Work Order	Corporate Total	KPCo Total	Project Title	Project Description
RDCP570001	127,813	4,462	Corporat Tech Program Mgt	Coordinate Corporate Technology program. Support Corporate Technology Council
RDDA524101	26,634	1,220	Grid Resiliency Initiative	The EPRI Grid Resiliency project is a 3 year effort researching construction, maintenance, and service restoration practices that will improve utilities ability major storms. As currently scoped, the Grid Resiliency project will study 1 Overhead structure hardening - how do structures behave during storm conditi management practices - what s best practices for line clearance 3 Undergrounding of overhead lines - what s total cost of ownership of overhead vs. unde Modernization - what impact does gridSmart have on storm restoration 5 Practices for Storm Response - what practices do different utilities use in respon storm outages 6 Prioritization of Distribution Resiliency Investments - what's the optimum cost alternative for grid resiliency Project Benefit Research resu AEP to take the effects of storm caused outages i.e. the effect of tree fall impact on structures into account when designing distribution systems; compare restoration practices between utilities; and better target efforts and spending on vegetation management, undergrounding of overhead lines and installing s technologies.
RDDA524301	40,087		PEV Performance & DataAnalysis	1. To gather Plug-in Electrical Vehicle PEV operational driving and charging data in real-time on a broad range of utility fleets securely and reliably. 2. T gathered data to answer key questions around optimal charging infrastructure footprint, distribution system impacts, operational cost improvements and co preferences for PEV use. 3. To provide utilities the tools and data necessary to conduct their own analyses pertaining to their own fleet vehicles and compa fleet aggregate results. Project Benefit 1. Collected data will be used for the Electric Transportation portion of the AEP Ohio Demonstration Project. 2. Dev understanding of customer PEV use and charging patterns.
RDDA530001	31,332	1,437	Distribution R&D Program Mgmt	General management and coordination of the Distribution R D program
RDDA530201	10,533	324	Field Demo - CEA-2045 Standard	Project Purpose: 1. Perform a field evaluation of smart grid devices that utilize the CEA-2045 standard. 2. Work with manufacturers to develop off-the-shelf CEA-2045 capable devices 3. Work with communication vendors to develop communication modules that support the CEA-2045 standard. Project Benefit: Support industry efforts to provide a cost effective way for residential products to be made smart grid ready. In addition, a modular interfac flexibility to employ networking equipment of one's own choosing, and would help prevent appliance obsolescence related to changing communication tech
RDDA570101	517,583	23,733	Distribut EPRI Annual Portfol	Program 1B - PQ Knowledge-Base Service: The overall objective of this project set is to implement monitoring system advancements that will not only en benchmarking and reporting functions of the monitoring systems, but also provide the basis for advanced applications that can actually improve equipment reliability. This project set has three integrated project areas that complement each other. P1.005 û Integration of Data from Multiple Monitoring Systems: helps increase the value of monitoring systems by integrating information from many different devices and equipment that may provide increased value to quality data management and analysis applications. This can include a variety of IEDs that may be part of new system investments, as well as advanced m that are used for many customers. Important topics to be addressed in the research include the following: ╖ Monitoring equipment considerations (accurac Integration of data from different monitoring systems (relays, digital fault recorders, metering systems) ╖ PQDIF tools and support (PQDIF user group) ╖ verification for monitoring systems ╖ COMTRADEùcontributions to next version of COMTRADE to make it more compatible with PQDIF (IEEE Relay Com Communications issues and capabilities The research priorities for this project are developed each year by a project advisory group. Prioritization of the sp and interfaces to be evaluated allows for the most timely and useful deliverables to be provided to the members. P1.006 û Advanced Applications for Mon This project provides the technical basis for advanced applications that can be applied in monitoring systems to improve system reliability, equipment perfo operations. The objective is to provide the basis for analyzing PQ trended data, transient disturbance data, fault data, and related system information to ide and system problems that can be resolved in a more timely manner. Alarms and reports can then be integrated with system maintenance procedures and more efficiently resolve problems and improve equipment reliability. The net effect can be a dramatic improvement in system reliability and a reduction in m operation expenses. Members will help prioritize important functions to be included in a power quality monitoring system that can provide operational and m improvement benefits. Important capabilities that are likely to be considered include the following: ╖ General processor for trended PQ data to identify abn based on control chart theory, etc. ╖ Voltage regulator performance module ╖ Fault protection and coordination assessment module ╖ Automated pow

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				reliability reporting methods ╖ Transformer loading and lifetime assessment, including harmonics ╖ Arrester performance for transient events Work will a database collection (library) of disturbance data for use in the development of advanced applications. P1.007 û Monitoring System Development and Man the project where the advanced capabilities actually get implemented in power quality monitoring management systems. Application in actual software sys PQView, allows utilities to realize the benefits of the research in P1.005 and P1.006. In 2007-2008, the work in this project set is also being coordinated clo DOE-funded research project on fault analysis and fault location technologies that will complement the EPRI research and provide substantial added value in this project set. Program Set 1D - PQ Knowledge-Base Service: The Power Quality Knowledge-Based Services program comprises an array of resourc the core of the program is a customer hotline offering round-the-clock power quality technical support. Complementing the hotline are the following: ╖ Five distributed newsletters which regularly provide the latest information on power quality business, technical trends, educational opportunities, and project upd detailed EPRI PQ Encyclopedia, a definitive reference and training tool for power quality ╖ Continued enhancement of the highly valued PQ case study lib customers with an essential and productivity-improving resource ╖ Access to the PQ Hotline for best-in-class problem-solving resources ╖ The PQ Hotlin unparalleled archive of a range of solutions and industry experience ╖ Additional resources for the Power Quality Online Resource Center to further enhan Complimentary registration for one Power Quality Interest Group meeting, along with a registration discount on all PQA Conferences Project 30.003 û Ma Management Strategies: A number of utilities continue to experience gas-related explosions in underground structures such as manholes, service boxes, root causes are needed for an event to occur: the buildup of explosive or combustible gases and the presence of an ignition source. These events can occ and can involve numerous explosions in adjacent structures. The financial and political consequences of such events can be significant. Explosions and u underground structures are rare, involving fewer than 1% of underground structures, and range from "smokers" with little effect, to "flyers" with very serious damage, injury, and even death. Many causal factors are involved, and multiple events are possible. Predictability is very difficult. Damage can range from damage in "smokers" to collateral damage to external facilities or personal injury from flying manhole or vault covers in "flyers." In 1991, a utility experienc In 1995, Underwriters Laboratories (UL) issued a milestone report detailing the composition of evolved gases. A test facility was built in Lenox, Massachus EPRI and Consolidated Edison (ConEd) co-funding. At some utilities approximately 1% of underground structures are involved in an event each year; with 0.01% involving collateral damage. During 1996-1998, milestone tests, funded by ConEd and EPRI, were conducted in Lenox involving "standard gas exp mitigation approaches. Recently, many utilities have reported major events. No utility is immune from the prospect of underground explosions! EPRI's app several paths: research, construction of test facilities, and various workshops and rapid response meetings following manhole events. The research has be involving full-scale tests, analytical studies, and computer modeling. Research topics have included: explosion characteristics, electrical (fault) vs. gas expl composition of gases involved, explosion mitigation, cover restraints, cover design, root causes, and environmental factors. EPRI has also tapped into info technologies in other industries that operate underground systems and may experience similar problems. 1.008 System Compatibility Research: This re involves characterizing compatibility issues between end use equipment, power conditioning technologies and power system performance. It includes esta evaluation criteria (e.g., testing protocols), evaluating failure mechanisms, and identifying solutions.
RDDA570201	139,359	6,385	CEA Membership & Projects	The CEA is a collaborative of companies that propose and fund research topics. These topics can range from asset management to automation. The pur project is to allocate funding for topics of interest within the Distribution organization. Individual project descriptions will be presented in the comments are document when available. CEA = Canadian Electric Association Replaces work order RDDA570201
RDDA570401	166,491	7,628	NEETRAC Membership	The National Electric Energy, Testing, Research, and Applications Center (NEETRAC) was established in 1996 by the Georgia Tech Research Corporatio cooperative organization of the Georgia Institute of Technology. It is supported by a membership consisting of utility and industrial companies. The purpo is research, development and testing in areas of interest to the membership and is funded by the Research and Development Baseline Budget from dues that membership. The project selection generally is of a scope that is sufficiently broad as to be attractive to several Members, who are interested in shari intellectual property. NEETRAC membership includes both collaborative and directed funding research. AEPÆs strategy is for NEEETRAC to compleme Technology CenterÆs (DTC) capabilities through research in such areas as cable life extension and other research or testing areas that the DTC is not di AEP will be joining NEETRAC as a Corporate û Charter Member with voting rights on the selection and prioritization of projects. NEETRAC is a non-profit Replaces work order RDDA560301
RDDA571101	37,062	1,698	Grid of the Future Test Bed	Develop a Grid of the Future test facility at Dolan Technology Center that will enable the evaluation of technologies that support AEP's vision of the next ge Distribution network. For 2007: installation of a WiMAX network, demonstration of WiMAX compatibility with standard utility protocols, integration of Adv

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				Infrastructure components, Distribution Automation components, and Asset Monitoring and Control components. The test bed will include an IP-based cor will facilitate AMI, DA, and Asset Monitoring and Control testing. For 2008, the test bed will be extended to include the evaluation of back office solutions (others), Home Area Networks (HAN), advanced DA and Asset Monitoring and Control, Distributed Energy Resources including Distributed Generation and Technology. The information generated from these evaluations will be used to support decisions on vendor acquisitions, systems compatibility, and over system design. Once the utility to HAN interface has been defined, communications into the customer premises will then be evaluated for DSM, DR, and r applications like real-time pricing, tamper detection, remote connect/disconnect, and outage management. Equipment from multiple vendors will be accon
RDDA571201	21,880	1,004	AMI Test Bed Development	Develop an Advanced Metering Equipment (AMI) test facility at AEP that creates the in-house capability to evaluate current and future AMI equipment and Distribution applications. The information generated from these evaluations will be used to support decisions on AMI vendor selection and system design. AMI with Distribution Automation equipment will be explored, and Distributed Intelligent Monitoring, Communication, and Control evaluations will be suppo Communications into the customer premises will be evaluated for DSM, DR, and metering applications. Equipment from multiple vendors will be accomm
RDDA581701	793	36	GRDSMRT-SolarWindEnergyStorage	The primary purpose of the project is to test and compare Greenfield Steam & Electric's concentrated photovoltaic (PV) technology prior to any large-scale The testbed will allow the concentrated PV performance to be easily compared to the performance of a commercially available PV system. The testbed wil model a typical residential-size distributed energy resource installation. The integrated test bed will allow AEP to study the effects of residential-size wind grid, as well as the interface and controllability it may have with a Home Area Network (HAN) and Advanced Metering Infrastructure (AMI)
RDDA582101	5,588	256	PHEV Technlgy FutureStrategies	The primary purpose of the project is to prepare our business for the mass deployment of PHEVS across AEPS regulatory jurisdictions. Develop a strateg with R&D) that will have a positive impact on revenue and that leverages the capacity of our existing infrastructure.
