service Date	Fuel Type	Net Rating (MW)	Emission Control Equipment	In Service Date of Emission Control Equipment
Paradise 1	Paradise / Muhlenberg	1963	High sulfur bituminous coal	652	FGD (SO2)/ SCR (NOx)	2005 / 2001-2002
Paradise 2	Paradise / Muhlenberg	1963	High sulfur bituminous coal	638	FGD (SO2)/ SCR (NOx)	2005 / 2001-2002
Paradise 3	Paradise / Muhlenberg	1970	High sulfur bituminous and low sulfur sub-bituminous coal	1027	FGD (SO2)/ SCR (NOx)	2006 / 2003
Shawnee 1	Paducah / McCracken	1953	Low sulfur bituminous and sub-bituminous coal	138	FGD (SO2)/ SCR (NOx)	2017 / 2008-2010
Shawnee 2	Paducah / McCracken	1953	Low sulfur bituminous and sub-bituminous coal	138	FGD (SO2)/ SCR (NOx)	2017 / 2008-2010
Shawnee 3	Paducah / McCracken	1953	Low sulfur bituminous and sub-bituminous coal	138	FGD (SO2)/ SCR (NOx)	2017 / 2008-2010
Shawnee 4	Paducah / McCracken	1954	Low sulfur bituminous	138	FGD (SO2)/ SCR (NOx)	2017 / 2008-2010

			and sub-bituminous coal			
Shawnee 5	Paducah / McCracken	1954	Low sulfur bituminous and sub-bituminous coal	138	FGD (SO2)/ SCR (NOx)	2017 / 2008-2010
Shawnee 6	Paducah / McCracken	1954	Low sulfur bituminous and sub-bituminous coal	138	FGD (SO2)/ SCR (NOx)	2017 / 2008-2010
Shawnee 7	Paducah / McCracken	1954	Low sulfur bituminous and sub-bituminous coal	138	FGD (SO2)/ SCR (NOx)	2017 / 2008-2010
Shawnee 8	Paducah / McCracken	1955	Low sulfur bituminous and sub-bituminous coal	138	FGD (SO2)/ SCR (NOx)	2017 / 2008-2010
Shawnee 9	Paducah / McCracken	1955	Low sulfur bituminous and sub-bituminous coal	138	FGD (SO2)/ SCR (NOx)	2017 / 2008-2010
Shawnee 10	Paducah / McCracken	1956	High sulfur bituminous and low sulfur bituminous coal	127	FGD (SO2)/ SCR (NOx)	1985 / 2002

3) Kentucky Hydro
Livingston, KY
5 units
1944
Hydro power
No emission controls needed

11. Provide a summary of any planned base load or peaking capacity additions to meet native load requirements in the years 2005 through 2025. Include capacity

additions by the utility, and those by affiliates, if constructed in Kentucky or intended to meet load in Kentucky.

There are no planned base load or peaking capacity additions to meet native load requirements in the years 2005 through 2025 in the state of Kentucky.

12. What is the estimated-capital cost per *W* and energy cost per kWh for new generation by technology?

    TVA is not planning on adding any base load or peaking capacity additions in the state of Kentucky.

13. If current plans for addressing projected capacity deficits include the addition of gas-fired generation, describe the extent to which fluctuations in natural gas prices have been incorporated into these plans. Explain how fluctuations in natural gas prices may have altered the results of previous plans.

    TVA has no current plans for addressing projected capacity deficits with gas-fired generation.

14. Provide a summary of any permanent reductions in utilization of generation capacity due to Clean Air Act compliance from 2000 through 2004. Identify and describe any forecasted reductions during the 2005 through 2025 period.

Permanent Reductions in Kentucky Generation Capacity due to Clean Air Act Compliance

	Total Capacity (MW) Reduction
2000	2.4
2001	5.5
2002	9.3
2003	12.5
2004	12.5
2005	34.3
2006	51.8
2007	51.8
2008	53.9
2009	55.9
2010	57.9
2011	57.9
2012	57.9
2013	57.9
2014	57.9
2015	57.9
2016	57.9
2017	79.2

2018	79.2
2019	79.2
2020	79.2

15. Provide a summary of all forced outages and generating capacity retirements occurring during the years 2000 through 2004.

