History of Westinghouse Electric Corporation
Process Control Computer Systems
Pittsburgh, PA, from 1960 to 1979
James F. Sutherland

The ENIAC digital computer was built using vacuum tubes at the University of Pennsylvania in Philadelphia in 1947, the same year the transistor was demonstrated at Bell Labs. There was a slow transition toward using transistors in computers in the 1950's. Large companies such as IBM and Univac were making computers to rent to universities and industrial customers for data processing. Westinghouse was one of these customers; they used a large computer in their Analytical Department in East Pittsburgh for engineering design analysis and payroll accounting.

In the late 1950's, Westinghouse was building transistorized digital controls in Buffalo, NY., for steel mill drive applications. Each "4449" drive system had hundreds of circuit boards containing individual logic elements called "NOR's" (Not OR), which were manufactured by Westinghouse in Buffalo. Each NOR element consisted of a Westinghouse germanium transistor (made at the Westinghouse plant in Youngwood, PA.) and five or eight resistors on a small printed circuit board depending on whether it was 3-input or a 6-input unit. A picture of the stack of resistors of the NOR unit and its schematic can be seen on page 11 of the "Computers" section on this report.

In 1960, when Westinghouse needed a computer for electric utility applications, management decided it should be designed and built in Pittsburgh, using (W)Buffalo NOR logic elements. Complex integrated circuits made for the Apollo moon landing program were not available for commercial use in 1960, so it would be 15 years before "computers on a chip" would be used in Westinghouse process control computer systems.

Westinghouse in Pittsburgh pioneered in the design, development, and manufacturing of digital computer systems for use in process control applications such as: electricity generating stations, metal processing industries, and petrochemical installations.

The **(W) New Products Laboratory (NPL)** in Cheswick, PA., was where the first Prodac (Programmed Digital Automatic Controller) computer system was designed in 1960-61 to control a new Westinghouse generator that was to be installed in the Sewaren power generating station in New Jersey in 1963.

Many of the engineers chosen to design the Prodac-X, the prototype of the Prodac-IV, at (W)NPL came from **(W) Research & Development** and the **(W) Analytical Department in East Pittsburgh**. The special boards needed for the Prodac-X were designed and made in the (W)NPL model shop so that they would be physically compatible with other printed circuit cards manufactured by Westinghouse in Buffalo, NY.

Before 1960, a Westinghouse worker in Buffalo suggested that the cost of making the NOR logic elements could be reduced by using "V" notches on the edges of small cord-wood circuit boards instead of drilling holes for component leads. Unfortunately, the Prodac boards made in Buffalo for the Prodac-X randomly failed intermittently a few minutes after power was switched on because the epoxy surrounding the resistors expanded when heated, pulling the soldered resistors from their V notches.

The Prodac-X never ran reliably. There was not enough time to build a Prodac-IV in East Pittsburgh using reliable "drilled-hole NORs", so Westinghouse management decided to ship the prototype Prodac-X to the Sewaren station.

Later, a Prodac-IV, using the Prodac-X design and NOR elements with drilled holes, was built in (W) East Pittsburgh for Texas Electric Services (TESCO) Handley Station, where it set records for reliability for many years.

(W)Computer Systems Division (CSD)

After the Prodac-IV experience, Westinghouse management decided that future computer systems would be designed around a computer bought from an outside company, such as Univac, so a new division of Westinghouse -- the **Computer Systems Division (CSD),** was formed in 1961 at the (W)R&D Center in Churchill Boro.

(W)CSD's series of P-500 computer systems used the Univac 418[1] computer because it was rugged and reliable. (W)CSD engineers designed the peripheral circuitry used with the Univac computer in the Westinghouse P-510 and P-580 computer systems. The P-510 was for smaller applications with just four channels for peripheral equipment,. and the P-580 was for larger systems with more peripherals. The first P-580 was shipped from (W)CSD in June, 1963, and was installed in Novenber, 1963, in Phoenix, AZ, in the Arizona Public Service ADDAPS power dispatching system.

[1] See https://en.wikipedia.org/wiki/UNIVAC_418 for the computer description.

(W)CSD needed a low-cost small computer, so they designed the P-50. Most of the sensors and actuators in a process being controlled were analog type, so analog signals were converted to digital signals by a computer peripheral input/output system, After the P-50 I/O system was found to be very successful, it was used with the Univac 418 computer in P-550 systems which were sold instead of the P-510 and P-580.

(W)CSD designed and built computer systems, but another Westinghouse division at (W)R&D, the **Power Control Division (W)PCD** had customer system responsibility. After a system was sold, each of the divisions expected to receive their profit margin. (W)PCD management thought they were losing too much final billings because (W)CSD was charging a high profit margin for the P-50.

In 1963, (W)PCD developed a system based on the PDP-5 from **Digital Equipment Corp (DEC)** in Maynard, MA.. They added some peripherals, and offered it their customers as the "Prodac-5" computer system. In response, (W)CSD reduced their financial margin, and no Prodac-5 were ever sold. In 1965, (W)PCD was merged into (W)CSD at the R&D Center.