RDDR560401	67	3	Rolls-Royce 1MW SOFC Test&Eval	Partner with Rolls Royce Fuel Cell Systems (RRFCS) to confidentially test and evaluate their pre-commercial, natural gas fueled, 1 MW SOFC system, util Test Facility. Participation provides ôhands-onö experience with the technology. This enables AEP to proactively plan for the application and interconnec technology and its impact on the shaping the grid of the future.
RDDR570001	4,020	185	DER Program Mgmt	Provide program management for the Distributed Energy Resources (DER) program.
RDDR570101	2,319	106	DER 2007 EPRI Annual Portfolio	Energy Storage has been recognized as a strategically important component of our future grid. Membership in EPRI 94.001 provides AEP with information utility-related energy storage technologies and their applications in the industry Distributed Energy Resources (DER) program.
RDDR570301	66	3	Micro-grid Test Bed/DOE Tests	To demonstrate, evaluate and document performance and protection measures designed in the CERTS Micro-grid Concept. During 2006, the CEC/CERT Project Team constructed a microgrid test bed at AEPÆs Walnut Test Facility. This project continues in 2007 from work performed in 2006 and involves protection tests on the CERTS Microgrid Test Bed, funded by Dept. of Energy (DOE) through a contract with the University of Wisconsin. In addition to co range of detailed protection tests, according to an approved test plan, it involves analyzing protection test results and documenting the results in a Final Re
RDES505401	35		Vertical Flow Treatment Cells	Establish a pilot project at Quarrier landfill to determine the efficiency of in-ground stepped vertical flow treatment cells for removing trace metals from land stepped design will allow for incorporation of these cells into difficult terrain situations. The project will test the effectiveness of yard waste compost in the treatment cells and will test the effect of retention time on treatment. The development of low-cost biological treatment to meet NPDES limits can be a ber utility industry. Information gained from the project could be used to design full-scale vertical flow treatment cells at other facilities.
RDES510301	5,457	45	2011 CEATI Membership	The scope of the Strategic Options for Sustainable Power Generation Interest Group SOIG is to develop, evaluate and demonstrate sustainable power ge technologies that will result in an increase in power supply capacity and a reduction in greenhouse gas emissions. Includes distributed generation, distribu fuel advancements and advanced generation cycles.
RDES510401	18,272	514	Energy Sustainability Int Grp	The ESIG has identified the following priorities for 2011 identifying common and best practices of sustainability leaders; case studies of best practices in su

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				continued focus on supply chain operations/sustainability; the next generation of sustainability reporting; sustainable technology development. This group i collaborative effort within the electric utility industry to advance sustainability within the industry. It is the only electric utility-specific group of its kind at this
RDES510601	1,000	8	Selenium Working/Interest Grp	The purpose of this project is to participate in a technical working group that brings together environmental professionals from industry, academic, and regu sectors. In 2003 the North American Metals Council formed a Selenium Working Group which was formed to coordinate industry action concerning seleni activities in Canada and the United States. The Working Group has funded a series of technical publications concerning selenium toxicity and chemistry. requested for preparation and finalization of a final technical document re: treatment of selenium in wastewater. The Working Group meets twice per year research findings and pending regulatory initiative.
RDES510901	16,570	431	Static Liquefaction of CCP's	Study the effects of rapidly closing an ash pond and the potential for static liquefaction to occur, causing dam instability. The objective is to determine wha closure is to allow gradual relief of pore pressure and to allow safe closure. Please see the end of this project charter for more detail.
RDES511001	4,322	96	Mapping Ecosystem Svcs-Rockprt	EPRI will develop a GIS tool for the Rockport site that can be used for assessing current and future impacts to natural resources and associated ecosyster approach will provide a strong scientific framework for optimizing AEP land management practices and help balance these decisions with other corporate p GIS tool will provide capability that will allow for a rapid, cost-effective, and comprehensive assessment of AEP land management decisions that will benef resources and associated ecosystem services wildlife, carbon storage, pollination, water purification, and others . Further investment in this approach will success and value of this pilot application at Rockport. Part of this effort will include the development of instructional materials so that AEP staff can imple approach on other properties.
RDES511601	11,193	241	Stator End-Winding Monitoring	To perform long-term technical evaluation of using a combination of on-line end winding vibration monitoring, partial discharge, and electromagnetic interfe EMI for condition assessment of air and hydrogen cooled generators with end winding problems. Project Benefit: It is expected that increasing level of en vibration will be detected in sufficient time to avoid in-service failure of 3000 3600 RPM machines that have high 5 mils end winding vibration.
RDES512001	5,443		Gavin Hg Reduction: FGD Ponds	The purpose of this project is to evaluate the feasibility and cost-effectiveness of a treatment technology aimed to reduce the levels of mercury released fro FGD landfill leachate ponds. Effluent limitations for mercury must be met at one of the ponds Pond 2 no later than 12 31 2012. The feasibility of using ac and/or biochars to sequester mercury in pond sediments will be evaluated. Project Benefit: A successful demonstration of this treatment technology will pro certainty in achieving effluent limitations in a cost effective manner.
