

BEFORE THE
STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

In the Matter of

Consolidated Edison Company of New York, Inc.

Case 07-E-0523

September 2007

Prepared Exhibits of:

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Jason Pause - Research & Development

Exhibit___(JP-1)

List of Staff Information Requests

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Company Name: Con Edison
Case Description: Electric Rate Filing
Case: 07-E-0523

Response to DPS Interrogatories – Set Staff7
Date of Response: 07/26/2007
Responding Witness: Kressner

Question No. :128

Are the R&D – New Initiative Programs (see Kressner Testimony, p.16 et. seq.) new programs? If not, explain why these programs are now being implemented compared to previous years. Additionally, provide the following information associated with each of the programs covered under the new initiatives programs identified within the Company's testimony, during each of the past five years. a) Forecasted budget b) Actual amount spent c) Description of work completed including dates and locations

Response:

Yes, these are new programs. These programs are intended to address emerging issues, or potential technical solutions that have arisen since our last rate case. The technologies are nearing a stage where further development or demonstration by the Company will become appropriate within the new rate period. There have been no expenditures on these programs in the past five years.

Company Name: Con Edison
Case Description: Electric Rate Filing
Case: 07-E-0523

Response to DPS Interrogatories – Set Staff12

Date of Response: 05/27/2007

Responding Witness: Kressner

Question No. :227

Subject: R&D – Distribution Programs - Please refer to exhibit AK-1. For the Network Equipment Reliability Projects, Fault Locating Projects, Stray Voltage/Manhole Events Projects, Overhead Projects, System of the Future Projects and associated subset projects, provide the following information: Is it an existing program? If not, explain why the program is now being implemented. If it is an existing program, provide the following information associated with the specific improvement during each of the past five years: Forecasted budget Actual amount spent Description of work completed including dates and locations

Response:

The network equipment reliability projects consist of several on-going projects which had significant expenditures in 2006. The major projects include:

- 1) Network Feeder Disconnect Switch, which began in 2006, had expenditures \$119,000 in 2006. In 2007 \$25,000 has been spent by R&D. Storm surge flooding has been identified as a credible risk to our network distribution system, especially in lower Manhattan. This project designed, developed and test-certified a small high-capacity submersible disconnect switch to mitigate the potential damage. During development, the multi-discipline team recognized that the new switch would also be useful for network splits, reducing the intermesh duration from days to hours. Presently, the switches have been installed for use in several network load transfer projects and storm surge damage mitigation in Manhattan.
- 2) Remote Visual Inspection (RVI) Tool Development began in 2004 with \$42,800 expended in 2005. The feeder cables and splices in our underground network system are of various ages and are subject to a wide array of environmental conditions. Occasionally, conditions in a manhole are unstable or unknown. Physical inspection of the visible external attributes of cables and splices is used to determine safe entry protocols, and to manage maintenance and replacement programs. This project will explore the practicality of a hand-held remote visual inspection tool that will allow pre-entry inspection of those structures and determination of actions necessary to enhance safety and sustain reliability. Working with Electric Operations, we researched several RVI tools and systems, and conducted a few trial applications. These systems are used on occasion to help in the identification of damaged cable.

- 3) Distribution Cable and Splice Center for Excellence which began in 2001 had expenditures of \$500,000 in 2002, \$340,000 in 2003, \$311,000 in 2004, \$16,000 in 2005 and \$94,000 in 2006. This project was to establish a Distribution Cable & Joint Center of Excellence to evaluate existing distribution assets and develop improved solutions for necessary repair and replacements. The Center consolidated the cable and joint autopsy programs that were dispersed among various operating groups. It developed databases and analyzed condition assessment techniques and data-mine databases to optimize the future management of distribution cable system operations, maintenance and replacement. Finally it is a catalyst for enhanced inter-utility collaboration on cable and splices.
- 4) Applications Research for Distribution Substations and Transmission began in 2005 with \$87,000 spend in 2005, \$88,000 in 2006 and \$105,000 in 2007. Thru this project Con Edison joined NEETRAC in January 2005. NEETRAC has proven to be a useful venue for collaboration on research, development, prototyping and testing of technologies and equipment that are important to our operations. It has increased leverage of our funding, including the cable diagnostic focused initiative that, with Federal funding, is resulting in leverage of over 30 to 1. Con Edison's NEETRAC membership agreement provides for priority handling of directed research for members beyond the membership payments. We have engaged it to perform qualification tests of a new 69kV transition joint from high-pressure gas to solid dielectric, and forensic analysis and tests on gassing network transformers, and have participated in work groups reviewing advanced fault current limiter designs.

