

# **EIMAC**

## **Celebrates 50 Years of Excellence**

### **1934-1984**



*50th Anniversary EIMAC/Varian flag is raised over the San Carlos, California plant by Tom Yingst, General Manager.*

# Congratulatory Comments

It is a pleasure to wish congratulations to everyone at EIMAC for achieving 50 years of success. I have fond memories of my own days working at EIMAC and know first hand the dedication and lively spirit of that group of employees. Thank you for a job well done.



*George Caryotakis, President of Electron Device Group*

It is a privilege to continue the fine tradition of leadership in the microwave tube industry begun by Bill Eitel and Jack McCullough. EIMAC has built a reputation for quality through the years and our fine group of employees will perpetuate this standard of excellence.



*Tom Sege, Varian Chairman of the Board and President*

It is a rare achievement in the high-tech industry to have 50 years of successful operation. We are indeed proud of EIMAC's accomplishments.



*Tom Yingst, General Manager, and Beverly Marsh, Executive Secretary.*



William W. Eitel (W6UF)



Jack A. McCullough (W6CHE)

## EIMAC 1934-1984

A very small advertisement in the November, 1934 issue of QST magazine announced that a new tube, "unsurpassed in every important feature" was available from an obscure company in California. The company was Eitel-McCullough, Inc., and the tube was the 150T. How did it all start?

In 1932 two radio amateurs, Jack McCullough (W6CHE) and Bill Eitel (W6UF), decided to build high power transmitters to work some of the 20 meter overseas stations being heard in California. They found to their dismay that the expensive transmitting tube they purchased refused to work at 1,000 volts—and that was all the high voltage their supply would provide for them. They decided they could build a better tube themselves that would work at low voltage.

They borrowed a modest sum and in 1934 started a company with only three people. The product was the 150T triode. From this humble beginning, the company expanded steadily. Other tubes were added to the line and the number of personnel increased slowly.

In late 1935 some tubes were sold to the U. S. Naval Research Laboratory for use in an experimental radar set that worked on 200 MHz. The 50T was the only tube that provided sufficient pulse power and that was able to stand up to the high plate voltage. More tubes were ordered by the military and in 1939 the first Navy sea radar tests used EIMAC tubes.

During 1938, the U. S. airways were developing radio beacons and high frequency radio links all over the United States. A new EIMAC tube type (450TH) was chosen for this service, and a number of other types were used for broadcast radio, including the newly-developed Armstrong FM broadcast service, and experimental television service. Radio amateurs worldwide also used EIMAC tubes as their popularity grew and dependability became known.

In 1940 the company received its first big war order from Western Electric for the delivery of 10,000 tubes! Up to now, an order for fifty tubes would be a cause for celebration. Converting from hand methods to mass production kept everyone working night and day for months, sent the hiring rate skyrocketing and tossed out all standard methods and routines. By July, 1941, the original staff was ten times as large as it was a year earlier and the plant was doubled in size to accommodate the work.

Expansion of the company was so fast that a second plant was opened in Salt Lake City, Utah. By 1945, EIMAC had grown to over 1800 people and nearly 3,500 tubes per day of all types were being manufactured.

The end of hostilities in 1945 and the cancellation of government contracts brought about a crisis at Eitel-McCullough, Inc. Production fell to near-zero as government stocks of surplus tubes were dumped on the market for as little as fifteen cents each. The Salt Lake City plant was closed.

Foreseeing the end of the war, however, EIMAC had evolved new tube types, including the new beam tetrode (4X150A) which performed well in the vhf region. At the same time, a new Salt Lake City plant was opened to make television picture tubes. The future of the company no longer depended upon the older tubes so plentiful on the surplus market.

In 1958 a new Eitel-McCullough plant was built in San Carlos, California, for production of new tetrode tubes, plus larger tubes for broadcast and TV service. At the same time, TV klystrons and other microwave devices were developed for troposcatter communications.