Actual Forced Outage Hours for Kentucky based units

Calendar Year	**2000**	**2001**	**2002**	**2003**	**2004**
Paradise 1	605.17	383.07	317.42	1140.12	284.68
Paradise 2	1033.17	921.8	148.62	950.3	564.35
Paradise 3	1482.25	1010.8	790.18	1924.97	1148.8
Shawnee 1	33.5	128.05	152.13	1.3	1.58
Shawnee 2	61.82	180.63	0	0	0
Shawnee 3	246.05	122.18	68.98	283.23	43.78
Shawnee 4	0.65	106.33	188.25	202.83	131.97
Shawnee 5	26.78	0.83	0	6.78	0
Shawnee 6	134.72	123.87	0.1	0	1.42
Shawnee 7	249.42	0	26	136.05	93.42
Shawnee 8	69.12	65.52	115.27	207.72	31.43
Shawnee 9	8.3	139.03	29.47	164.98	2.1
Shawnee 10	1156.95	941.62	417.47	498.47	611.4

16. Provide *a* summary of the utility's plans for the retirement of existing generating capacity during the 2005 through 2025 period.

    There are currently no plans for the retirement of existing Kentucky-based generating capacity during the 2005 through 2025 period.

17. Provide a summary description of your utility's existing demand-side management (" D S M ") programs , which includes :
    a. Annual DSM budget,
    b. Demand and energy impacts.
    c. The currently scheduled termination dates for the programs.

a. The DSM budget for FY04 was $13.5 Million for Residential/Commercial & Industrial programs, $3.0 Million for the Direct Load Control program, and $1.6 Million for the Green Power Switch program.

b. TVA DSM Program Impacts for FY04

	Demand Efficiency (MW)	Energy Efficiency (MWh)
Residential Total	**52.51**	**75,123.17**
- Retrofit HP	9.82	39,766.23
- New Homes	39.22	30,103.72
- Manufactured Homes	2.14	3,707.50
- Audits	1.33	1,545.72
C&I Total	**4.9**	**24,387.84**
- Large C&I	3.34	17,555.04
- ESCO	1.56	6,832.80
DLC	47.0	0.0

For FY04, the Green Power Switch program sold 22,372 blocks.

c. None of these efforts have termination dates.

18. Provide your utility's definition of "transmission" and "distribution."

    Transmission - Facilities with an operating voltage of 46,000 volts and above.
    Distribution - Facilities with an operating voltage below 46, 000 volts.

19. Identify all utilities with which your utility is interconnected and the transmission capacity at all points of interconnection.

The following values are Summer capabilities and they are the capability of the physical connection between the utilities. The actual amount of power than may be transferred between the utilities may be different than the number given here.	
Associated Electric Cooperative, Inc	600 MVA
Big Rivers Electric Cooperative	1576 MVA
East Kentucky Power Cooperative	1013 MVA
Louisville Gas & Electric Energy/Kentucky Utilities	2094 MVA
Ameren	1065 MVA
Illinois Power	355 MVA
Carolina Power & Light	276 MVA
Duke	216 MVA
Southern Company Services	9395 MVA
Entergy	7595 MVA
American Electric Power	4384 MVA

20. Provide the peak hourly MW transfers into and out of each interconnection for each month of the last 5 years. Provide the date and time of each peak.

    We have no interconnections with non-Kentucky utilities in the state of Kentucky, so we feel like the data requested has already been supplied by other utilities. We will be willing to verify any of the information that has already been supplied by the Kentucky utilities.

21. Identify any areas on your utility's system where capacity constraints, bottlenecks, or other transmission problems have been experienced from January 1, 2003 until the present date. Identify all incidents of transmission problems by date and hour, with a brief narrative description of the nature of the problem. Provide the MW transfers for each of your utility's interconnections for these times.

12788	Shawnee - East W. Frankfort 345 kV	03/20/2005 13:43	03/20/2005 20:55	7.2	3a	2

Tie Line Summary @ 1430: AEP -84MW, LGEE -360MW, BREC -201MW, AMRN -78MW, EKPC 74, EEI -1070MW, AECI -129MW, SOCO 1248MW, EES -459MW.