RDES512101	20,012	242	SuprcriticalWaterwalOxideGrwth	Supercritical waterwall cracking is one of the boiler tube failure mechanisms for supercritical units that were driven by heavy ID deposition. The deposition corrosion of the condensate and feedwater piping and subsequent depositing of this corrosion product on the ID of supercritical waterwall tubing. It was be the conversion of supercritical units to oxygenated feedwater treatment OT which drastically reduces the corrosion product transport from the condensate cycle that this tube failure mechanism would go away. Unfortunately this mechanism has returned. EPRI has been working on this failure mechanism for th years and have come up with several different causes. One thing that has not been investigated fully is the difference between supercritical waterwall oxid oxygenated feedwater treatment and after oxygenated feedwater treatment. Fortunately AEP Gary Wood has a library of tube samples from various supe over the years. In particular he has a sample of a pre OT unit with very heavy deposits, and a sample of a typical pre OT unit. Couple this with samples fro we will have the ability to look closer at these oxides to see what differences exist. Something that will be done for the first time on this type of deposit is th milling tool which will allow us to see the oxide much better.
RDES512201	183,625	9,619	Demo of the SAP for Hg Control	Full scale demonstration project for the development of activated carbon AC for Hg control. EPRI system will be utilized for the on site production of activ on site fuel and supplied to the Sorbent Activation Process under existing EPRI patents.
RDES521001	115		Water Use&Consumptn-TexasPlnts	The Electric Power Research Institute has developed significant information on water conservation technologies for power plants, including costs, performa under a wide variety of site characteristics. The purpose of this study is to apply these results to the Texas generation fleet and to consider the unique res climate variations and regulatory constraints that Texas power generation providers must adhere to for water withdrawals and water consumption. Project

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				study will provide a stable dataset that outlines water use, water consumption and water conservation within the Texas power generation sector, as well as analysis of the water conservation options that are economically viable. This analysis will also illuminate how changing generation assets may impact wat over the next 50 years. The study will provide the basis for a consistent and sound cooling water life-cycle comparison. The results can be applied to oth hydrologic locations for the purpose of finding the lowest cost conservation options to achieve water sustainability. Public benefits are also derived from re rates and reduced impacts of water availability to local economies.
RDES521301	2,664	108	Development-Shale Gas Reserves	The development of extensive shale gas reserves will continue drive an increased reliance on natural gas for electricity generation in the United States. V environmental considerations have been identified related to shale gas production. The purpose of this project is to assess the scope and magnitude of th considerations so that related risks can more effectively be managed. Project Benefit The assessment of environmental risks from shale gas production w identifying and managing related risks associated with the current and future reliance of fuel supplied from shale gas resources.
RDES521501	(6,477)	(482)	EPRI Catalyst Sample Testing	Provide bench scale tests at AEP DeNOx Catalyst Laboratory for ten 10 deactivated regenerated SCR catalyst samples, which include plate type, honey corrugated type, received from EPRI s member electric utilities. The test for each catalyst sample includes the bench reactor test to determine the catalys SO2 to SO3 conversion rate, and pressure drop as well as X-Ray Fluorescence XRF analysis for the catalyst surface and bulk material composition. The performed in accordance with the VGB guideline R302 H e. Benefit Long term performance of regenerated catalyst from different applications.
RDES521901	509		Concrete Insp-HydropowerAssets	The purpose of the project is to demonstrate state of the art nondestructive concrete inspection technologies at hydro assets. Project Benefit To demons performance of emerging nondestructive concrete evaluation technology at hydro assets.
RDES530201	5,443	107	AirEmissionControl By-Products	Project Purpose: New learnings from this research include a robust database of the impact of various air emissions control technologies on environmental and engineering coal combustion products CCPs and wastewater solids. In addition, the project will provide new information and methods for the application of stabilizati methods to highly soluble salts. Project Benefit: These data will then be used to develop appropriate management practices that are protective of the environment. Successful completion of this project w public by supporting environmentally safe management practices specifically for these materials. Such practices are anticipated to have lower life cycle co added benefit of lower impact on electricity rates over the long term.
RDES560101	1,075,572	20,486	EPRI Environmental Controls	Environmental Controls projects from the EPRI Annual Research Portfolio include: 1) Program 71 û Combustion Performance and NOx Control - AEP buy from this program. Project 71.001, Mitigation of Fireside Corrosion and Waterwall Wastage in Low-NOx Systems, takes a three-pronged approach to unde resolving the costly consequences of accelerated fireside corrosion exacerbated by low-NOX operation, looking at coal quality, boiler design, and material solutions. Purchase of t
RDES560201	4,609,976	87,065	EPRI Environmental Science	Environmental Science projects from the EPRI Annual Research Portfolio include: 1) Air Quality Programs - By providing credible scientific information and assessment and management tools, EPRI's air quality programs support the development of effective and protective policies, standards, implementation p compliance strategies. Programs within the Air Quality area include 42 û Air Toxics Health and Risk Assessment, 91 û Assessment Tools for Ozone, Parti Haze, an
RDES580601	9,146	248	OhioRiverEcologicalResearchPrg	The objectives of the project are to 1) provide information on the effects of fish impingement, thermal discharges, and other power plant wastewater proces populations in the Ohio River; 2) provide information useful in commenting on proposed ORSANCO, federal, and state water quality standards for the Ohio update existing data and refine fish population estimates to address USEPA 316(b) concerns. Schedule will include winter sampling, which has only been history of the program.

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RDES582501	42,872	591	EPRI HG-SE FGDBlowdwnWtrTrtmnt	All flue gas desulfurization systems require periodic blowdown to limit the build-up of chlorides and other soluble products of the combustion process. So of the blowdown water will include trace elements that are subject to increasingly stringent control requirements. Two such elements are mercury and sele project will evaluate promising technologies for treating emissions of those elements in the chloride purge stream.