In 1965, Eitel-McCullough merged with Varian Associates of Palo Alto, California. The Varian EIMAC divisions continue to produce all types of transmitting tubes, and are known worldwide as a leader in advanced tube design. Super-power tubes were developed and built for broadcast service (up to 1.5 megawatt anode dissipation) and special tube types are constantly being developed for research studies and experimentation.

Varian EIMAC has pioneered the use of Pyrolytic grids in power tubes for the broadcast industry, making use of a novel laser-milling operation to achieve increased tube performance, stability and higher power output.

Modern Varian EIMAC manufacturing techniques have led to improved VHF performance in large power grid tubes, such as the 4CW300,000G. Other Varian EIMAC products are used in the Department of Energy's fusion research program.

The latest development, the Klystrode, combines the better features of the klystron and the tetrode.

Bill Eitel and Jack McCullough, although both now retired, are still interested in the company and, of course, are still very active radio amateurs. The EIMAC divisions of Varian owe a great deal to amateur radio for it was in this field that many of the early transmitting tubes proved their worth and even today—many of the company's customers are radio amateurs.

As Bill and Jack say, "If it were not for amateur radio, EIMAC could never have existed."

EIMAC first was known as Eitel-McCullough, Inc. when it was established in a former butcher shop at 592 San Mateo Avenue in San Bruno in the fall of 1934.

In just two years the plant was moved to larger facilities.

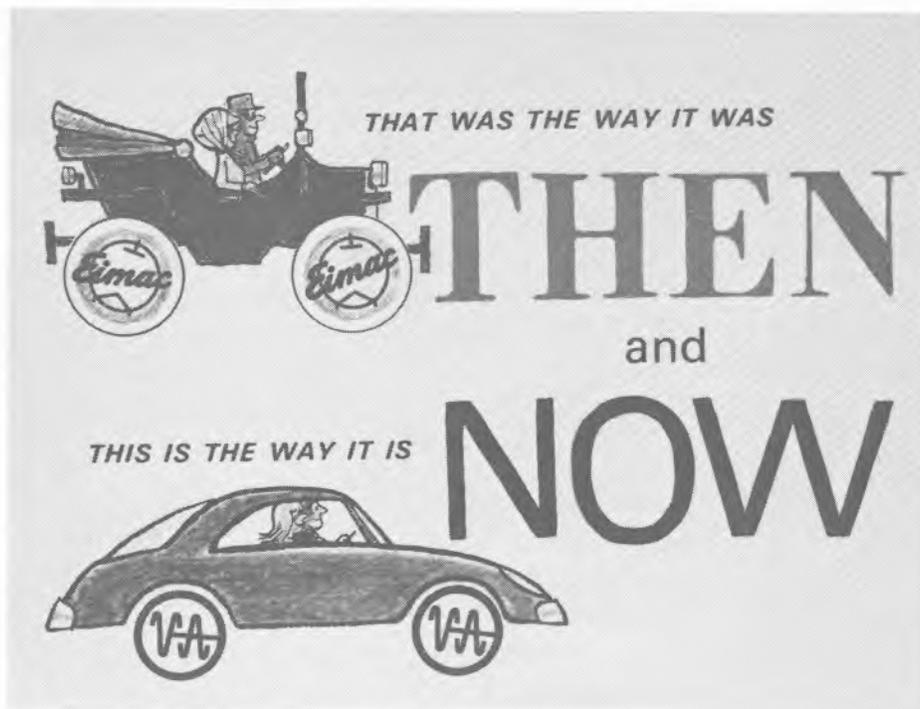
By 1944, a large facility was built to accommodate 1800 employees working around the clock.

The present San Carlos plant was constructed in 1958 and continues to be modified to meet production needs.