Fault Locating Projects with significant expenditures in 2006 include:

- 5) Real Time Fault Location System began in the late 1990's with \$315,000 being expended in 2002, \$109,000 in 2003, no expenditures in 2004, \$15,000 in 2005, \$77,000 in 2006 and \$33,000 thru June 2007. This project is to develop and demonstrate a real time fault locating system. The first field trial was completed on June 5, 2000 using a staged fault. Work proceeded with creation of feeder models and the database of wave patterns, and the vendor extended the functionality of the off-line system and established the hardware and software requirements for migration to real-time mode. While the system was a technical success, communication needed for the system developed on this project remains both an insurmountable technical and financial hurdle for its deployment. Thus the project stalled for several years, and then in 2006, in the wake of closeout of the contract with the vendor, we developed a substitute. This method uses Power Quality Nodes and interfaces to host an algorithm called "reactance to fault" (RTF) that expedites fault locating on our distribution feeders. When this program was used predominantly in Manhattan in 2006, fault-locating times averaged about a half hour less than the previous year's average of over 2 hours. This program is continuing to be rolled out and adjusted to produce similar results on the 27kV systems in Brooklyn, Queens and The Bronx.
- 6) Feeder Tracing Current Remote Sensing Development began in 2005 with expenditures totaling \$81,700. In 2006 \$20,000 was expended and \$47,300 so far

in 2007. Feeder cables and splices in our underground network system are of various ages and are subject to a wide array of environmental conditions. Occasionally, the condition of a component in a manhole requires that it be classified as a D fault, and access to the structure is restricted. In order to make repairs the involved feeder is taken out of service. However, positive identification of the involved feeder is required, and until that identification is made there exists the possibility that the component is not on the expected feeder, but is on another one and is therefore still energized. This project designed and built several wireless remote tracing current pick-up coils and associated receivers and explored the feasibility of their use on our prototype system. Based on a field trial and review of the prototype, additional features were requested to facilitate operational field use. The enhanced kits are being fabricated and will be used in shakedown trials in several operating regions prior to system-wide use.

- 7) Fault Indicators with Automatic Reset for Network application began in 2005 with \$26,000 being spent in 2005 and \$24,000 spent in 2006. This project was conducted to test and evaluate underground Fault Circuit Indicators (FCI) for Con Edison network applications. We contracted with a vendor to provide equipment and services for the testing and demonstration of an underground fault indicator that meets Con Ed requirements set forth in the June 7, 2004 specification addressing Underground Directional Network FCI for Con Edison "Known Point Splice Applications". The vendor manufactured 54 FCI units and delivered them in two stages: 12 units were delivered for performance verification; the remaining 42 units for field verification. The initial performance testing of the units were completed and successful in that they met the requisite Con Edison specifications. The FCI were installed in the field and we are awaiting the results of the field trial.