On 3/20/05 at 1426, a TLR 3A was issued for FG 12788. 1ST contingency loading for DOE C35-C37 for the loss of (flo) Shawnee-E.W.Frankfort 345 at 95% operating limit.

At 1526, a TLR 3A was reissued for FG 12788[Shawnee-EW Frkfort]. 1ST contingency loading for DOE C35-C37 flo Shawnee-E.W.Frankfort 345 at 100% operating limit.

At 1626, Reliability Coordinator (RC) reissued TLR 3A for FG 12788. 1ST contingency loading for DOE C35-C37(flo) Shawnee-E.W.Frankfort 345 at 100% operating limit.

At 1729, RC reissued TLR 3A for FG 12788[Shawnee-EW Frkfort]. 1ST contingency loading for DOE C35-C37(flo) Shawnee-E.W.Frankfort 345 at 95%+ operating limit.

At 1806, RC reissued TLR 1 for FG 12788[Shawnee-EW Frkfort]. 1ST contingency loading at 90% operating limit.

At 2055, RC terminated TLR 1 for FG 12788[Shawnee-EW Frkfort]. 1ST contingency loading(<90%) for DOE C35-C37.

		03/19/2005	03/20/2005			
12788	Shawnee - East W. Frankfort 345 kV	23:14	7:28	8.23	3a	6

Tie Line Summary @ 0030: AEP -264MW, LGEE -481MW, BREC -229MW, AMRN -78MW, EKPC -63, EEI -1058MW, AECI -106MW, SOCO 1083MW, EES -767MW.

On 3/19/05 at 23:13, RCSO issued TLR 1 for flow gate 12778, Shawnee - EW Frankfort 345 kV. Areva state estimator real time contingency analysis showed a 97% loading on C35 - C37 flo Shawnee - EW Frankfort.

At 028, RC reissued TLR 3A for FG 12788[Shawnee-EW Frkfort]. 1ST contingency loading for DOE C35-C37(flo) Shawnee-E.W.Frankfort 345 at 100%+ operating limit.

At 0133, RC reissued TLR 3A for FG 12788[Shawnee-EW Frkfort]. 1ST contingency loading for DOE C35-C37 (flo) Shawnee-E.W.Frankfort 345 at 100%+ operating limit.

At 0231, RC reissued TLR 3A for FG 12788[Shawnee-EW Frkfort]. 1ST contingency loading for DOE C35-C37(flo) Shawnee-E.W.Frankfort 345 at 100%+ operating limit.

At 0328, RC reissued TLR 3A for FG 12788[Shawnee-EW Frkfort]. 1ST contingency loading for DOE C35-C37(flo) Shawnee-E.W.Frankfort 345 at 100%+ operating limit.

At. 0433, RC reissued TLR 3A for FG 12788[Shawnee-EW Frkfort]. 1ST contingency loading for DOE C35-C37(flo) Shawnee-E.W.Frankfort 345 at 100%+ operating limit.

At 0626, RC issued TLR 1 for FG 12788[Shawnee-EW Frkfort].

At 0728, RC issued TLR 0 for FG 12788[Shawnee-EW Frkfort]

		03/19/2005	03/19/2005			
12788	Shawnee - East W. Frankfort 345 kV	0:22	6:05	5.72	3a	6

Tie Line Summary @ 0030: AEP -267MW, LGEE -362MW, BREC -227MW, AMRN -78MW, EKPC -10, EEI -1000MW, AECI -136MW, SOCO 758MW, EES -1237MW.

On 3/18/05 at 0140, loading above 100% were seen on the DOE C35 - C37 flo (for the loss of) Shawnee - W. Frankfort 345 kV. All limits were checked and verified and generation was adjusted at Shawnee and Joppa 4-6 to mitigate overload.

On 3/19/05 around 0038, RCSO issued a TLR 3A with 60 MW relief on flow gate 12788, Shawnee - EW Frankfort due to loading of 103% on C35 - C37 flo Shawnee - EW Frankfort identified by the Areva state estimator real time contingency analysis tool. Note that study TLR on flow gate 12787, C35 - C37 flo Shawnee - EW Frankfort showed no relief provided on that flow gate.