RDES593101	4,148	107	Ohio River Basin Trading Prgrm	This project will design and implement a regional trading program in the Ohio River Basin for both water quality and greenhouse gas credits. Building on r to quantify greenhouse gas (GHG) emission reductions for avoided fertilizer use, this project will develop an approach for creating GHG and water quality with reduced nitrogen fertilization on agricultural crop lands. This project also will build on EPRIs work to establish a WARMF watershed model of the entir Basin. Properly designed and deployed, this trading program will reduce GHG emissions and nutrient discharges, such as nitrogen, and protect watershe costs. This project will be a first-of-its-kind regional trading program and represents a comprehensive approach to managing nitrogen, phosphorus and GH This work is timely as existing challenges to meet nutrient discharge limits may be amplified by increased effluent discharges of nitrogen (due to operation controls), coupled with more stringent water quality based limits for surface waters. In addition, the establishment of GHG credits due to avoided emission ability to purchase local, ecologically defensible carbon offsets.
RDES593301	200,000	200,000	CarbonMgmt-UKResearchFndation	Per Kentucky Public Service Commission (KPSC) Order in Case No. 2008-00308, dated October 30, 2008, to establish a Regulatory Asset related to certa made to the Carbon Management Research Group (CMRP) and the Kentucky Consortium for Carbon Storage (KCCS) regarding the management of carb dioxide associated with existing coal-fired electric generating facilities in Kentucky. Kentucky Power Company (KPCo) has agreed to provide up to 10 yea funding of $200,000 annually. Payments are made to The University of Kentucky Research Foundation. Regulatory asset account 1823188 has been esta capture these costs.
RDGA260001	11,079	207	Adv. Generation Prog. Mgmt	This line item is used for the Advanced Generation R&D Program (AG) pre-project R&D development efforts and to track and manage misc. AG R&D proje $10K. The purpose of this charter is to document the scope, budget and costs (labor and non-labor) of those projects and efforts included in the Advanced Management function. It is also used to track participation at general conferences and other trips associated with the Advanced Generation program. The charter includes:
RDGA260101	12,783	393	Adv Gen EPRI Annual Research	The Advanced Generation selection from the EPRI Annual Research Portfolio consists of Program 9: Technology-Based Business Planning Information & Technology Assessment Guide, or TAG). The EPRI TAG provides performance and economic information about most generation technologies. The TAG Database and Software currently covers 24 categoriesùincluding all major fossil and nuclear plant types, several energy storage technologies, small-scale options, renewable resource techno
RDGA260201	110,367	1,686	Coal Utilization Research Council	The Coal Utilization Research Council (CURC) was formed in 1997 as an ad-hoc group to act as an industry voice for R&D needs associated with the role sustainable energy source for electric power generation as well as the transportation and chemical industries. CURC members include utilities, equipment companies, universities, and other energy-related companies and consortiums. The CURC provides its members with a respected, influential forum in whi ensure the c
RDGA260601	96,807	2,980	Technology Assessment Guide	The EPRI Technology-Based Business Planning Information & Services (aka Technology Assessment Guide, or TAG) provides performance and econom about most generation technologies. The TAG-Supply« Database and Software currently covers 24 categoriesùincluding all major fossil and nuclear plan energy storage technologies, small-scale generation options, renewable resource technologies, and transmission and distribution facilitiesùwith nearly 100 configurations of proce
RDGA260701	22,678	619	Geologic CO2 Sequestration P2	This is an on-going project (co-funded by the DOE and led by Battelle) that is investigating the feasibility of safely injecting and storing CO2 in deep salt wa formations. The project is located at AEPÆs Mountaineer plant in New Haven, WV.
RDGA281901	970	16	EPRIDemo-	The ability to provide a low-cost stream of pure oxygen is an enabling technology for two different methods of separating carbon dioxide from flue gas, IGC oxy-combustion. Current cryogenic methods of oxygen production are very expensive in terms of capital, auxiliary power consumption, and water usage.

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			IonTrnsprtMbrneOxyPrd	the United States Department of Energy have worked to develop methods of oxygen production involving transport of oxygen ions through a ceramic mem technology has progressed to a point where a demonstration unit is possible. EPRIs role in the project will be to provide an electric utility industry perspec to ensure the ability to employ the technology in actual power plants.
RDGA292101	511,373	6,252	IndustrialAdvisoryCmte-SthrnCo	AEP will participate in a partnership at the Carbon Research Center at Power Systems Development Facility (CRC at PSDF). The focus of the CRC is to c R&D to advance emerging CO2 control technologies to commercial scale for effective integration into either IGCC or advanced combustion processes. A of the CRC testing is to evaluate solvents, sorbents, membranes and other emerging technologies in various contacting devices at an appropriate scale wi As concepts proceed past the bench scale, a test under industrial conditions with real syngas is needed to provide a pathway to commercialization. For bc existing power plants, post-combustion capture technology must be made more efficient and cost-effective. Many technologies are under consideration fo combustion capture, but these technologies need to be proven and integrated in an actual power plant setting. A Flexible Pilot Test Unit test module will b installed at an existing pulverized coal plant adjacent to the PSDF.
RDGA300001	389,413	12,583	Gen Asset Mgmt - Prog Mgmt	This line item is used for Generation Asset Management (GAM) pre-project R&D development efforts and to track and manage misc. GAM R D projects cc purpose of this charter is to document the scope, budget and costs (labor and non-labor) of those projects and efforts included in the GAM function. It is a participation at the general conferences associated with GAM especially EPRI conferences for the AEP EPRI Advisors.