When **Scientific Data Systems (SDS),** in California, introduced a series of Sigma computers in 1965, (W)CSD recognized that a Sigma-2 computer would cost less than what Univac had been charging (W)CSD for the Univac 418. (W)CSD purchased 54 Sigma-2 computers from XEROX, after it bought SDS. An adapter panel was designed at (W)CSD to couple the Sigma-2 with P-50 I/O equipment, making a system called the "P-250."

Hagan/Computer Systems Division (H/CSD)

Hagan Controls was purchased in 1967, and was merged with (W)CSD at (W)R&D to form a new division called **(W) Hagan/CSD**. In 1969, the division moved to a new facility at Regional Industrial Development Corp (RIDC Park) in O'Hara Twp.

Computer and Instrumentation Division (CID)

In 1970, the Motorola instrumentation department in Phoenix, AZ, was bought by Westinghouse, and became part of the O'Hara (W)Hagan/CSD), which became **(W) Computer and Instrumentation Division (CID).**

Westinghouse Computer Department

In 1971, some (W)CID managers were transferred to Orlando, Florida, to form the **(W) Computer Department**. The W2500 computer which was developed there was based on Intel 8-bit and 16-bit microcomputers rather than individual transistors. For ten years the Orlando operation was successful, and more than 300 W2500's were sold.

In 1973, the Westinghouse REDAC product line was moved from Newark, NJ, to (W)CID.

Industry System Division (ISD)

In 1974, part of the Buffalo Industry Systems Division was merged with (W)CID to form the **(W) Industry System Division (ISD)** at O'Hara Twp.

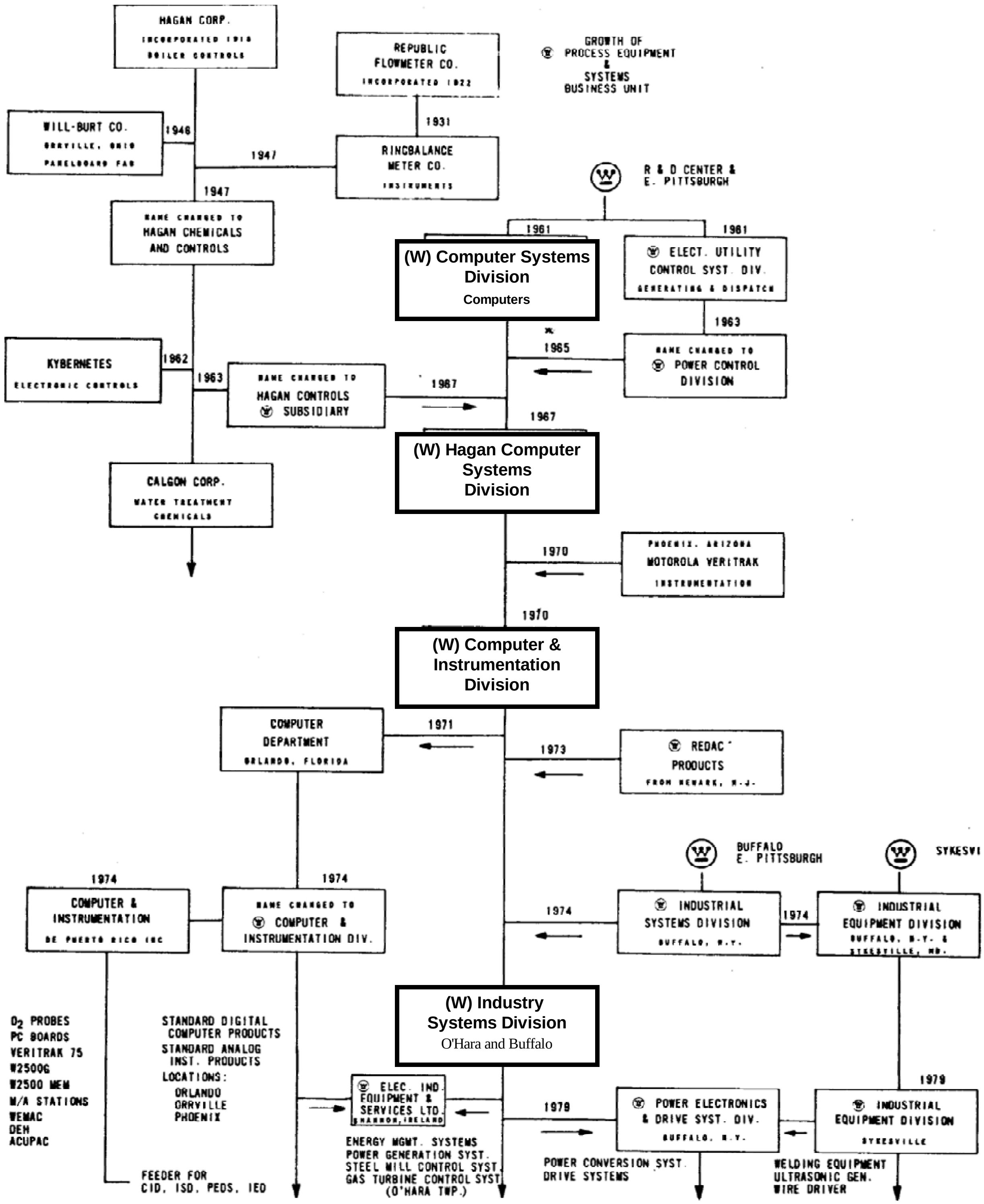
At (W)ISD, the P-2000 computer was developed to reduce the number of circuit boards in a computer system to just four. It was very successful, and Westinghouse sold more than 200 P-2000 systems in the next 10 years. The P-2000 was the last Westinghouse computer built with discrete circuit components, such as transistors, resistors, and capacitors.