At 0128, RC reissued TLR 3A for FG 12788[Shawnee-EW Frkfort]. 1ST contingency loading for DOE C35-C37 approaching contingent limit. (98%+) Changed from 1→3A.

At 0229, RC reissued TLR 3A for FG 12788[Shawnee-EW Frkfort]. 1ST contingency loading for DOE C35-C37 approaching contingent limit. (98%+) Changed from 1→3A.

At 0333, RC reissued TLR 3A for FG 12788[Shawnee-EW Frkfort]. 1ST contingency loading for DOE C35-C37 approaching contingent limit. (98%+ Contingency loading).

At 0428, RC reissued TLR 3A for FG 12788[Shawnee-EW Frkfort]. 1ST contingency loading for DOE C35-C37 approaching contingent limit. (98%+).

At 0530, RC issued TLR 1 for FG 12788[Shawnee-EW Frkfort].

At 0605, issued TLR 1 for FG 12788[Shawnee-EW Frkfort].

		02/04/2005	02/04/2005			
1605	Shawnee - Clinton 161	0:27	6:14	5.78	3a	6

Tie Line Summary @ 0000: AEP 324MW, LGEE -423MW, BREC -229MW, AMRN -820MW, EKPC 95, EEI -945MW, AECI -268MW, SOCO 2477MW, EES -1246MW.

On 2/3/05 at 14:00, TVA SRAO noted that the Shawnee to Clinton and Shawnee to Coleman 161 kV lines would overload for the loss of the Marshall to Cumberland 500 kV line.

At 00:27 after shift change, a TLR level 3A was issued on the Shawnee-Martin 161kV line for the loss of the Marshal - Cumberland.

At 02:30, the TLR level 3A was reduced to a TLR level 1.

At 06:14, TLR was terminated for FG 1605, Shawnee - Clinton 161kV line.

			05/31/2004	05/31/2004			
12151	35 - 37	Reactor	13:06	23:28	10.37	3b	6

Tie Line Summary @ 1400: AEP 285MW, LGEE -496MW, BREC 33, AMRN -633, EKPC 96, EEI -705, AECI -140MW.

At 1100, NW-TO reports DOE having overload problems on Reactors C-35/C-37. RC & SRAO reviewed operating guide and report.

At 1145, RC requested TVA-BA to redispatch Shawnee Unit 8 generation to aide in relieving overload at DOE C-35/C-37 reactor.

At 1250, DOE reports C-35/C-37 loading back up to high, alarm limits again. Requested BA to redispatch Shawnee Unit 5 100MW to 140MW.

At 1407, RC issued TLR 3B on temporary FG 12151[35-37] for additional relief to DOE C-35/C-37 reactor. 191MW relief was provided.

At 1429, RC reissued TLR 3A on FG 12151[35-37] for relief DOE C-35/C-37 reactor. 190MW relief was provided.

At 1435, RC requested EEI provide an additional 25MW relief to assist overload problem at DOE. EEI accommodated.

At 1528, rRC eissued TLR 3A on FG 12151[35-37] for relief DOE C-35/C-37 reactor. 190MW relief was provided.

At 1535, RC requested EEI provide an additional 20MW relief to assist overload problem at DOE. EEI accommodated.

At 1628, RC reissued TLR 3A on FG 12151[35-37] for relief DOE C-35/C-37 reactor. 190MW relief wasa provided.

At 1727, RC reissued TLR 3A on FG 12151[35-37] for relief DOE C-35/C-37 reactor. 190MW relief was provided.

At 1831, RC terminated TLR 3A on temporary FG 12151[35-37] DOE C-35/C-37 reactor.

		05/18/2004	05/19/2004			
12086	C35 - C37	23:38	17:58	18.33	3a	1

Tie Line Summary @ 0000: AEP-55MW, LGEE -551MW, BREC -275, AMRN --681, EKPC -224, EEI -858, AECI -144MW.

At 0010, N/W dispatcher called to inform of DOE overload on the 35-37A line. RC issued TLR 3A for flow gate #12086.

At 0326, TLR flow gate # 12086 reduced to a level 1.

At 1858, TLR flow gate #12086 reduced to a level 0.