RDGA320901	37,500		Eval Gr23&24 SteelWeldCracking	Project Purpose To evaluate the effect of as-welded microstructure and chemical composition on the susceptibility to hydrogen assisted, hydrogen induce relief cracking in Grade T23 and T24 steel welds. Project Benefit This project will provide information to establish fabrication requirements for these steels necessary information to reject these materials from future HRSG purchases due to the cracking susceptibility already detected in Europe and the United S
RDGA321101	1,471	(153)	Mercury Oxidation Measurements	SCR catalyst oxidizes the elemental mercury in the flue gas to oxidized mercury which is subsequently removed by the downstream FGD system. It is the SCR and FGD for mercury removal. The purpose of this project is to measure mercury speciation at SCR inlet, outlet and between catalyst layers and und performance of each catalyst layer with respect to mercury oxidation as flue gas condition changes from catalyst layer to catalyst layer. Project Benefit T of mercury oxidation performance of each catalyst layer will help to improve catalyst management strategies for mercury control. AEP WILL BE REIMBUR FOR THIS TESTING PROJECT.
RDGA380101	2,633,150	42,787	EPRI Annual Portfolio	Program 63 - This program develops technology and guidance that allows participants to safely manage boiler component life for high reliability and reduc Technology development efforts will focus on advanced inspection techniques to identify component damage early and accurately; analysis tools to predic remaining life and in-service failure risk; decision support tools that allow AEP to balance risk and economic benefits under a variety of plant operating sce conditions; and repair techniques designed to maximize component economic life. (EPRI = Electric Power Research Institute) Program 64 - Participatior provides the opportunity to access the EPRI knowledge base across the wide breath of this target. Program 87 - Acquire through EPRI membership in P8 P87.002 the most current guides for material. Program 88 - The P88-HRSG Dependability program is to provide technology that will address chemical iss 171 - Develop guidelines, materials, solutions and monitoring techniques in this Issue Program so.
RDGA380801	387	12	CreepStrength-G91FerriticSteel	The purpose of the project is to identify effective methods for locating and characterizing deficient G91and other Creep Strength Enhanced Ferritic(CSEF) material specs and processing standards to assist utilities in procuring G91 and other CSEF steel components; assemble a guideline that provides the life protocol for G91 and other CSEF steels.
RDIT530001	42,556	1,392	IT R&D Program Management	General management and coordination of the IT R and D program
RDLABACC01	(1,130)	(40)	Labor Accrual - R&D	To record research and development portion of labor accruals.

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RDNU560101	1,493,547		EPRI Nuclear Annual Research	Collaborative R&D within the nuclear power industry ensures that nuclear power is an economically feasible option within the current and future generatior end, EPRI develops cost-effective technology for safe and environmental friendly electricity generation that maximizes profitable utilization of existing nucl supports promotion and deployment of new nuclear technology. EPRI's Nuclear Power program centers on seven key business objectives.
RDRE510201	9,050	283	CEATI-EmergingEnergyTechnology	Obtain a comprehensive assessment of emerging energy technologies including technical, environmental, and market assessments of wind turbines, solai thermal, nuclear, biomass/waste-to-energy, enhanced geothermal high level , small hydro, hydrokinetic turbines, ocean technologies, fuel cells, utility scal hydrogen high level , Stirling Engine gensets, and gas electric engines.
RDRE520301	162	5	ManagingSpeciesIssues-Renewabl	The purpose of the project is to perform a population-level risk assessment on eagles with respect to wind farm development and siting using real world da Project Benefit: To develop an understanding of population-level impacts of wind development on eagles for more informed siting decisions, risk managem mitigation of potential impacts. This will add certainty to long-term wind operations.
RDRE570001	47,168	1,526	Renewable R&D ProgramMgmt	This is used for Renewable Energy Resources Initiative (RERI) pre-project R&D development efforts and to track and manage misc. RERI R&D projects c \$10K. The purpose of this charter is to document the scope, budget, and costs (labor and non-labor) of those projects and efforts included in the Renewal Management function. It is also used to track participation at general conferences associated with Renewable Program Management, especially EPRI cor AEP RERI area. Donald Hubschman stated that Cardinal SHOULD NOT be billed for these charges.
RDRE570101	198,096	6,435	EPRI Renewabl Annual Port	This project charter supports AEPÆs renewables involvement with EPRI, namely: PS 84.001 Renewable Energy TAG û provides a basic reference for tec economic assessment of renewable energy generation technologies PS 84 D Biomass Energy û provides industry reference and contacts for renewable e generation, most notably biomass co-firing Donald Hubschman stated that Cardinal SHOULD NOT be billed for these charges. EPRI = Electric Power Re
RDRE590701	105	5	Impact of CoFiring on EnvEquip	To determine the combustion impacts of 10% biomass wood by heat on environmental control equipment, including catalysts, precipitators; also to evaluat select equipment.
RDTA500701	2,154	79	Equip Health Info-CntrlRoomOpr	This project intends to first make broad brush health information (red, yellow, and green) available for operators based upon analyses of historical paramet pieces of equipment and/or classes of equipment. This would then lay the groundwork for augmenting historical assessment with improved asset condition real time asset condition assessment applications. Ultimately, we envision real time and forward looking equipment failure predictability being integrated in planning. The project will be coordinated with EPRI projects focused on asset condition assessment as well as substation monitoring and data integration p new learning in this project is focused around presentation of asset condition information for system operations applications. This project intends to provid utilities, Regional Transmission Organization (RTO) and Independent System Operator (ISO) with the transformer health visualization tools to: Improve sit awareness Avoid damaging and costly wide spread blackouts of transmission grids Develop and demonstrate new applications to improve operation awar schedule maintenance based on the performance and conditions of the equipment in order to improve system reliability and to reduce the maintenance co
RDTA510301	1,038		Oklaunion HVDC Converter Statn	A high level assessment of the Oklaunion HVDC converter station to determine and evaluate the remaining life expectancy of the major AC yard converter to increase the operational reliability of the existing HVDC installation. The objective of the project is to use the assessment data, decide on the scope of t and to issue the results, along with AEP HVDC specifications, to the vendors to solicit bids for Oklaunion HVDC refurbishment.??
