

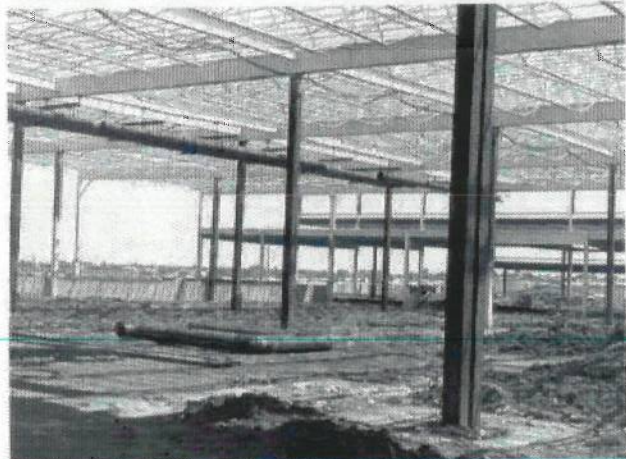
35 Year History of the Dallas Works (1970 – Present)

1969 – 1984 Western Electric Company

General Managers

- Bob Cowley
- Ed Robertson
- Mike Northrop

- **Start-up Operations** - Western Electric purchases land on Skyline Drive, Mesquite, Texas. The original plant occupied 890,000 square feet situated on 150 acres of land. A later internal addition of a second floor for offices and labs brought the current square foot total to 965,000.



The first 4 employees were hired in Sept '69 (Pat Bomar, Louise Lambright, Don Walker, Mo Kennedy). Western Electric initial operations began in Training Center in Skyline Industrial Park on Executive Blvd where employee orientation and training took place. Shortly thereafter, as more employees were hired and trained, operations were expanded to the Pilot Plant, also on Executive Blvd, where the first production lines were established. Main plant (current) was in partial use by the last quarter of 1970 and opened for most operations by June of 1971. Training for Production Employees consisted of use of wire wrap guns and removal tools, quality requirements, soldering, cable forming, unit and frame assembly, stamping and testing.

Early aerial photos indicate the facility may have been built over a pond. This could lend to the instability of the building. While some thought the piers were sinking it took several years to realize the floor was in fact rising. Windows have popped out (in front) and several top layers of cinder block have been removed. Portion of manufacturing floor was constructed with large steel I-beams for a proposed Monorail system to move ESS frames around from manufacturing to shipping. The Monorail System never materialized but the steel was later used to build the second floor offices and labs that now are in place. With many VanDorne molding presses in the hi-bay area producing bobbins we had our own Tool and Die makers and an apprentice program for tool and die makers. Had Father/Son combos such as Hal Williams Sr. and Jr. and John and Terry Leathers.



- **ESS Dallas Plant**, The Dallas Plant was a Satellite facility to the Oklahoma City Works. First product was #1 Electronic Switching Systems for use in Telephone Company Central Offices. The Plant shipped product directly to customers and supplied product to Oklahoma City Works for systems integration and testing. Dallas also built and tested component parts and peripheral products associated with #1 ESS production including Ferreed switches, the entire family of A-coded circuit packs, Ferrod sensors, and molded piece parts used in the assembly of all of the above. Processes were later expanded to include products for Columbus Works #4 Toll Switches, Merrimack Valley Microwave, Lightwave and Lightguide products, Denver Works Information Systems and the Regional Bell Operating Companies (RBOCS).
 - ❖ Coil Winding, Dry Reed Relays (transferred from Oklahoma City Works)
 - ❖ Ferrod Sensors #1 and #2,
 - ❖ Ferreed Switches
 - ❖ Pulse Transformers
 - ❖ Plastics Molding Operations
 - Molding of bobbins in-house for above products in Hi-Bay area (now receiving, Stockshop area)
 - Molding of ladders for Ferrod Sensors
 - Molding 905 Connectors
 - ❖ Cable Forming and Wire wrapping of frames
 - ❖ A-Pack Shop
 - 1978 Built first Power Products – Electronic Converter Systems
 - ❖ Mini Trunk
 - Used Metal PWBs from Kearny and FR-4 PWBs from Richmond
 - ❖ Built special packs for 36 hours straight to deliver on time to “New” Jemma Airport
 - ❖ Remote Switching Systems (RSS) & Peripheral Unit Controllers (PUC)
 - ❖ Gold Plating operations for 947 connectors. Gold Plating engineers: Pat Smith, Bill Everts;
 - ❖ 942 Backplane Connector Assembly Engineers: Kent Brown, TD Truong, Gary Matthais

1977 Dallas Plant renamed to Dallas Works

1980 – 1984 Electronic Switching Systems (ESS) moves to Oklahoma City and Dallas Works becomes sole AT&T manufacturer of Power Products.