		05/16/2004	05/16/2004			
12086	C35 - C37	10:52	21:46	10.9	3b	6

Tie Line Summary @ 1150: AEP 298MW, LGEE -640MW, BREC -234, AMRN -712, EKPC -159, EEI -849, AECI -156MW.

At 1151, DOE reactor reaching amp limit. RC issued TLR 3B on FG 12086(C35-C37) with 200mw's relief requested. 13.72 MW of relief was provided.

At 1336, RC reissued TLR 3A on fg #12086.

At 1427, RC reissued TLR 3A on fg #12086.

At 1530, RC reissued TLR 3A on fg #12086.

At 1742, RC issued TLR level 1 on fg 12086.

At 2255, RC issued TLR level 0 on fg 12086.

		03/28/2004	03/29/2004			
1605	Shawnee - Clinton 161	12:15	12:42	24.45	3a	6

Tie Line Summary @ 1530: AEP -1209MW, LGEE -678MW, BREC -260, AMRN -283, EKPC -116, EEI -652, AECI -279MW.

At 1215, issued TLR Level 1 on Flow gate 1605 Shawnee - Clinton 161kv Line. Actual line loading at 96 % of line rating. TVA BA requested to decrease generation at Shawnee.

At 1232, RC issued TLR 3A on FG 1605 and requested 43mw of relief. 10.5MW of relief was provided. Shawnee-Martin at 97% of rating.

At 1326, RC reissued TLR 3A on FG 1605.

At 1426, RC reissued TLR 3A on FG 1605.

At 1528, RC reissued TLR 3A on FG 1605.

At 1527, Shawnee-Martin at 102% of rating due to loss of Cumberland generation.

At 1620, NW Dispatcher was notified to call on call mgr to discuss returning the Cumberland-Marshall 500kv line to service due to the loss of Cumberland unit 1.

At 1729, RC reissued 3A TLR – flowgate 1605 (Shawnee/Clinton).

At 1829, RC reissued 3A TLR flowgate 1605.

At 1930, RC reissued 3A TLR flowgate 1605.

At 2105, Shawnee/Martin 161 line at 80% of rating.

At 2130, RC reissue 3A TLR flowgate 1605.

At 2229, RC reissued 3A TLR flowgate 1605.

At 2327, RC reissued 3A TLR flowgate 1605.

On 3/29/05 at 0127, RC reissued 3A TLR – flowgate 1605.

At 0229, RC reissued 3A TLR – flowgate 1605.

At 0328, RC reissue 3A TLR – flowgate 1605.

At 0430, RC reissued 3A TLR – flowgate 1605. Shawnee/Martin 161 line at 85% of rating. Cumberland unit ramping up.

At 0530, RC reissued TLR 3A on flowgate 1605.

	14HOPCO5 161 5BARKLEY	09/23/2003	09/23/2003			
2102	161 1	15:28	21:47	6.32	3a	0

Tie Line Summary @ 1630: AEP -312MW, LGEE -416MW, BREC -322MW, AMRN -562MW, EKPC 42, EEI -594MW, AECI -148MW.

At 1625, RC issued TLR3A for flow gate 2102, Hopkins Co.-Barkley 161kV for the loss of the Wilson – Green River 161kV.

At 1728, RC issued TLR 3A for flow gate 2102, Hopkins Co.-Barkley 161kV loss of the Wilson – Green River 161kV.

At 2246, RC issued TLR 0 for flow gate 2102, Hopkins Co.-Barkley 161kVline for the loss of the Wilson – Green River 161kV.

11702	Shawnee/Marshall 500kV	09/19/2003 15:10	09/20/2003 23:38	32.47	3b	6

Tie Line Summary @ 1230: AEP -333MW, LGEE -624MW, BREC -345MW, AMRN -693MW, EKPC -13, EEI -249MW, AECI -194MW.

At 1610, RC issued preliminary TLR level 3A w/ 100 mw of relief on Shawnee - Marshall 500 kV line.

At 1637, RC reissued TLR level 3A w/ 100 mw of relief on Shawnee - Marshall 500 kV line.

At 1720, DOE reactor below limit. EEI will start units up at Joppa.

At 1725, reissued TLR 3A W/100 MW of relief on Shawnee-Marshall 500 kV line.