Stray Voltage/Manhole Events Projects with significant expenditures in 2006 include:

- 8) Stray Voltage Monitoring and Communications Via RMS began in late 2004 with \$34,000 being expended in 2005 and \$14,000 in 2006. The capability to monitor stray voltages on our service boxes and manholes will alert us to dispatch a crew to rectify the condition soon after it occurs. With a monitoring and communication system in place, inspection cycle of our structures can be reduced. Due to the vastness of our networks - approximately 300,000 manholes and service boxes, deployment of such a system can be very costly. Utilizing power line communication and the existing RMS system as the communication backbone is one viable option to limit the communication cost. In this project, a vendor is developing a Stray Voltage Detector (SVD) System that is designed to monitor and report stray voltages on service boxes. The proposed system makes use of sensors installed at each box that monitor and report the status of the box via PLC communication. The system first utilizes the secondary distribution lines, and then makes use of the existing Con Edison Remote Monitoring System (RMS) communication network, to complete the link from the street box to displaying it on VDAMS. The receiver and transmitter are currently being designed. A connector interface was built to interconnect the A/D converter to the process in the receiver. Software development is progressing. The stray

voltage sensor is currently being designed and requirements are currently being established.

- 9) Decision Support System (DSS) for Stray Voltage and Manhole Event Analysis was started in 2005 with \$151,000 being expended. Spending in 2006 was \$52,000. In this project the contractor used machine learning and natural language recognition to predict M&S plates service boxes, and manholes that are most susceptible-to-events that could pose an unsafe exposure to the public. The predictions were integrated into a graphical interface that will be fast and easy to understand.
- 10) Composite Cover Load and Fatigue Testing began in 2005 with \$82,000 being spent in 2005 and \$107,000 in 2006 when the project was completed. The objective is to test S-type trench panels for their strength and durability by subjecting these panels to static and fatigue load testing for higher strength. Static and fatigue load tests were also performed at test frequency of 25 cycles per minute (CPM) to minimize the heat generated from where the applied loading makes contact with the trench panels. The fatigue test was successfully completed without resulting in significant increases in the temperature on the sample panel surfaces by running the test at 25 CPM and varying the loads from 1000 pounds (1 kip) to 27,000 pounds (27 kips) for a half-million cycles. The fatigue load testing showed that the panels meet traffic requirements. The static load tests also confirmed that the panels exceeded the manufacturers' rated load-carrying capacity. They were designed for 86,956 pounds (or 87 kips); their resulting ultimate strength were found to be at values ranging from 118.5 kips to 128.8 kips, which is greater than their rated design.

Systems of the Future Projects which had significant expenditures in 2006 include:

- 11) Integrated System Model (ISM) Validation Using DEW for 3G System of the Future started in 2006 with expenditures totaling \$508,000. The 3G System of the Future Project (SOF) is currently developing the infrastructure designs that will have the flexibility to accommodate many future scenarios while enhancing robustness of the energy delivery to our consumer. One challenge is to develop the computational tools that will drive the system towards operational optimization. Future build-outs must be modeled and analyzed to fully understand the implications of the new electrical architecture, improve system intelligence and increase efficiency and reliability over time. 3G SOF designs must be modeled and tested on the computer first, with consequences evaluated before actions are taken. Under another R&D project (3G SOF Independent Reliability Assessment of Hudson Yard Load Transfer Design), a model of the Hudson Yard proposed design will be built by using the DEW (Distribution Engineering Workstation) software. Using the software, the reliability of the 3G designs will be compared with the existing system. In this project, Engineering is seeking to validate the DEW software for accuracy in load flow and reliability analysis. An integrated system model including the transmission, substation and distribution down to the customer will be modeled for the Sutton Network. The

contractor will work with Engineering to compare and evaluate both power flow and reliability analysis against existing tools.