RDTA510401	643	24	GeoMagnetic Disturbance	Project Purpose Geomagnetic Disturbance GMD is not a new phenomenon, yet it is of rising concern to the North American electric power sector due tc awareness, grid complexity, understanding of intensity, location and orientation, and societal dependence on reliable electricity supply. GMD has the pote system disturbances and equipment damage. In an extreme case, GMD may have the potential to cause wide spread electric disruption and destroy long- equipment, such as transformers, vital to support the delivery of electricity. For the purposes of this project, an extreme event is characterized as being te magnitude of the solar storm that led to the collapse of the Hydro Quebec system in the early hours of March 13, 1989 centered at the 50th latitude, center Fredericksburg, Virginia, and northward. Some scientists estimate that such an extreme event may result in a system collapse, hundreds of large autotran damaged or destroyed and an outage that will last for months rather than days. Other scientists anticipate that existing system protection schemes will ad

Work Order	Corporate Total	KPCo Total	Project Title	Project Description
				the system disconnecting transmission components with little or no equipment damage, and that after the storm, the system could be quickly restored. Sp projects objective is to Determine the likely impact of an extreme event, as defined above, on the North American bulk power system, based on present sy configuration, protection capability, and practices. Identify technologies available today (especially in operations), or in the near term, which can be used to equipment damage, reduce the extent of the interruption, and speed recovery. Identify technologies that can be developed to reduce the impact of the stor same time lower the cost of protection. Project Benefit The understanding developed in this project is intended to help utilities prepare for large solar storn the grid through such events. This may improve bulk power system reliability by shortening customer interruptions as well as minimizing the risks of equipr addition it may identify gaps in forecasting and mitigation solutions, and give guidance on the economic feasibility of available mitigation technologies.
RDTA520401	17,042	628	HVDC Cable Interest Group	Participation in this interest group will focus on the following 1.Increase understanding about HVDC cable technology applications 2.Share the experience participants and learning from each other on HVDC cables 3.Identify technology R D needs in HVDC cables 4.Reduce the costs of power transmission, po electricity rates to end-use customers 5.Increase overall system controllability, stability, and reliability 6.Make informed decisions based on technical and e of HVDC technologies 7.Learn about operational Experience of existing DC cables 8.Learn about the DC cable type selection, and economic choices 9.Ir knowledge about the VSC based DC applications 10.Learn about challenges and opportunities presented by cable technologies
RDTA520601	14,685	540	DaylightDischargeInterestGroup	The technology for viewing corona and arcing discharges in full daylight has been around for a number of years. AEP possess three DayCor cameras and technology to evaluate electric discharges associated with new products designs and for operation and maintenance of transmission lines. One of the diffic applying this technology is the interpretation of the data or visual images. This is because arcing is often interpreted as corona and vice versa, and the loca discharges and their effect are sometimes mis-diagnosed. This failure may lead either to unnecessary intervention or to equipment failure. An ongoing cha improved understanding and diagnosis of the visual images taken from the camera. These benefits can ultimately translate into O M cost savings. Project objectives of this project are to move this technology forward by 1 Developing training material and updating existing material with new research finding Undertaking fundamental research on UV IR inspection of transmission line components 3 Providing a hands-on workshop and training
RDTA530201	30,311	1,197	Integrated Network Model Mgmt	This project seeks to investigate the network model data needs of common Transmission system applications used within Transmission Operations, explo processes involved in the maintenance of shared network model information and propose a generic approach to coordinated Transmission network model using the CIM as a semantic model. This approach will be the blueprint for a 3-5 yr roadmap which will allow TOPS to streamline infrastructure and busine involved in real-time network model management. TOPS Transmission Operations CIM Common Information Model
RDTA530301	8,078	291	Transmission ModernizationDemo	The objective of this collaborative project is to share learning from new applications that are being presently developed by research organizations and dem utilities and to accelerate these new applications adoption across the electric power industry. These new applications which may include data manageme data analysis systems, analytics and visualization approaches may be needed to facilitate additional transmission analysis and management functions to f the grid's reliability, operational efficiency, and asset performance. In addition, it is expected that new innovative approaches to data management, data an system integration will continue to be identified and this project may provide a framework for demonstrating and valuating them in real-world utility applicat Project Benefit · Provide insight and direct link to other EPRI projects since this work will be coordinated directly with the relevant EPRI research programs such as the C and Planning P39 40 , Bulk Renewables Integration P173 , IntelliGrid Program P161 , and Transmission and Substation P35, 36 37 . The proposed p expected to employ learning by doing – demonstrating and assessing the value of new analytical applications of existing and new data streams and comm infrastructure developed separate from this project, such as within base research programs, through parallel supplemental projects, at utilities, in laborato etc. · Provide benefit to Planning, Operations, and Asset Management with advanced applications · Provide learning opportunities from actual implementations of common data sets and applications · Provide new methods for data collection, management, visualization, analytics, and integration · Provide company-specific Opportunity Matrix which will note what to do and what not to do which will assist in economic assessments

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				· Increase the value of smart grid infrastructure and data through individual funder s roadmap and industry wide roadmap
RDTA570001	41,160	1,514	Transmission RD&D Program Mgmt	The money allocated to this project will be used to fund new activities or projects that develop as the year 2007 progresses. This is to make sure that a lac would not stop valuable R&D activities that were not anticipated at the beginning of the 2007 budget cycle.