Q-line of Modular Computers developed at W(ISD)

In Europe, the CAMAC standard for computer sysem modules made it possible to incorporate parts from multiple manufacturers into a control system. In 1977, the "Q-Line" of Intel microcomputer-based circuit cards was developed by W(ISD) at O'hara following the CAMAC electrical and mechanical standards. There were many applications in boiler controls where the Q-Line was exactly what was needed, but the **Westinghouse Nuclear Systems Division** was not convinced the Q-Line system was needed in their control and protection systems.

In 1979, the **Industrial Services and Services, Ltd,** was formed in Shannon, Ireland by personnel who moved there from O'Hara and Orlando.

Last years - In 1989, the Westinghouse divisions at O'Hara and Monroeville merged to form the ***Process Control Division (PCD),*** *with headquarters at 200 Beta Drive in the RIDC Park in O'Hara Twp. The new division was sold to Emerson Electric in 1998, for $265 million. In 2002, Emerson renamed the O'Hara Twp site, "Process Management Power and Solutions."*

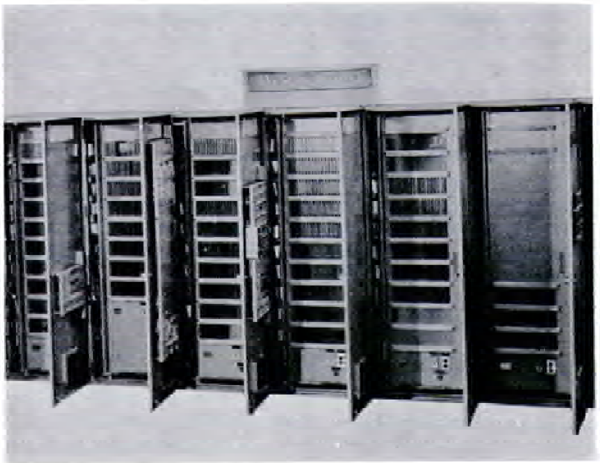


This chart show doesn't show that the Westinghouse New Products Lab at Cheswick, PA, moved to (W)R&D after the Prodac-IV was developed, and was part of the new Computer Systems Division (W)CSD. It does show how the (W)CSD was merged with the Power Control Division (W)PCD and Hagan Controls Company at R&D to form Hagan/Computer System Division, which moved from R&D to O'Hara Twp. in 1968.

WESTINGHOUSE AND COMPUTERIZED PROCESS CONTROL

What has Westinghouse done to contribute to the advancement of this art? Probably more than you think! Prior to 1959, Westinghouse invested considerable time and money for development of CPC systems. This resulted in 1959 in the manufacture and sale of the *Prodac 4449* computer control system, developed specifically for the steel industry. This system had the capability for monitoring and controlling *all* the factors within a particular steel making process. It was the *first "closed loop" control system* installed in the steel industry.

Prodac 4449 Computer Control System



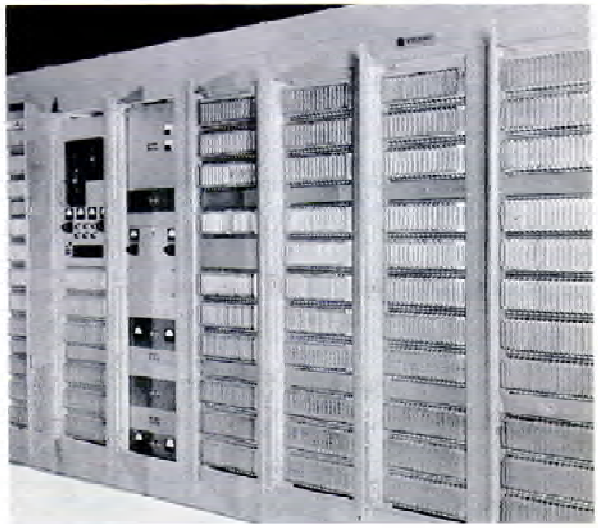
Existing installations of this equipment include:

1. Republic Steel Corporation, Gadsden, Alabama
2. Crucible Steel Corporation, Midland, Pennsylvania
3. United States Steel Corporation, Gary, Indiana
4. Sheffield Division of Armco Steel Corporation, Houston, Texas

All Prodac 4449 control systems were manufactured at Westinghouse's Buffalo Plant.