At 1808 EEI notified TVA RC that units at Joppa Steam plant on north bus now back to full load-Reactor at DOE amps below limit.

At 1839, RC reissued TLR 3A W/50 MW relief on Shawnee-Marshall 500 kV line.

At 1930, RC reissued TLR 3A W/50 MW relief on Shawnee-Marshall 500 kV line.

At 2025, RC reissued TLR 3A W/50 MW relief on Shawnee-Marshall 500 kV line.

At 2134, RC reissued TLR 3A W/50 MW relief on Shawnee-Marshall 500 kV line.

At 2234, RC reissued TLR 3A W/0 MW relief on Shawnee-Marshall 500 kV line.

At 2325, RC reissued TLR 3A W/0 MW relief on Shawnee-Marshall 500 kV line.

On 9/20/03 at 0032, RC reissued TLR 3A W/0 MW relief on Shawnee-Marshall 500 kV line.

At 0127, RC reissued TLR 3A W/0 MW relief on Shawnee-Marshall 500 kV line.

At 0229, RC reissued TLR 1 on Shawnee - Marshall 500 kV Line.

At 1215, DOE reactor at 1156 – rating 1200.

At 1224, RC issued TLR 3B flowgate 11702 -100mw relief.

At 1255, RC issued TLR 3A – flowgate 11702.

At 1327, RC re-issued TLR 3A – flowgate 11702.

At 1428, RC re-issued TLR 3A – flowgate 11702

At 1529, RC re-issued TLR 3A – flowgate 11702, (Shawnee/Marshall 500kv line).

At 1746, RC reissued TLR 1 on Shawnee-Marshall 500 kV line.

At 1821, DOE operator reported amps on reactor at 1147 to1158.

At 1827, RC reissued TLR 3A on Shawnee-Marshall 500 kV line w/50 mw's relief.

At 1932, RC reissued TLR 3A on Shawnee-Marshall 500 kV line w/50 mw's relief.

At 2027, RC reissued TLR 3A on Shawnee-Marshall 500 kV line w/50 mw's relief.

At 2127, RC reissued TLR 3A on Shawnee-Marshall 500 kV line w/0 relief.

At 2327, RC reissued TLR 1 on Shawnee-Marshall 500 kV line.

At 2226, RC reissued TLR 3A on Shawnee-Marshall 500 kV line w/0 relief.

At 0037, RC terminated TLR on Shawnee-Marshall 500kv line.

11702	Shawnee/Marshall 500kV	09/14/2003 16:45	09/14/2003 21:17	4.53	3b	1

Tie Line Summary @ 1830: AEP 129MW, LGEE -554MW, BREC -276MW, AMRN -802MW, EKPC 39, EEI -436MW, AECI -159MW, SOCO 1419MW, EES -794MW..

At 1030, N/W dispatcher called to inform that DOE has a reactor bank that is rated at 1200 amps and is currently carrying 1230 amps. N/W dispatcher requested relief.

At 1335, RC issued TLR3A for DOE on flow gate 11701.

At 1845, RC issued TLR 3B on flow gate 11702 Shawnee-Marshall 500kv line for the overload at DOE.

At 1905, RC reissued TLR 3A on flow gate 11702 Shawnee-Marshall 500kv line to reduce line reactor overload at DOE.

At 2210, TLR on Shawnee-Marshall 500kv line terminated.

		09/14/2003	09/14/2003			
11701	5C35 - 5C37A 161kV	12:38	18:30	5.87	3a	6

Tie Line Summary @ 1330: AEP -335MW, LGEE -552MW, BREC -355MW, AMRN -848MW, EKPC-40, EEI -422MW, AECI -183MW, SOCO 1720MW, EES -890MW..

At 1030, N/W dispatcher called to inform that DOE has a reactor bank that is rated at 1200 amps and is currently carrying 1230 amps. N/W dispatcher requested relief.

At 1335, RC issued TLR3A for DOE on flow gate 11701.

		09/04/2003	09/04/2003			
2423	Hardinsburg-Paradise 161 kV	6:54	22:29	15.58	3a	0

Tie Line Summary @ 0730: AEP -237MW, LGEE -538MW, BREC -436MW, AMRN -823MW, EKPC-129, EEI -672MW, AECI -254MW, SOCO 1388MW, EES -960MW..