- 12) 3G SOF Independent Reliability Assessment of Hudson Yard Load Transfer began in 2006 with expenditures of \$210,000. In this project, the 3G SOF team is investigating alternative power supply systems for the Hudson Yard Load area that will ultimately maximize the utilization of the installed equipment. a software model is currently being built to compare the reliability with the existing system.
- 13) 3G System of the Future Program Activities started in 2006 with expenditure of \$403,000. The 3G-System of the Future implementation Tasks are intended to translate concepts and design alternatives into specific application design templates. The initial design template will be created for new load growth pockets, which allows more freedom to develop an independent overlay design. This will subsequently be further developed into a design template that can be used to support evolutionary changes to the existing system design as part of broader substation (transformer, switchgear and cable) life extension programs. The goal of the design templates is to use equipment and technologies as they become available to meet increased load demands and life extension needs using less equipment with better asset utilization, shared spare capability and much more diagnostic and smart switching capability to more effectively and efficiently operate our own equipment, as well as exploit synergies and benefits that may emerge from coordination with DSM as spinning reserve, Building HVAC and facilities control, Advanced Metering, Customer portals and distributed resources. The System of the Future Design templates have identified new functionalities like fault current limiting and new types of equipment such as submersible vault locatable 13kV Switches that would be needed to fully enable the improved asset utilization, reduced cost goal of the 3G-System of the Future while preserving high reliability. Other equipment may also be initially developed by others that could be adapted to our specific application needs. The intent of this project is to encourage vendor development of these and other devices and where deemed in Con Edison's interest apply limited funding to evaluate feasibility and/or accelerate availability of specific equipment that would support the 3G System of the Future. Where ever possible these efforts would partner with vendors and/or other stakeholders to minimize Con Edison. It is also essential that we work with DOE and others to use new materials such as SiC to develop new power electronics devices and packaging to reduce the size and costs of both fault current limiters (to draw in distributed generation developers as collaborating stakeholders), and to reduce the footprint and cost of other fault current limiters as they migrate to transmission voltages and FACTS devices and HVDC terminals for deployment in both distribution and transmission applications. Where more substantial development is required, separate authorizations would be issued. Funding provided to date has included continuing development of the submersible 13kV Fast Switch for load transfers, International Benchmarking Meetings and Engineering Exchanges and participation dues for the GridWise Alliance.
- 14) Operations Support System for Lower Manhattan Development was started in 2006 with \$117,000 being expended. R&D developed a prototype Integrated Construction and Operations Management (ICOM) System for Lower Manhattan

which provides a solution to better manage street construction work and the associated permits application. This project has gotten a lot of buy in from various departments as well as improving liaison with City Agencies. The Maintenance & Construction (M&C) Department has deployed the prototype and the system is providing the following business benefits: a) fast, accurate submission of permit; b) an effective framework for the negotiation of permits; c) fewer rejections, lower cost of rejections to all parties; d) shorter time to approval of permits; e) productivity improvement & reduced costs; f) improved tracking, audit & dispute resolution support; g) reduced paper transaction; h) better financial, operational and management information and reporting and; i) close, positive relationship with the City. As a result of the prototype development, the M&C Department is pursuing a large scale deployment of the ICOM System for Lower Manhattan work.

- 15) Overhead Projects is an area of research we plan to expand. Historically, we have relied primarily on industry R&D regarding overhead systems. Since most other electric utilities are predominantly overhead, research funded through industry organizations (e.g., EPRI) and other utilities is available to the Company. Overhead Company-specific projects have been generally limited to demonstration projects. The Company is planning to expand its own R&D for Overhead Projects because of the increasing focus on storm recovery and system reconfiguration and restoration in its service territory.

Company Name: Con Edison
Case Description: Electric Rate Filing
Case: 07-E-0523

Response to DPS Interrogatories – Set Staff17
Date of Response: 05/27/2007
Responding Witness: Kressner

Question No. :321

Subject: Previous R&D Expenditures Provide the total forecasted budgeted and actual amount spend during each of the past five years for research and development.

Response:

The Company objects to the time frame requested. See below for 2004-2006.

<u>Year</u>	<u>Expend</u>	<u>Budget</u>
2004	\$ 8,590.00	\$ 8,999.00
2005	\$11,558.00	\$ 11,667.00
2006	\$10,544.00	\$ 12,246.00

Company Name: Con Edison
Case Description: Electric Rate Filing
Case: 07-E-0523

Response to DPS Interrogatories – Set Staff32
Date of Response: 08/28/2007
Responding Witness: Kressner

Question No. :491

Subject: Research & Development – In-depth Cost Breakdowns - Provide a more in-depth cost breakdown of how the future expenditures proposed by the Company in the exhibits and work papers were derived for the following programs: - Energy Efficiency/Environmental (\$0.6M for RYE 2009, \$2.6M total) - Network Reliability and Monitoring (\$4.5M for RYE 2009, \$13.5M total) - 3G System of the Future (\$1.2M for RYE 2009, \$3.2M total) - Superconducting & Fault Current Limiters (\$3M for RYE 2009, \$10M total)

Response:

See attached.