In addition, Westinghouse built two *Prodac IV* process control computer systems in East Pittsburgh for Texas Electric Service Company and Public Service Gas & Electric in Newark, New Jersey.

Prodac IV Computer



This experience, in both Buffalo and Pittsburgh, and the rapid acceptance of more sophisticated control by industry combined to clearly indicate a new direction for control participation by Westinghouse. The skills and experience of all the different parts of the Corporation were brought together in 1961 into what was then called Industry Systems Department.

This department was chartered to coordinate *all* activity on the Westinghouse CPC systems and to make initial plans for much greater activity. Many months were spent in marketing studies, engineering design and manufacturing planning to establish customer requirements now and for the next five years.

In the corporate reorganization of February 1962 the Industry Systems Department became the

Computer Systems Division

and facilities were set up at the Westinghouse Research & Development Center, Churchill Borough (Pittsburgh), Pennsylvania.

WESTINGHOUSE COMPUTER SYSTEMS DIVISION

Purpose of the Computer Systems Division

According to the Westinghouse directive founding the Computer Systems Division, it was assigned the responsibility of—

"producing the maximum continuing profit from the design, procurement and marketing of computers, peripheral equipment, programming and related software".

Organization

An organizational chart was published when the Computer Systems Division was founded, similar to the one illustrated in Figure 1. Note that the manager of the Division reports directly to the Vice President of Industrial Systems as do the managers of the Metals, Manufacturing, Processing and Public Works provinces. The purpose behind this organization can be seen by reviewing the second part of the Westinghouse directive on the responsibilities of the Computer Systems Division—

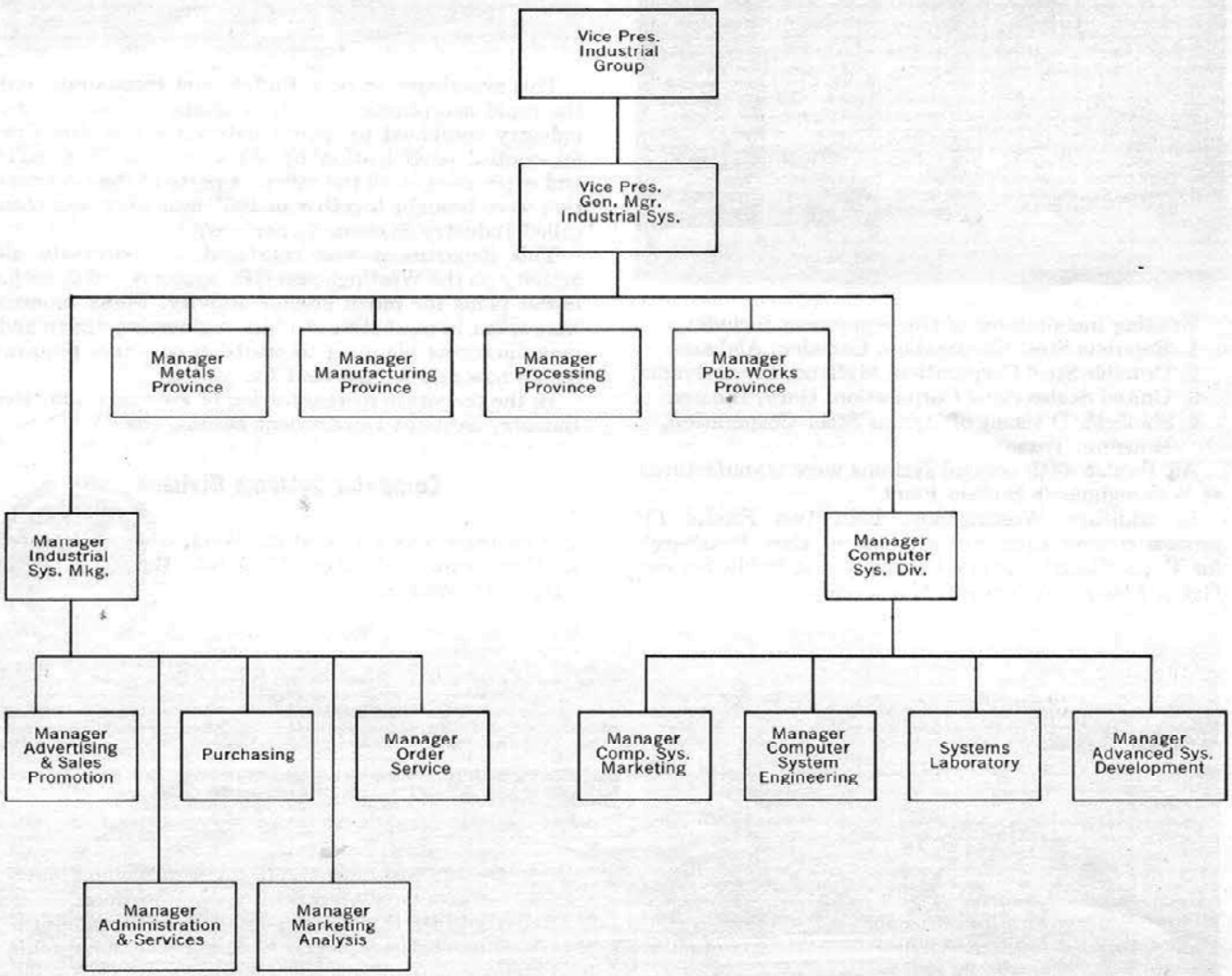
"The Computer Systems Division will work closely with the province departments, including the Electric Utility and Marine Province, in supplying them computers, peripheral equipment and software to specification for their industry customers."