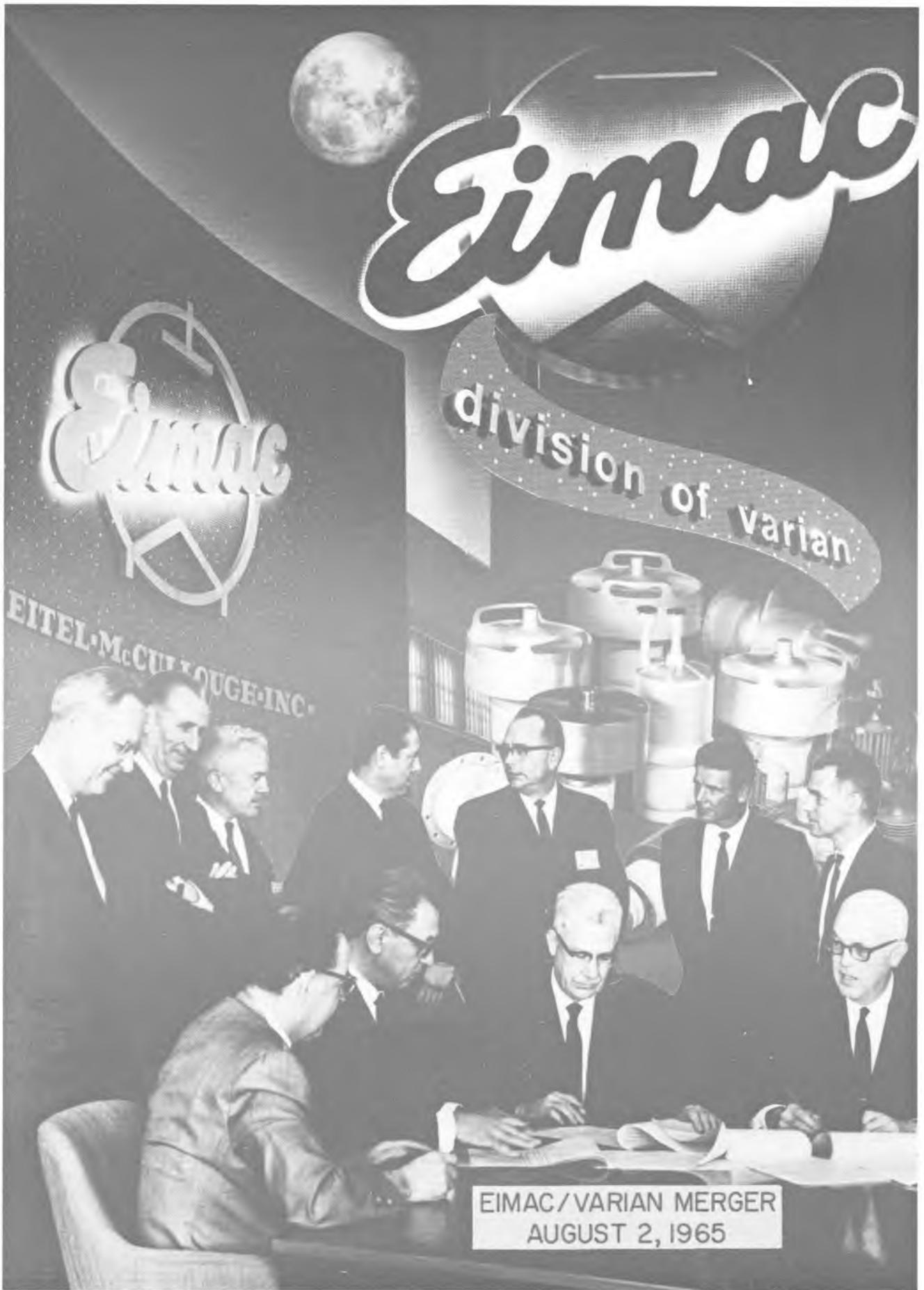
# *Eimac*



A major milestone was the merger with Varian Associates on August 2, 1965. As a result, Varian expanded from their microwave portion of the spectrum to include the complete line of power tubes from the 60 cycle power line frequency through audio, radio and microwave frequencies to the highest frequencies then in use. At that time Varian had approximately 3700 employees and sales of 52.6 million while Eitel-McCullough had 1800 employees and 28 million in sales.