**Research & Development
New Initiatives in 2008 Budget Associated With the Pending Rate Case**

CSN	Engineer	Title	2008 PROPOSED BUDGET		Rate Year		Rate Year	
			Ending 3/09	Ending 3/10	Ending 3/10	Ending 3/11		
ENERGY EFFICIENCY AND ENVIRONMENTAL SUSTAINABILITY								
08220	Carbonara J.	IMPROVED CO2 FOOTPRINT	\$ 250,000	\$ 250,000	\$ 200,000	\$ 200,000	\$ 200,000	In 2009 and 2010, R&D plans to identify the Company's operational impact on green house gas emissions and investigate various new technologies to achieve reductions in CO ₂ and other greenhouse gas emissions.
08221	Carbonara J.	ENERGY EFFICIENCY PROJECTS	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	In 2009 and 2010, R&D plans to identify the Company's operational impact on green house gas emissions and investigate various new technologies to achieve reductions in CO ₂ and other greenhouse gas emissions.
08230	Carbonara J.	DATA CENTER & COMPUTER EFFICIENCY DEMONSTRATION	\$ 100,000	\$ 150,000	\$ 200,000	\$ 200,000	\$ 200,000	The goals of the proposed effort are to address research gaps, determine if more efficient computer power supplies improvements are technically feasible and/or cost-effective. The objectives of the effort are as follows: 1) Gather knowledge on the past, present, and future of energy efficiency for data centers and computing power supplies; 2) Survey candidate sites for field deployment of energy efficient power supplies to determine suitability for participation in a field study; 3) Create a comprehensive test plan that clearly defines and documents the procedures needed to conduct in-situ testing of high efficiency power supplies; 4) Quantify real-world savings made possible by using high efficiency power supplies. And monitor individual computer or server consumption over a time period to establish a baseline; 5) Retrofit with advanced, high efficiency power supplies, and monitor again; 6) Determine the impact of the use of high efficiency power supplies will have on generation mix, usage pattern, coincidence with area loading, harmonics, cascade savings, potential market impact from wide-scale adoption, reliability benefit to the distribution system, and CO ₂ reduction.
PHEV FLEET DEPLOYMENT								
			\$ -	\$ -	\$ -	\$ 800,000	\$ -	In Rate Year end 3/2011, R&D will incur the differential cost of approximately \$6K per PHEV vehicle (versus conventional vehicles) for up to 100 company vehicles. This will provide the company with both gain first hand experiences with the operation of these vehicles as well as the impact on our system. This program also includes the cost of changes needed to the infrastructure to handle these 100 vehicles. Charging stations, metering devices and supply chain changes will be needed to maintain these vehicles. R&D will conduct a study of the data gathered from the vehicles purchased and their impact on the distribution system. R&D will also review the environmental aspects of PHEVs being a "greener technology" versus conventional fossil fuel vehicles.
			\$ 550,000	\$ 600,000	\$ 600,000	\$ 600,000	\$ 1,400,000	
SUPERCONDUCTING AND FAULT CURRENT LIMITER PROGRAM								
92027	Duggan P.	15KV FAULT CURRENT LIMITER (DEVELOP, DESIGN, ASSEMBLE, TEST & DELIVER PROGR	\$ 563,000	\$ 500,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	existing 15KV 4000 amp stand alone FCL design & deployment