What does this mean to the field salesman?

Who backs him up on computer negotiations?

The answer to both questions is Industry Systems, in the form of both the Provinces and the Computer Systems Division. This requires some explanation.

Figure 1. Organizational Chart



Division Objectives

The over-all objective of the Computer Systems Division is clear and simple—to **become a major factor in the computerized process control industry!**
This objective will be met by a combination of engineering and manufacturing knowhow and an aggressive, well-informed sales force . . . YOU! And in line with this thinking, short-range division sales quotas have already been established.

Figure 4. Division Quotas

Large Computer Systems

Year	Total Market	Ⓦ Booking in Units
1963	106	
1964	151	
1965	214	
1966	280	

Compact Computer System

Year	Total Market	Ⓦ Booking in Units
1964		
1965		
1966		

Why Are We Tied in with UNIVAC?

The time came to leap frog into a new generation of process computers. A central processor was required which could be mass produced. This normally takes years, but both time and money could be saved if an established manufacturer could be found who met our requirements for engineering, price and product reliability. Several were investigated and one met Westinghouse standards.

UNIVAC Division of Sperry Rand has been a leader in the development of engineering advances—the first electronic computer, the first core memory, the first solid state computer, and the world's most powerful scientific computer—LARC. The reliability of UNIVAC computers is almost unbelievable—rocket launchings for three years with not a single computer failure; the computer system selected for critical Naval Tactical Data System. This application has distinguished itself with a reliability ten times as good as what was considered acceptable.

Westinghouse and UNIVAC entered into a joint development agreement. Westinghouse established the functional characteristics the computer must have. UNIVAC established the hardware to attain these characteristics. Working together in both Pittsburgh and St. Paul, the two were able to develop the Prodac 500 quickly by complementing each other's ability and experience.

The computer main frame is built in St. Paul by UNIVAC. It is combined with the larger part of the computer system in Pittsburgh. From this point on, the responsibility belongs to Westinghouse.

Regardless of the hardware quality, without programming a computer is worthless, and programming is entirely Westinghouse's job. Maintenance is vital to a machine which controls an entire plant and Westinghouse service engineers will maintain Prodac 500 computers. If a question should develop concerning the guarantee, Westinghouse has that responsibility. If the component in question should be of UNIVAC manufacture, the Computer Systems Division will take the matter up with UNIVAC—the customer deals with Westinghouse!

On the subject of warranty, a look at the quality control or reliability engineering program practiced by both Computer Systems Division and UNIVAC is in order. Warranty claims should be very low, based on experience to date and the comprehensive program in effect. Every incoming component or sub-assembly is inspected on a 100% basis. Further tests are performed on each assembly and on the completed equipment both with and without the peripheral sections.

If a part fails in the field, it *must not* be examined on the spot but is returned to the factory exactly as removed. There it is dissected under laboratory conditions to determine the cause of the failure. Such unusual equipment as dental x-ray equipment is used for this.

The reliability program extends to vendors as well. Westinghouse and UNIVAC engineers go into their plants and help them establish and conduct reliability programs of their own.

Besides the statistical analysis of failures, 300% inspection and testing and locating the source of trouble, a great deal of reliability is added by the basic design of the machine itself. Applying electronic equipment at well below its maximum limit, eliminating soldered joints whenever possible, selection of proven materials and similar techniques give a head start on reliability.

When a customer elects to have a computer control a multi-million dollar plant, he *must have* the highest reliability which can be attained. With the Prodac 500 computers, he gets it and you can be proud and confident of what you sell.

GENERAL PROCESS CONTROL

Before examining the Westinghouse Prodac 500 Process Control Systems, let's briefly review the subject of *general process control*.

A PROCESS is—

"A particular method of doing something, generally involving a number of steps or operations."

Relating this definition to industries or utilities, we can say that an "INDUSTRIAL PROCESS" is—

"A composite of those manufacturing steps or operations necessary to produce an end product or service."

In practically all industrial or utility applications, each operation involves a number of variables—that is—

each operation is subject to change every time that it is performed.

As a result, each must be CONTROLLED—and the over-all scheme employed to control these variables is "PROCESS CONTROL."

The means employed to control an industrial process can greatly affect both PRODUCTIVITY and COST. It follows then, that an improvement in the accuracy and reliability of the process control scheme will result in—

- reduced costs
- increased production
- desired product quality
- reduced scrap losses

The development of automatic self-regulating controllers was a significant step forward in quality control, increased productivity, and better yield. However, these controllers were limited to control of small individual parts of the process. Until the development of the digital computer there was no control system which could take readings from whole manufacturing operations, inter-relate this data and regulate simultaneously all the many variables in the production process.