*Commemorative pens are used at the signing of the merger by (l to r) Bill Eitel, Ed Ginzton, Emmet Cameron, Jim Donovan, Jack McCullough and John Cooper.*



EIMAC/VARIAN MERGER  
AUGUST 2, 1965



First impressions of EIMAC are created by the reception in the lobby and over the telephone. Both functions are carried out by Maureen Alcott and Brenda Gordon who are delighted to have graduated from the cord board that was the latest model when it was installed.

# ADMINISTRATION



Bill and Jack maintained a team approach to guiding the company. They shared one office with two desks throughout their management of EIMAC.

In 1984, Tom Yingst as General Manager has a staff of eight to guide the plant.

*L to R: Cris Raimundo, Accounting Manager; Merrald Shrader, Advance Products Manager; Bob Lounsberry, Facilities Manager; Tom Yingst; Jack McCarthy, Personnel Manager; Wally Orlow, Operations Manager; George Hansell, Marketing Manager; John Quackenbush, Computer Services Manager; Bob Blake, Product Assurance Manager.*



Wally Orlow, Operations Manager, works with a staff of four to meet production schedules.

*L to R: Jorg Lenk, Parts Plant Manager; Bob Francis, Production Control Manager; Wally Orlow; Jack Strothers, Manufacturing Manager; Al Manthos, Purchasing Manager.*

The first step into Varian/EIMAC is through the Personnel Department which is responsible for recruiting and hiring all employees. Jack McCarthy and his staff meet the on-going needs of employees involving benefits, salary administration, employee assistance programs, retirement planning, social activities—all the concerns of employees.



A major concern in 1984 is the welfare of employees in terms of safety, health and environmental concerns. Gary Kerns, Katherine Ball and Judy Matthews are responsible for these aspects of the plant.



The physical security of EIMAC is under the surveillance of Don Newhouse and his staff around the clock.

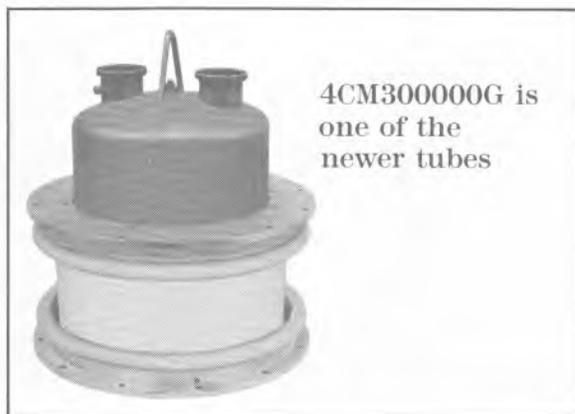




The research and development of products is the first step to providing new business. Under Merrill Shrader's direction the Advanced Products group fulfills this charge as well as providing engineering services to the production area and customers. A constant challenge is to meet the demands for new products.



New products can be implemented only when committed to paper for others to produce. The Manufacturing Engineering group maintain a busy schedule completing the drawings, creating new products, providing all necessary tools, equipment, facilities, methods and standards in addition to maintaining our competitiveness in the marketplace with extremely low factory costs.





The Purchasing Department under the direction of Al Manthos provides all external materials, equipment and services at the lowest price and highest quality.



Bob Francis and the staff of Material Control and Production Control determines the need of all necessary materials, stocks the parts and keeps them moving through the Plant. An achievement in FY'84 was the installation of a computer controlled storage system that has drawn lots of visitors for demonstrations.





The sub assembly group provides all the necessary components required for all low power tubes under the watchful eyes of Mary Warner.

The fabrication of the grids is the beginning of tubes, a very precise process that is difficult to learn. A very high volume area with hundreds of different product types make it a challenge for production scheduling and exact timing for assembly areas. Laurie Reich and her group meet these challenges.



The final assembly group works with real precision, a keen eye and steady hand. Maintaining quality is always a first priority for Joe Pfleghaar. From this area the tubes move on to the pumps.



Low power pumps, age and test is the final stage of the product line. Here the critical processes undergo severe testing and the product is determined to be of the highest quality according to customers specifications and George Naugle.