08223	Duggan P.	SUPERCONDUCTING CABLE AND FAULT CURRENT LIMITER AT 74 AND YORK	\$ 1,875,000	\$ 1,680,000	\$ 1,500,000	\$ 500,000	\$ 500,000	existing York-75th St. Superconductivity DEMO
82135	Duggan P.	SOLID STATE FAULT CURRENT LIMITERS	\$ 375,000	\$ 275,000	\$ 150,000	\$ 150,000	\$ 150,000	ongoing work alternative FCL technologies & migrations (EPRI, Fla State CAPS & other collaborations)
08228	Duggan P.	SUPERPOWER 138KV FCL	\$ 50,000	\$ 50,000	\$ 100,000	\$ 100,000	\$ 100,000	"sum of all three projects reflects development, design and deployment of the best alternative as a 138KV FCL
06128	Duggan P.	SCPOWER SUPERCONDUCTING FCL 138 KV	\$ 25,000	\$ 25,000	\$ 100,000	\$ 100,000	\$ 100,000	"sum of all three projects reflects development, design and deployment of the best alternative as a 138KV FCL
08227	Duggan P.	AMSC 138KV FCL	\$ 50,000	\$ 50,000	\$ 100,000	\$ 100,000	\$ 100,000	"sum of all three projects reflects development, design and deployment of the best alternative as a 138KV FCL
05180	Duggan P.	DISTRIBUTION FCL DEMO (34KV)	\$ 563,000	\$ 100,000	\$ 750,000	\$ 200,000	\$ 200,000	Develop, design, test deploy 34KV FCL (for 27KV & 34KV applications)
05170	Duggan P.	CURRENT-LIMITING DEVICES FOR NETWORK TRANSFORMERS FEASIBILITY	\$ 70,000	\$ 70,000	\$ 200,000	\$ 200,000	\$ 200,000	Develop, design, test deploy lower rated FCLs or other alternatives to reduce Dist X/mr, John & Marpole failures
06127	Duggan P.	ABB LIQUID METAL FCL	\$ 50,000	\$ 50,000	\$ 100,000	\$ 100,000	\$ 100,000	evaluate potential benefits of new unique FCL approaches
			\$ 3,821,000	\$ 3,000,000	\$ 4,000,000	\$ 3,000,000	\$ 3,000,000	
SYSTEM DESIGN								
08229	Duggan P.	DARWIN ZERO-CROSSING SWITCH	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	Develop and deploy zero crossing switches at various ratings to mitigate switching surges
82356	Duggan P.	3G SYSTEM OF THE FUTURE ACTIVITIES	\$ 250,000	\$ 50,000	\$ 100,000	\$ 100,000	\$ 100,000	Support of 3G SOF activities with other dense urban utilities and development of new equipment as identified
82184	Duggan P.	ENERGY STORAGE FOR PEAK LOAD SERVICE	\$ 55,000	\$ 55,000	\$ 250,000	\$ 250,000	\$ 250,000	Develop alternatives to enable energy storage to improve asset utilization and offset renewables unavailability
08224	Hekrasov A.	NETWORK AMR/AMI DEMO	\$ 668,000	\$ 870,000	\$ -	\$ -	\$ -	We propose under this program the demonstration of Advanced Metering Infrastructure system (AMI) for operation in low voltage distribution networks targeting urban areas such as Manhattan or Queens, which have networks with high concentration of buildings, customers, and high peak loads. Certain components of the AMI system do not currently exist and will have to be developed. Also as a result of the AMI business case analysis that was performed for the PSC Competitive Metering Order some of the cost and performance assumptions need to be validated with pilot projects and technology needs to be developed for network application. AMI demonstrations will also help quantify some of the softer benefits such as demand response, Real Time Pricing and Time-Of-Use as identified in the PSC Metering Order.
92724	Wong J.	DEVELOPMENT OF 345 KV OIL-LESS CABLE SYSTEM	\$ 150,000	\$ 125,000	\$ 550,000	\$ 650,000	\$ 650,000	The development of a new, environmental friendly oil free underground transmission cable
			\$ 1,425,000	\$ 1,200,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	