COMPUTERIZED PROCESS CONTROL

Computer, Computer System, Computerized Process Control System

Lest there be any confusion initially about the computer equipment Westinghouse manufactures, by our definition:

A *computer* is—

"an electronic device capable of performing mathematical and logical functions in accordance with a stored program (instructions put in, not built in, the machine to sequence its operation as to what, how, when it is to do something) and data that is put into it."

A *computer system* is—

"a basic computer plus the associated equipment needed to receive, prepare, evaluate and interpret the input-output data."

A *computerized process control system* is—

"a computer system which has the hardware and programs to give complete control of an entire process."

In other words—

A *computer* is the calculating device (the black box).

A *computer system* is a composite of many pieces of equipment that provide communication with the computer.

A *computerized process control system* is a computer system designed, programmed (told what to do, when and how to do it) and assembled to control a process or processes.

The Prodac 500 Systems Are Computerized Process Control Systems!

The Name—"Prodac"

In the past, the name Prodac has meant different things to different people. To salesmen serving the steel industry and to their customers, Prodac 4449 has meant "steel mill control." To other salesmen and customers, "Prodac IV" has come to mean electric utility control.

But in *all* cases, the name has become synonymous with *Westinghouse Process Control!* This fact combined with the fact that the name has a good reputation and that it is well accepted, has been responsible for the decision to retain the term "Prodac" and apply it to a new line of CPC systems.

Prodac 500 supersedes the Prodac IV and Prodac 4449. Prodac sequence control is still available from Buffalo.

What Is Prodac 500?

Prodac 500 series computerized process control systems are—

high-speed, solid state, digital computer systems designed for on-line, real-time, process control applications.

What Can Prodac Do?

Prodac 500 computer systems can monitor and control a process to provide the optimum return.

What Is This Monitor and Control Business?

The complete range of a computer's capability is often divided into these two general areas mostly because many users have installed them this way. Monitoring is frequently called "data logging" and is the first series of steps through which a computer goes to completely control a process. Here is a full list of these steps:

Collect—

From instruments on the process itself the computer collects data. These instruments give such values (represented analgously by voltage) as temperature, pressure, flow, weight, speed, viscosity in analog readings and status of motors, valves, lights and such as "off" or "on" signals. Since the computer can read 75 analog signals and over a thousand contacts in a single second, data is collected in scan programs which might be 1-second scan, 5-second scan, 30-second scan, etc., depending upon how often we want to collect data.

Convert—

translate these voltage, current or contact status signals into engineering terms by way of information stored within the computer itself.

Compare—

limits for these values can be stored in the computer and the process readings can be compared with these limits. The limits can trigger alarm programs to sound a horn, light up a light, etc. Interaction frequently requires that the limits be varied according to other variables in the same process. A wide range of "custom application" is available in this area.

Calculate—

on the basis of the stored program, calculations concerning the status, efficiency, trends or operation are made.

This is the extent of the monitoring function and the computer can be instructed to print out what it knows about the process at this point, or it can suggest changes which the operator should make, or it can alarm the operator concerning what he must do. Fullest utilization of the computer is obtained when the computer goes on to:

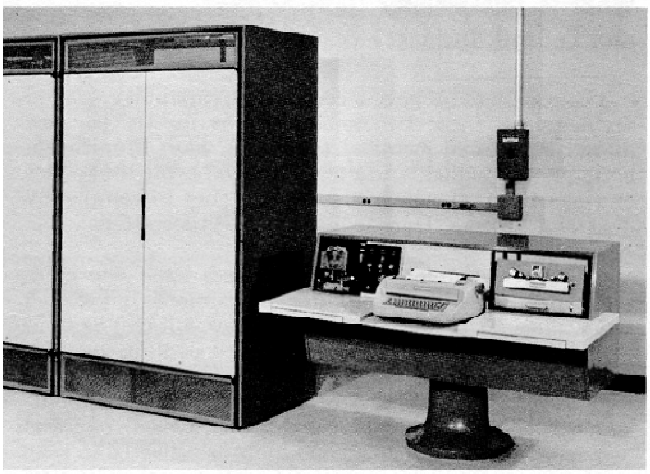
Control—

The computer feeds back to the process analog values and contact closures, which will make the necessary corrections in the process to keep it running at top efficiency.

It is evident that in addition to the degree of flexibility which different processes require, different customers will want to make use of varying amounts of the computer's ability. The trend is toward greater use of the computer, especially as experience with these machines develops greater confidence in their reliability and as more is learned about the process and the relationship of all the variables is determined.

Now, here is the product which you have to provide this sort of control—the Westinghouse PRODAC 500 SERIES COMPUTER.

Prodac 500 Computer Shows Equipment Cabinets and Programmer's Console



The Prodac 500 series currently consists of the *Prodac 510* and the *Prodac 580*.