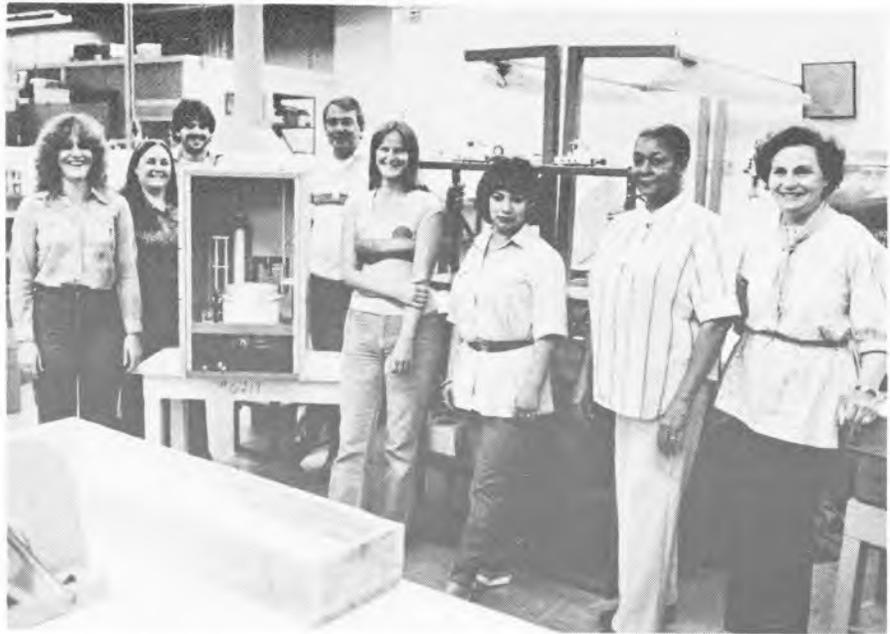
The Medium Power, High Power and Megawatt Assembly group utilize the latest technical innovations and assemble state-of-the-art products utilized in high power transmission energy research and industrial heating. These products are found worldwide in the most modern and advanced installations. Bill Taylor leads this group of experienced employees.



The Medium Power, High Power and Megawatt Pump, Age and Test group under Scott Cook's guidance work with extremely high energy equipment duplicating normal operation conditions. The products are aged and tested for several days to assure maximum performance and product life.



The Cavities and Hardware department under Pete Murphy's guidance provides all required cavities, sockets and all needed accessories for a radio transmitter operation. This group's effort assists us in creating the nests for our tubes.



The Ceramics department under Ed Berns' guidance provides the critical metalizing for metal to ceramic assemblies necessary for the entire San Carlos Division as well as Salt Lake City and several Palo Alto Divisions.

The Assembly and Brazing group provides all the hermetic seals necessary for assembly of all product lines. Metal to metal, glass to metal and ceramic to metal seals must be vacuum tight and are leak checked to ensure that all tubes will pass the severe vacuum criteria required. Elmer Downey and Eleanor Hjelmstad are the experienced leaders of this group.





Jorg Lenk, Manager, depends upon the Parts Plant Engineering group to provide all methods, tooling and machine software for Punch press and machining for the entire corporation. Several modern numerically controlled machines have recently been introduced to expand Parts Plant's capacity and service to all Varian Divisions.

Paul Hohl and the Tool Room machinists meet the needs of the highly specialized machining by creating all necessary tools for the Parts Plant Punch Press and Machining areas and the tooling needs for EIMAC San Carlos. The mandrels for tube production are considered the most difficult job in the tooling fabrication technology.



The Parts Plant has been an expanding department in recent



years. Recently Dave Starnes joined EIMAC to assist in the growth. With the addition of the latest NC (numerical control) equipment, Jerry Henderson and the NC group now serve the entire corporation. Around the clock shifts produce highly precisioned parts of copper, nickel, stainless steel and several exotic materials. Parts from San Carlos are assembled in virtually all Varian products.



The conventional machining under Bob Toop's guidance has been the back-bone of the Parts Plant because of the exceptionally skilled employees, some of whom have close to 30 years of experience at EIMAC. Computerized machines will replace the high volume jobs but the conventional machines will remain the best tools for proto type, post-braze and reclamation machinery. Romeo Salangsang and Meno Van Der Veen supervise the Swing Shift.