- **Conversion to Power while transitioning out of ESS**
 - ❖ Electronic Converter shop phasing in and A-pack shop phasing out
 - ❖ 1981 – 1982 PROCAT (PROgressive assembly, Clean & Automated Test) Shop – First completely automated (Machine Insert, Progressive assembly, Solder-Cut-Solder and Cleaning system was designed at Kearny, NJ (Power Facility in original Henry Ford Plant) and was built in The Netherlands and Germany. The system was to be installed on the 8th floor of Kearny but decision was made to close Kearny and send Power to Dallas based on prior success (1978) of Electronic Converter manufacturing and the fact the Kearny facility was sinking into the swamp. The product built on this line was one-inch and two-inch profile FASTEC Converters designed by Ron Praught and Jim Wadlington. PROCAT engineers: Rebel Jenkins, Ray Yeater, Steve Diggs

- ❖ PROFITS - In 1983, the first OEM product was manufactured (CS720A) for Fortune Systems, a California computer systems company. A separate new assembly shop was set up to build the product with semi-automated equipment handling processes. The PROFITS (PROgressive assembly and Flexible In-line Test System) shop . Engineering support provided by Jerry Pearson, Evan Lewis, Bruce Gibbs, Judd Russell, Steve Diggs. Operating Manager was Jerry Giles.

1984 – 1995 AT&T Bell Laboratories/Network Power Systems

Vice President - Andy Guariello

*General Managers - Jay Walters
- Ken Weatherford
- Walt Boyko*

- **BMP Transfer Operations**
 - ❖ 1984 - Ceramic BMP operations transferred from Kansas City to Dallas
 - ❖ Early Surface Mount Technology (SMT) operation although most Surface Mount Components (SMCs) were placed by hand
 - ❖ Later operations used early primitive Evana-Zevatech P&P systems
- **1984 – 1985 - Early Development Work on BMP Soft Substrate Design & Manufacturing**
 - ❖ Under John Lombardi, Bell Lab Department Head work started on developing BMP soft substrate conversions from the existing ceramic designs.
 - ❖ Design Supervisors: Tom Wilson, Rich Hock, Jim McElroy
 - ❖ Design Engineers: Ray Pilukaitis, Russ Pritchett
 - ❖ Manufacturing Process Engineer: Steve Diggs
 - ❖ First BMP soft substrate design was 376AS2, single sided with special side pin designs to replicate the ceramic design.
 - ❖ The 975 Series of Control Modules were designed to cost reduce the FASTEC Designs.
 - ❖ The early SMT designs were built by Contract Manufacturers for two years until Dallas obtained a surface mount shop.
 - CMs were located in San Jose, Austin, Brownsville, Garland and Michigan.
- **1984 – 1985 Complete transfer from Kearny to Dallas**
 - ❖ Remaining power manufacturing transferred from Kearny to Dallas. Included DC/DC converters, Custom AC and Energy Systems products. Factory re-arrangement included the addition of Circuit Pack, Cable, Unit, Frame and Kitting shops.
- **1986 – 1987 – Surface Mount Shop for BMP Manufacturing implemented in Mesquite**
 - ❖ After a great deal of research and experimentation was performed at our CMs and OEMs, equipment was selected to install at Mesquite for our own soft-substrate SMT operations.
 - ❖ Development utilizing AT&T's Engineering research Center, design and manufacturing came up with many early technologies that are still used today:
 - Ability to reflow components on both sides without adhesives or higher temperature solder pastes for second pass
 - Developed hot air convection in conjunction with IR reflow soldering systems
 - Developed synchronized center-support wires for IR and Wave soldering to support palletless soldering
 - Established industry accepted guidelines for reflow soldering
 - Pin in Paste technique – Inserting pin into but not through the PWB and soldering in place with second reflow
 - Pasting around a thru-hole while blocking the hole (doughnut) so as to add a thru-hole component and solder in place with second reflow
 - Active LASER trimming of chip resistors while the product is powered up for precise outputs
 - Fully automated, computerized wave solder systems
 - Point solder robotic soldering systems
 - Insulated Metal Substrate (IMS) product utilizing IMS for the power train and soft substrate for the control board.
 - Planar and edge plated magnetics used for power transformers and inductors

- Core-on-board technology for building transformers and inductors within the board.