At 0730, RC was notified during the morning generation conference call that Paradise unites 1, 2, & 3 were off, no return time known yet.

At 0755, RC issued TLR level 1 on Hardinsburg-Paradise flow gate 2423 with the reading of 232 with limit 260.

At 0735, RC issued TLR level 3A on Hardinsburg-Paradise 2423.

At 0930, RC reissued TLR 3A on flowgate 2423.

At 1030, RC reissued TLR 3A on flowgate 2423 on Hardinsburg - Paradise.

At 1130, RC reissued TLR 3A on flowgate 2423 on Hardinsburg - Paradise.

At 1230, RC reissued TLR 3A on flowgate 2423 on Hardinsburg - Paradise.

At 1245, RC changed TLR level on flowgate 2423 from 3A to 1.

At 2334, RC terminated TLR Flowgate 2423.

22. Provide details of any planned transmission capacity additions for the 2005 through 2025 period. If the transmission capacity additions are for existing or expected constraints, bottlenecks, or other transmission problems, identify the problem the addition is intended to address.

TVA has many transmission capacity additions planned for the time frame asked for. Most are not budgeted and subject to change. If the commission would like a list of our budgeted transmission additions we can supply that or if they would like to have a list that may include projects that may never be constructed, we can supply that.

23. Is your utility researching or considering methods of increasing transmission capacity of existing transmission routes? If yes, discuss those methods.

    TVA is always researching methods to increase transmission capacity. The methods that are being studied are sag monitors, other monitoring devices, dynamic rating of facilities and high temperature super conducting transmission lines.

24. Provide copies of any reports prepared by your utility or for your utility that analyze the capabilities of the transmission system to meet present and future needs for import and export of capacity.

    TVA performs many studies and some of those are studies are not shared with the public due to their confidential nature and critical infrastructure protection. The studies that TVA performs that we can share would be studies with the MAIN Coordination group in Illinois and the VASTE (formerly VAST) group in the SERC regional reliability council. We will have to secure permission to share these reports if the commission needs this information

25. Provide the following transmission energy data forecast for the years 2005 through 2025.
    a. Total energy received from all interconnections and generation sources connected to your transmission system.
    b. Total energy delivered to all interconnections on your transmission system.
    c. Peak demand for summer and winter seasons on your transmission system.

    TVA only forecasts peak generation demand, which may not be the same as peak transmission demand. We can supply the peak generation demand if that is what is wanted.

26. Provide the yearly System Average Interruption Duration Index ("SAID/") and the System Average Interruption Frequency Index (11SAIF117), excluding major outages, by feeder for each distribution substation on your system for the last 5 years.

    Distributor answered question.

27. Provide the yearly SAID1 and SAIFI, including major outages, by feeder for each distribution substation on your system for the last 5 years. Explain how you define major outages.

Distributor answered question.

28. What is an acceptable value for SAID1 and SAIFI? Explain how it was derived.

    Distributor answered question.

29. Provide the yearly Customer Average Interruption Duration Index (TAIDI") and the Customer Average Interruption Frequency Index ("CAIFI"), including and excluding major outages, on your system for the last five years. What is an acceptable value for CAIDl and CAIFI? Explain how it was derived.

    Distributor answered question.

30. Identify and describe all reportable distribution outages from January 1, Categorize the causes and provide the frequency of 2003 until the present date. occurrence for each cause category.

    Distributor answered question.

31. Does your utility have a distribution and/or transmission reliability improvement program?
    a. How does your utility measure reliability?
    b. How is the program monitored?
    c. What are the results of the system?
    d. How are proposed improvements for reliability approved and implemented?

    Distributor answered question.

32. Provide a summary description of your utility's:
    a. Right-of-way management program. Provide the budget for the last 5 years.
    b. Vegetation management program. Provide the budget for the last 5 years.
    c. Transmission and distribution inspection program. Provide the budget for the last 5 years.

    Distributor answered question.

33. Explain the criteria your utility uses to determine if pole or conductor replacement is necessary. Provide costs/budgets for transmission and distribution facilities replacement for the years 2000 through 2025.

    Distributor answered question.