The day and swing shift of Punch Press form all tube components from heavy and eight gauge materials to the required shapes needed in machining. Hans Van Dam and the punch press department provide services to all Varian Divisions and outside customers.





The Plating Department provides platinum, gold and other exotic metal finishing required of the tube components and the external finish of our products with Elmer Downey's direction.



Technical Services monitors the integrity of our manufacturing processes and verifies the chemical contents and properties of all materials provided to EIMAC from outside sources. Bill Kessler guides this specialized group.

Bob Blake and Quality Control are at the forefront of maintaining the EIMAC reputation for Excellence. The latest equipment which is computer controlled is utilized but the keen eyes of the inspectors still provide the extra measure that means perfection.



The Shipping Department and Hugh Thomas develop the special packaging needed for the valuable and delicate tubes which are shipped worldwide. They have developed sophisticated methods to meet monthly deadlines.

The Comptroller's Department is at the beginning and end of the operation of EIMAC: this staff approves all expenditures, collects all payments and remits all bills. The monthly reports and projections provide guides for all the functioning of the division and keep Cris Raimundo, Comptroller, very busy.





The world of 1984 involves the use of computers and computer reports for virtually every aspect of a company's operations and manufacturing. The EIMAC Computer Department interfaces with the Corporate MIS and completes specialized projects for EIMAC under the direction of John Quackenbush.

How could we function without the exchange of mail? In addition to sorting and distributing incoming and outgoing mail this group handles the basic stationery needs of EIMAC and assists with any printed materials for the entire plant. John Walden supervises this group.



Without Bob Lounsberry's Maintenance Department, EIMAC would quickly grind to a stop. This group of people keeps all production equipment in working order, constantly renovates and maintains the physical plant and exercises real ingenuity in keeping everything up-to-date.



With 750 employees taking vacation throughout the year, there is no day when every person is available for group pictures. These employees were vacationing when their department photos were taken.

The Swing Shift in Buildings 1 and 3 enjoy a rare break from their schedule of keeping production on its tight schedule. Howard Bowman keeps this schedule going.



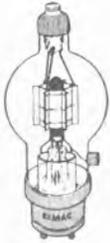
The third shift and supervisor Roger Fabris should be sleepy after working through the night.

Joanne Bergendorf and her staff keep the employees well fed for breakfast and lunch as well as catering the special barbecues for all employees and the various special luncheons.



# EIMAC The Tube You Asked For 150-T Is Here At Last!

## IN EVERY IMPORTANT FEATURE— UNSURPASSED



HERE is a tube, new and original in design. It fulfills the most severe requirements of amateur practice. High output is obtained with low grid driving power and low plate voltages. Exceptionally high vacuum increases stable filament emission and prolongs tube life. Tantalum grid and plate construction permits maintenance of high vacuum even when overloaded. Extremely low inter-electrode capacitance makes for high efficiency at high frequencies. Isolated grid and plate leads, in con-

junction with elimination of internal insulators, insure freedom from arc-over or breakdown. Low voltage double-V filament reduces hum, increases filament ruggedness and life and increases mutual conductance. The large NONEX envelope, free from discoloration, allows maximum heat radiation without bulky physical dimensions. Improved 50-watt base insures rigidity and freedom from short circuiting. "Ghost" grid structure minimizes electronic shadowing effects on the plate.

**Characteristics:**

EIMAC-150-T Triode

Fil. Voltage	5 V.	Fil. Current	10 A.
Rated Plate Dissipation	150 W.	Amp. Factor (1)	Max. Plate Current 200 MA
Plate Voltage	1000 2000 3000	Mutual Conductance	5800 7300 1200
Plate Resistance	2750 1900 1250	Normal Power Output (2.5% eff.)	150W 300W 450W
<b>PRICE \$24.50. Sold Only by Reputable Dealers</b>			

More POWER per dollar! Fewer dollars per hour of useful life! The result of six years' experience exclusively building transmitting tubes for ship, mobile, portable and amateur use. Unconditionally guaranteed to be get-free, and against mechanical defects for two years.