The *Prodac 510* process control system has four communication channels which are used for communication with—

1. Analog (such as thermocouples) and interrupt signals (such as an alarm condition) from the process.
2. Digital signals (such as pushbuttons and contact closures)
3. Programmer's console
4. Drum memory

This system accommodates most application requirements in most industries.

The *Prodac 580* process control system has eight communication channels, the four above plus four more. The 580 with its four additional channels is used on larger jobs such as when communications with other computers, a larger memory requiring additional drums or when other input-output equipment (card readers, etc.) is necessary.

In all other respects, however, the two systems are similar. As a result, both will be considered together here under the terms "Prodac 500."

Performance Features

In most cases we must interest a prospective buyer of a CPC system in evaluating five key performance characteristics:

1. Speed
2. Priority interrupt
3. Analog input-output
4. Contact closure input and output
5. Software or programming aids

1. *Speed*

Specifically, Prodac 500 is able to make as many as 125,000 calculations per second—more than twice as many as most other process control systems available today. Let's see why speed is important.

The computational speed of a CPC system determines it *throughput*, *flexibility* and *future capability*.

Throughput—Obviously the faster a CPC system can operate, the more process points can be monitored and controlled per unit of time. The faster this data can be analyzed, the more precise the productivity that can be achieved.

Flexibility—This inherent speed permits using programs (software) to adapt the computer to the job at hand rather than having to use hardware. In previous Prodac computers the interrupt function was handled primarily by hardware: diodes, resistors, transistors and capacitors. In the Prodac 500 series we take advantage of speed and perform this function by a program stored in memory. This means that when we make a change in the controls of the process we can do this with programming on a typewriter at the Programmer's Console rather than expensive rewiring of the basic hardware. Since the computer will determine new, factual information about the process, which progressive firms will utilize for improved control, changes will constantly be made. The flexibility of programming vs. hardware is readily apparent and is a major sales feature.

However, to obtain the interrupt function from a programming approach there must be sufficient speed so that this function doesn't use any appreciable amount of computer time.

Future expandability of a CPC system is another important customer consideration—and speed of handling logic decisions (such as, is the temperature within limits?) directly affects expandability. Prodac 500 can be installed initially to perform just the monitor function—such as data logging. Later, it can monitor one or more operations and signal the required changes to an operator. Later still, it can control an entire operation or even the entire plant. The computer must be fast enough to add operations and still have time to do them all as required by the process.

Because HIGH COMPUTATIONAL SPEED is an inherent feature of Prodac 500, expansion of the control system can be accomplished easily and economically to bring more areas of production into the overall production control.

2. *Priority*

In any system sufficiently complex to use a computer there are hundreds of things that demand attention. The computer itself wants to be recognized when it reports a given task is completed. Recognizing these various activities in order of their importance is the purpose of the priority system. Study of the mathematical model gives the sequence which the programmers select and order the computer to follow. Under the priority executive scheme used in the Prodac 500, programs stored in memory can refer back to the model and recognize the request which is most important at the time—even though a few seconds before it may have had either higher or lower priority. No hardware system could provide as much flexibility.

A business-type computer is designed and sold to perform administrative work such as calculating payrolls, working scientific problems, or processing orders. On the other hand, a process control computer system has as its prime objective, controlling production processes. It may, however, possess enough additional capacity to perform certain administrative functions in its "free time." But, because its prime function is to control a process, the system must be designed so that the process control function, which is dome in real time, can always get *top priority*. Control of the process itself will always be a series of functions at different priorities. An alarm function for example must have priority over a scan function or an efficiency calculation.

Prodac 500 has the capability of accepting off-line programs and handling necessary process conditions in the proper order of priority by means of a selective interrupting input. Here is an example:

If a Prodac 500 system is controlling a plant on the basis of a complete scan of all operations in only 10% of every 30-second cycle, its free time (27 seconds out of every 30 seconds) might be utilized to work a scientific or engineering problem which has also been fed into the computer. However, if an alarm condition occurs in the plant operational process, the Prodac 500 system has the capability of—

immediately sensing the alarm condition and stopping its work on the scientific or engineering problem,

correcting the emergency in accordance with the stored program in memory for such an occasion,

and then, when everything is under control, returning to the scientific or engineering problem at precisely the same point it was at when interrupted!

Prodac 500 has 192 levels of priority interrupt capacity—as compared to the 6 to 12 levels available with competitive systems.

3. *Analog Input-Output*

An analog value (which is similar in function but not in origin and structure to the original plant value) is often the most convenient and accurate way of monitoring process conditions.

However, inasmuch as Prodac 500 is based on a digital technique, the analog input cannot be handled directly by the computer system. It must first be converted to a value having numerical digits.

The Prodac 500 CPC system is capable of receiving *analog inputs*, converting them to digital values, acting upon them as required, and producing *analog outputs* capable of changing the process conditions (e.g., temperature, flow, pressure, etc.) to adjust valves, voltages or other set-point controllers.

Further, Prodac 500 is designed so that every single analog input is individually filtered continually for electrical noise rejection providing a more accurate signal—a customer benefit *no one else offers*. Competitors offer no filtering, filtering as they feel necessary, or let the customer provide his own.