**Research & Development
New Initiatives in 2008 Budget Associated With the Pending Rate Case**

NETWORK RELIABILITY AND MONITORING
07130 Lee S. CONTROL CENTER VISUALIZATION AND ANALYTICAL TOOLS

\$ 1,875,000 \$ 2,000,000 \$ 2,000,000 \$ 2,000,000 \$ 2,000,000

This project addresses the need of developing an analytical tool for better operator decision making by integrating information from currently disparate data sources into an integrated system model. The R&D effort will demonstrate the integration of machine learning to evaluate and predict the performance of the electrical infrastructure based on real-time information run against the model. A key component in this effort includes advanced visualization providing an integrated view of the system status. This would be analogous to a Heads-up Display (HUD) utilized in battlefield conditions. It presents a highly visible view of what the operator needs to know immediately in order to respond to emerging threats. Adequate assessment of the electric distribution system and how it impacts customers requires modeling of the area substation, primary feeders, network secondary and services supplying the customers. A real-time stable and reliable integrated load flow and reliability model is envisioned that can assess the state of the system and loads on components for all levels of contingency, highlighting potential problems that may affect other facilities and/or customers' services.

08225 Nekrasov A. RMSX - ADVANCED PRIMARY AND SECONDARY SCADA

\$ 375,000 \$ 850,000 \$ 1,250,000 \$ 500,000

In this project, a new two-way network remote monitoring system - RMSx (Remote Monitoring System Expansion) will be developed and demonstrated as part of a R&D initiative. The new two-way network remote monitoring system will have the capability to monitor (open/close position) and control (open/make automatic) the existing network protector located at the sub surface network transformer vault. Initial demonstration can be performed on 480V isolated networks followed by chronic units not reporting on the present one-way RMS. The system would use a backbone communication system to take full advantage of the system control and data acquisition available with the present microprocessor relays, including flagging sources of off-on-backfeeds (ABFs). Benefits gained by a trial on 480V locations include capability of feeder emergency de-loading and selective load shedding, and elimination of time delays associated with opening or closing 480V spot or isolated network protectors when processing feeders.

08226 Nekrasov A. SECONDARY MONITORING TECHNOLOGIES DEMONSTRATION
08222 Wong J. PURS SCADA VISUALIZATION SYSTEM

\$ 250,000 \$ 850,000 \$ 1,250,000 \$ 1,250,000 \$ 1,250,000

Develop and demonstrate various communications and sensors for the secondary networks

08420 Duggan P. WIDE AREA MONITORING AND PROTECTION SCHEMES

\$ 250,000 \$ 775,000 \$ 250,000 \$ -

This project will provide advanced visualization to the PURS SCADA system to give the operator an integrated view of the system status.

08231 Nekrasov A. ZIGBEE PERFORMANCE EVALUATION

\$ 25,000 \$ 25,000 \$ - \$ - \$ -

Migrate to Wide Area Monitoring (e.g. of Phasors and DGs) and Protection Schemes (reliability vs communication dependences)

TOTAL RATE CASE PROJECTS

\$ 2,775,000 \$ 4,860,000 \$ 5,000,000 \$ 4,000,000

To demonstrate the functionality of the ZigBee technology for network communications.

\$ 8,369,000 \$ 9,300,000 \$ 10,800,000 \$ 9,400,000

Jason Pause - Research & Development

Exhibit (JP-2)

**RESEARCH & DEVELOPEMENT TESTIMONY
R&D BUDGET ANALYSIS
FOR CONSOLIDATED EDISON
BUDGET (\$000)**

Project	Actual	Actual	Actual	Budget	Con Ed	Staff	Variation
	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	Proposed <u>RYE 2009</u>	Proposed <u>RYE 2009</u>	
Existing Base Programs	8,590	11,558	10,544	12,250	12,402	11,000	1,402
New Initiatives	0	0	0	0	9,300	8,000	1,300
Totals					21,702	19,000	2,702

Note:

- 1) RYE - Rate Year Ending