"COMPARE AND REFLECT"

**EITEL-McCULLOUGH, INC.**  
San Bruno, California, U. S. A.

The first ad appeared in  
QST Magazine in June, 1934.



## EIMAC's new 8990 tetrode premieres in Harris' FM-25k.



25 kW with a single, high gain tetrode.

The new Harris FM-25K, twenty-five kilowatt FM transmitter combines advanced solid state circuitry with the high-gain EIMAC 8990 power tetrode to present the world's first one tube, high power FM transmitter.

The FM-25K is the first transmitter to utilize the high gain, high efficiency 8990 tetrode as the final amplifier. It is driven by solid state amplifier modules to provide greatly improved transmitter reliability and a reduction in overall tuning requirements.

The ripple-free anode of the 8990 provides exceptional cooling at reduced air requirements for quiet operation and the PA cavity design eliminates troublesome sliding contacts and assures wide RF bandwidth.

The EIMAC 8990 provides high RF efficiency, permitting operation at full ratings up to 110 MHz, and the 20kW anode dissipation rating provides ample safety for continuous heavy duty service.

**Send for details.**

Complete specializations on the exciting new FM-25K transmitter are available from Harris Corporation, Box 4290, Quincy, IL 62301. And complete data on the 8990 power tetrode is available from EIMAC, Division of Varian, 501 Industrial Way, San Carlos, CA 94070. Telephone (415) 542-1221. Or contact any of the more than 30 Varian Electron Device Group sales offices throughout the world.



varian

Printed in U.S.A.

## Reduce maintenance cost, buy long life planar triodes.

Longer tube life and lower maintenance cost is no empty promise from EIMAC.

For years, EIMAC has supplied specially designed and processed planar triodes with exceptional reliability. Now EIMAC is pioneering the development of improved long-life replacement tubes to help you cut maintenance costs even further.

For example, after conducting their own life tests in the field, Alaska Airlines, Braniff International, United Airlines, and Western Airlines have all chosen to replace standard 7B15AL planar triodes with improved, long-life EIMAC 8906AL's.

Branch tests began in July 1970. Over 4,600,000 tube hours have accumulated with only 5 failures out of 840 tubes installed. Life expectancy has almost doubled.

EIMAC developments in long life and reliability don't end with the 8906. Research, design and production of newer, better designs is a continuing program at EIMAC.

For details, contact Varian, EIMAC Division, 1678 Powers Road, San Jose, CA 95128. Telephone (603) 972-5000. Or any of the more than 30 Varian Electron Device Group Sales Offices throughout the world.



varian



Other ads through the years have had themes that convey a feeling of the times as well as displaying the products.

VEI-3001A

Printed in U.S.A.





An interesting experience for many of the employees was the filming of EIMAC's high-technology work for ABC television. That is Beulah Ragland continuing to work without distraction.



Another kind of communications involvement from the founding days has been the ham radio world. John Reinartz was one of the leaders in the field and was honored for making the first Trans-Atlantic crossing between Boston and France by Gen. Grizwald of the Strategic Air Command, Bill Eitel and Herbert Hoover, Jr.



Meeting the needs of our country has been an important part of EIMAC's history. September 10, 1942 marked the raising of the Army-Navy Production Award, the "E" flag. The award was created to "stand today as our fighting forces' joint recognition of exceptional performance on the production front . . . of the determined, persevering, unbeatable American spirit which can be satisfied only by achieving today what seemed impossible yesterday." Art Linkletter presided over the outdoor ceremony, the Fourth Army Band played and the honored guests included Cordell Hull, Secretary of State; Henry L. Stimson, Secretary of War; Frank Knox, Secretary of the Navy; James V. Forrestal, Undersecretary of the Navy; Culbert L. Olson, Governor.

The printed program stated: "In addition to today's high honor, this week marks the conclusion of eight years of successful operation of the Eimac factory. The employees feel deeply honored and proud on this occasion.