RDTA570101	1,049,967	38,666	Trans EPRI Annual Portfol	Integrated Monitoring & Diagnostics (P37.007) - The purpose of this project is to examine techniques for monitoring as many different components in a sul few sensors as possible, which is complementary to the projects examining inspection tools for specific components such as transformers or circuit breake this project is to optimize applications of the sensors in substation. The concept of station-wide monitoring is to provide the low-cost screening tool that will detailed inspections at the component level. The unique focus of this project is on inspection tools that cover an entire substation, rather than at an individu level. Life Extension of Existing HVDC Systems (P162.001) - This project will address the life extension of HVDC systems in a systematic method. Shar and practices across utilities provides one of the most cost effective ways of ensuring that best-of- class field practices permeate across the global industry of the project is to prepare ôLife Extension for HVDC System,ö which is expected to facilitate the process of refurbishing of existing HVDC equipment Poly Composite Overhead Line Components (P35.010) - Extend polymer and composite component life expectancy and avoid outages due to premature failure improved selection, application, and inspection. (Ongoing work - EPRI Base project P35.007)
RDTA570201	24,156	890	CEA LCMSEA	CEA LCMSEA- CEA Life Cycle Management of Station Equipment and Apparatus Interest Group. This on going interest group is a low overhead collabora focused on member driven station equipment, maintenance, tools, asset management techniques,benchmarking,diagnostics,and life extension . Projects a contract awards made to investigate and deliver solutions, knowledge, tools, evaluation and techniques for defined issues. Projects are usually completed CEA = Canadian Electric Association
RDTA570301	705	26	CEA TLAMIG	CEA (Canadian Electricity Assoc.) T Line Asset Management Interest Group (ôTLAMIGö) is a low overhead collaborative focus on member-driven transmi maintenance needs and problems. AEP funded 2006 projects in reliability effects of defective line insulators and an asset management approach to tower promising projects will be funded in 2007, including the deployment of a transmission line hardware failure reporting database for the detection of trends in failure modes.
RDTA570401	58,580	2,161	PSerc	PSerc (Power Systems Engineering Research Center) is an NSF sponsored university (13)ûindustry (38 members) consortium. Participation in PSerc pro access to experienced university researchers in leading electric power programs across the U.S., results of collaborative member defined and approved lo projects, and access to leading students for both intern and permanent employment positions. Participation in PSerc is a valuable element of a balanced p internal and external R&D plays
RDTA570901	9,311	343	Phasor Tech: Plan & Ops Tools.	1) Develop tools and techniques to analyze data captured by AEP phasor monitoring units (PMUs) and apply the tools and techniques in planning (off-line (real time) environments. 2) Participate in the Eastern Interconnection Phasor Project (EIPP), which is facilitating development of a phasor data network ir Interconnection (EI). The vision of EIPP is to improve power system reliability through wide area measurement, monitoring and control.
RDTA571101	186	7	BPL Use for Data Transportatio	Explore the use of BPL (Broadband Power Line Carrier) technology for data transport to reduce the use of leased lines and associated O&M costs. Build c gained from the 2006 BPL SCADA and Protective Relaying R&D project. Project elements likely will include: 1) further characterization of 46kV, 69kV and transmission lines as BPL communication channels; 2) performance comparison of single phase and multi-phase BPL coupling 3) optimization of Amper system for internal utility data transfers to reduce cost and maximize distances between repeaters. 4) analysis of various options for powering BPL repeat exploration of the use of BPL as a transmission line diagnostic tool. 6) through Amperion û Dolan Lab development and testing, qualify BPL components 69kV and 138kV applications.
RDTA571401	302	11	High Temp Superconduct Cable	This project has developed a high temperature superconducting, three phase, triax cable and is in the process of demonstrating its suitability for a high pov underground retrofit application. AEP is hosting the demonstration at ColumbusÆ Bixby Substation as part of a $9M DOE Superconducting Partnership In successful, it will further DOEÆs objectives to accelerate the introduction of HTS cables into the utility grid. The cable is currently operating in real life cond

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				primary source to the Bixby 13.2kV bus and distribution feeders supplying electricity to industrial and residential users. Both closed loop pulse tube and op cryogenic cooling will be demonstrated. The project will answer userÆs questions regarding long length application, the triax cable design, cryogenics coo system reliability and O&M costs. The cable and support systems will be removed and the station restored after the 1-2 year demonstration is completed. order RDTA561401
RDTA590501	2,761	101	NanoCoatings T-Line Insulators	This is a current EPRI TC project that AEP is joining. Over the years fiberglass transmission line components have suffered from a range of failure and de Nanotechnology based materials are currently being developed to address a wide range of industry applications. This project is to investigate the possibili existing nano coatings or to modify existing coatings to address the known problems stated above.
RDWM201001	42,558	2,031	DTC Walnut Maintenance	The Walnut Test Facility is owned by Columbus Southern Power. The facility is used by the corporate Utilities R&D program. As such, the expenses and done at the facility are done for the benefit of multiple operating companies. This project / work order will allow for a mechanism to capture the annual cos the facility, future investments, and other related annual expenses û e.g., depreciation of the assets that were transferred in accordance with the dissolutio EmTech, LLC, etc. û and expensing them to the appropriate benefiting locations.