1988 – 1994 – The Road towards winning the Deming Prize for Quality

- ❖ 1988 – Strategic Business Units (SBU) were formed and a Focused Factory Concept was implemented.
- ❖ Three major SBUs were: Energy Systems, Electronic Power Supplies and Discrete Components and consisted of fifteen product families.
 - Two major Product Family Groups: Electronic Power supplies and Energy Systems
 - The Focused factory Concept re-engineered each manufacturing shop to promote Just In time (JIT) activities, Continual Improvement (CI) in Total Quality Control (TQC), reduced Manufacturing Intervals (MI) and minimization of Work In Process (WIP)
 - Focused Factories:
 - Board Mounted Power (BMP) 47,000 square feet
 - Off-line Switchers (OLS) 43,000 square feet
 - DC/DC Converters & Mature Products 60,500 square feet
 - Energy Systems (ES) 100,696 square feet
- ❖ 1989 – Decision was made to consolidate Sales, Marketing, Research/Development and Manufacturing under one roof.
 - To accommodate space an additional 150,000 square feet of office area was required. 75,000 square feet of manufacturing space was taken for first floor offices and a second floor of 75,000 square feet was built on the huge “I” beams originally included in the building structure for the ESS monorail system. The Atrium and library came out of this major renovation project. The library became the current vending machine area within the Atrium.
 - As focused factories were streamlined using JIT principles, the 75,000 square feet of manufacturing was easily made available.
 - The second floor was added as the BMP focused factory moves in below. Manufacturing volume actually increased during this period.
 - Long hours were spent by many during this undertaking, typically seven days per week using multiple construction crews. While manufacturing space required was less, capacity and throughput increased, even through the construction period.
 - Bell Laboratories Research and Development in Parsippany, New Jersey was relocated within the Dallas facility.
- ❖ 1990 – Consolidation of Piece Part Manufacturing within Dallas Works
 - Once Sales, Marketing and Design was settled in the same building and more free space became available from the Focused Factory realignment the decision was made to bring in our magnetic piece part manufacturing performed at the New River Valley facility. This facility utilized over 500,000 square feet of space.
 - Power Magnetics manufacturing and design transferred from New River Valley, VA to Dallas. Product included were Ferroresonant “Large” for ES, SOS type for circuit pack applications, Linear and Surface Mount types
 - Magnetics Manufacturing was split between the Dallas Works and Matamoros Plant #1
- ❖ 1990 – Total Quality Management (TQM) was adopted.
 - AT&T Dallas adopted the QI Story concept from Florida Power and Light, the only American Service Provider to win the Deming Prize for Quality.
 - Many QI stories and Teams were formed resulting in phenomenal progress and rewards for quality improvement.
- ❖ 1991 – Notebook Power Supply Focused Factory Implemented
 - A new initiative began to launch into and capture the NBPS market supplying to customers such as Toshiba, Dell, TI, AST and Apple

- SBU Head, Karen Mortazavi, Sales, Mickey Miller, Design, Sabi Varma, Wing Eng, Matt Wilkowski, Manufacturing, Steve Diggs, Ray Yeater, Operations, Don Rackley.
- ES JIT initiatives introduced component and product Kanbans on the factory floor. Master Scheduling utilized replenishment production Kanban Cards generating daily production schedules resulting in significant process flow through, operating efficiencies and inventory reductions while addressing quality issues as they occurred.
- ❖ 1992 – Employee “Powerful Ideas” Suggestion Program began.
 - Simple and easy to submit suggestion program for all employees to use.
 - Many worthwhile and valuable ideas came from this program. In many cases, once approved the employee submitting the idea was empowered to implement the suggestion.
 - Significant deployment of Poke-Yoke (mistake proof) techniques were deployed throughout Power Systems in manufacturing, development and all other functional organizations.
- ❖ 1992 – AT&T Power Systems was awarded the Shingo Prize for Manufacturing Excellence
 - Dr. Shigeo Shingo, renowned author of books on Single Minute Exchange of Die (SMED), JIT and others programs he implemented at Toyota Motor Company, Nagoya, Japan visits Dallas Works.
 - In advance a Dallas Team came up with the ten hardest shop problems we had. They were presented to him on the shop floor and he solved each one by one within the day. Dr. Shingo was in his eighties at the time of this visit, was pushed through the shop in a wheelchair and passed away shortly after his visit to the Dallas Works.
 - JUSE (Japanese Union of Scientists and Engineers) was advisors on capturing the coveted Deming Award for Quality
- ❖ 1994 - AT&T Power Systems, Mesquite, Texas is the first and only American manufacturer to claim the prestigious Deming Award for Quality.
- ❖ 1995 – AT&T sets sights through Continuous Improvement of a US \$1 Billion Goal.
- ❖ The Dallas Works Celebrates the 25th anniversary starting as Western Electric in 1970, becoming AT&T Power Systems in 1984 and later to become Lucent Technologies in 1996
- ❖ Magnetics were transferred to Matamoros, outside suppliers, including contract manufacturers.