They and their company join in celebrating today's high honor, as well as proudly looking back on the eight years which have seen their efforts culminate in national recognition. Their earnest hope is that future years will bring further honor and success to their company, its product, themselves and their efforts."

In 1984, the Aegis program is an important aspect of the production effort. The tubes are a critical part of the radar system on the Navy's new Aegis cruisers. This unique radar searches a vast volume of space almost instantly and, without interrupting surveillance, detects and tracks literally hundreds of targets simultaneously.



# SOCIAL ACTIVITIES

For 50 years the EIMAC employees have enjoyed socializing together as well as working together. In the early years when all three shifts were at maximum strength, activities were held literally around the clock. Dances started in the late afternoon and ended in the early mornings so that everyone could attend during this era of "The Big Bands." Movie and swim parties also drew large crowds. Some of the 40 year employees talk about everyone in the plant being young and full of energy, living near the plant so that EIMAC became the center of their lives. Early company newspapers are full of accounts of small social gatherings and who attended. Many marriages resulted among employees.

Social Committees have contributed to these fun times and maintain events that are indeed traditional. The Christmas Dance and the summer picnic provide opportunities for the families to be involved. In recent years, the Christmas party for the children of employees has provided the Christmas spirit for adults, perhaps even more than for the children. Trips to Tahoe and Reno have provided laughs and a sense of camaraderie. Raffles have sparked interest at Thanksgiving and other times. Now traditional are the company special dinners at Christmas and celebrating successful financial achievement years.

EIMAC employees know how to have a good time!









Creativity, humor, fun have been a part of the days at EIMAC. In the early days, the Umac 606 infernal anode appeared looking very much like the original tube. The grid lead was attached to the hardware cloth grid under the plumber's friend plate which was of a "unique self-flushing construction." Note the built in grid leak. The spec sheet was a tube engineer's delight.

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As committees were organized to help meet the needs of the company, the picture of "The Purging Committee" appeared including a hanging rope space reserved for an employee who told ancient jokes.

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The 1980's movie "Jaws" prompted a composit picture proclaiming, "Don't let our competitors eat us up. Think and work quality."

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The 4CW300 megawatt tube weighs approximately 100 pounds, so it was a sleight of hand (and trick photography) that allowed a slight employee to lift it with her fingers.

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# SPORTS

Sports teams have been an important part of EIMAC's extracurricular activities and the 50th Anniversary year was celebrated in style with the winning of the Menlo Park softball league. The "Eliminators" chose their name well and had a spectacular series of games.

Perhaps bowling has been the most consistent sport for a league team has played without interruption for virtually all 50 years. Golf, softball, basketball and even volleyball have been played by EIMAC teams. In the early days, swimming at the Burlingame gym and roller skating at the Coyote Point rink brought out large numbers of employees to participate.

This interest is likely to continue for when the Eliminators won the 1984 pennant, Management challenged them to a 'Game of the Year.' No need to say which team was victorious!



# PEOPLE

Throughout all of the reports and documents related to EIMAC is the theme represented by the statement from Bill Eitel and Jack McCullough in an annual report: 'To the Company's greatest asset, its team of highly trained professional individuals, technicians and operators, we acknowledge with gratitude their loyalty and service throughout the year.' There is rare spirit, camaraderie, and sense of family among EIMAC employees seldom found in an industrial setting of such size.

Long years of service are common throughout the plant. The assembly group of supervisors are merely typical! In September, 1984 pictured left to right are:

George Naugle	2 yrs. 6 mos.
Mary Warner	31 yrs. 2 mos.
Roy Micheli	37 yrs. 9 mos.
Lauree Reich	22 yrs. 6 mos.
Joe Pfleghaar	25 yrs. 5 mos.

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Total	119 yrs. 4 mos.
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And speaking of fine people, Helen McCullough and Laneil Eitel were an integral part of the EIMAC success story.



A well earned rest!



From the first 150-T triode rated at 150 watt anode dissipation to the 8974 which is rated at 1,000,000 watts, EIMAC has come a long way, and we are just beginning to grow.