1996 – 2001 Lucent Technologies Power Systems

Vice President - **Dr. Bill Spivey**
General Manager - **Bruce Brock**

- ❖ AT&T Power Systems is spun off and becomes Lucent Power Systems
 - It was announced in September 1995 that AT&T would spin off and divest into three separate companies. These would be:
 - AT&T Long Lines & Universal Credit Cards
 - National Cash Register (NCR)
 - The “No Name” company
 - It was not until February 1996 that we were given the name Lucent Technologies and Dallas became known as Lucent Power Systems
- ❖ Growth from 1996 to 2000 was phenomenal due to popularity and spread of the internet and dot com companies. It was all Power Systems could do to keep up with demands. We put our customers on allocation as we could not serve all needs.
- ❖ An early user of BMP modules was Silicon Graphics whose computers brought us Terminator II and Jurassic Park.
- ❖ BMP alone by 1999 was adding one SMT Line per month, we added three CMs in 1999-2000 and were looking for more.

- ❖ 12/19/00 – "I estimate that over the last 3 weeks MicroPower (all locations + CM's) has shipped 1,495,956 modules. At 5.5days/3 shifts, that's a little over **1 module per second!**" – Rene Weaver
- ❖ BMP Growth from 1996 – 2000 (1999 – 2000 projected)

YEAR	ANNUAL	ANNUAL
	REVENUE	VOLUME
1996	\$120,200,000	3,600,000
1997	\$145,000,000	4,600,000
1998	\$179,000,000	5,600,000
1999	\$228,000,000	6,500,000
2000	\$285,000,000	6,800,000

- ❖ In 1999 Lucent Power Systems achieved US \$1.1 Billion.
- ❖ 2000 Lucent Power Systems is put up for sale.

2001 – Current Tyco Electronics Power Systems

President

- Steve Gardner
- Thomas Jahn
- Paul Timashenka

Vice-President

- Mickey Miller
- Bob Sweeney

- ❖ In January, 2001 Lucent Power Systems becomes Tyco Power Systems
- ❖ March 2002 manufacturing transfers from Mesquite facility to the Matamoros Facility.
- ❖ Contract Manufacturers are also used to support manufacturing needs.
- ❖ 2002 – Major effort to open up business within China, CMs well established in SuZhou and Shanghai, China
 - Tyco has AMP Connectors, TDI Batteries, Packaging (Printed Circuit) Group and Power Systems in Shanghai and Qingdao, China.
 - Tyco Power Systems plans, builds and open a Research & Development Center in Shanghai, China.
- ❖ 2004 – Power Systems adopts Six Sigma Programs
- ❖ 2004 - Tyco forms an alliance with LiteOn, Taiwanese Power Supply Company having operations in DongGuan, China.
- ❖ 2004 – Tyco Forms alliance with SynQor DOSA (Distributed Power Open Standards Alliance) Members include Galaxy Power, Delta, Celestica, Artesyn, Ericsson, Lambda Invensys and Wall Website: <http://www.dosapower.com/member-list.html>

2005 Tyco Electronics Power Systems - Dallas Works is 35 Years Old

- As Dallas Works turns 35 years old we have 34 people on the role today who either started at the Mesquite Facility or have been associated with Power Systems.
- If you combined the years of service for these 34 people you would have over 1,100 years of experience! A true accomplishment in today's age of workforce reductions and turnover.