In addition, analog inputs are electrically isolated from the computer. That is, the computer is never directly connected to any sensor—

eliminating possible damage to the computer due to accidental contact with a high voltage source

and

assuring further noise rejection

4. *Contact Closure Input and Contact Closure Output*

The Prodac 500 system is capable of accepting inputs from any plant or operator-actuated switch, pushbutton, or similar control device. These inputs are either 48-volt or 125-volt, d-c signals, and so eliminate the possibility of dirty contacts by burning the contacts clean every operation.

Prodac 500 also incorporates "mercury-wetted relays" providing an extremely long and stable relay life. This is the user's assurance of trouble-free operation for many years.

Programming

Since a computer is incapable of original, creative thoughts or decisions, each step in the routines it follows must be prepared in advance by a human. The program, therefore, is every bit as important as the hardware design.

The program, written in computer language, and stored in computer memory, tells the computer what to do, when to do it, how to do it, where to do it, and when to stop doing it. All this is based on known facts about the process and is only as accurate as the process knowledge and interpretation into the program.

In some respects the relationship between programming and a computerized process control system can be likened to the relationship between a road map and the operator of an automobile who is making a cross-country trip. The road map tells the operator—

which road to take,
where there are detours,
how far to the next turn,
etc.

Similarly, the program tells the computer system *what* it should be doing and what should be occurring at each step of an over-all process.

It is at this point, however, the analogy falls short because the road map cannot observe, evaluate and make recommendations on such trip variables as—

weather
road conditions
traffic congestion
the paradox of fuel economy vs. high speed

Neither can it compensate for emergency conditions such as—

flat tires
running out of gas
accidents

However, the program does provide the process control computer system with detailed instructions on what to do about every possibility in the form of:

1. *How* to collect and organize intelligence on every facet of the process.
2. *How* to interrelate the data obtained from various points of the process.
3. *How* to maintain a historical file of this data for periodic reference
4. *How* to evaluate this data
5. *How* to decide what and when action is needed.

Although a process control computer system is an awe-inspiring electronic complex, it must be remembered that it is capable of doing *only* what it is told to do. This is the responsibility of the program and the programmer who prepares it, and this is an area where Westinghouse, with both computer and process knowledge, has a real advantage over most of the competition.

Prodac 500 systems offer the utmost in programming flexibility and performance—to insure that the user will obtain maximum benefits from his investment.

Westinghouse is extremely flexible as far as programming service is concerned. We are in a position to—

1. Sell the "hardware" only, permitting the customer to program the computer system.
2. Assist the customer in programming (on a contract basis).
3. Perform the entire programming operation prior to shipment of the equipment. (This is performed on a Prodac 580 installed in the Systems Laboratory at Pittsburgh. The complete program is "debugged" on a computer *prior to shipment.*)

Maintenance Policies

Westinghouse can provide complete equipment maintenance if the customer desires it. This is offered on a service contract basis and is handled by engineers of the Service Division.

Rental Contracts

We have an established rental policy and contract form.

Equipment Sold

Already these Prodac 500 computers have been ordered:

1. Arizona Public Service
   Phoenix, Arizona—1963 delivery
   Type—Prodac 580
   Application—To perform economic dispatch
2. Pacific Gas & Electric
   Contra Costa, California—1963 Delivery
   Type—Prodac 510
   Application—To perform economic dispatch
3. Commonwealth Edison
   Joliet, Illinois—1964 delivery
   Type—Prodac 510
   Application—To monitor a power plant
4. Gulf States Paper Co.
   Demopolis, Alabama—1963 delivery
   Type—Prodac 580
   Application—To control a Kymar continuous digester
5. Cosider
   Taranto, Italy—1963 delivery
   Type—Prodac 580
   Application—To control a reversing plate mill
6. Inland Steel Company
   East Chicago, Indiana—1964 delivery
   Type—Prodac 580
   Application—To control a hot strip mill
7. Public Service Gas & Electric
   Hudson Station, New Jersey—1964 delivery
   Type—Prodac 510
   Application—To monitor a power plant
8. Chelan County PUD
   Seattle, Washington—1963 delivery
   Type—Prodac 510
   Application—To monitor a power plant
9. Boston Edison
   Boston, Massachusetts—1964 delivery
   Type—Prodac 510
   Application—To monitor a power plant
10. Selni, Italy—1963 delivery
    Type—Prodac 510
    Application—Atomic power plant

COMPETITION

There is no shortage of competition in the computerized process control system industry. Westinghouse is competing with many companies which are well established, which make good equipment, and which are aggressive. Every effort will be made to be sure that you are kept up to date on the latest competitive activities, their product improvements and their product features. This will be a continuing program designed to keep you well informed about trends within the industry.

As an initial step, here are thumbnail sketches of some of the more important competitors.

International Business Machine (IBM)—El Segundo, California

IBM is getting into the computerized process control field with a low-cost system originally designed for another purpose. However, they present the most formidable competition in the long run. Approaching this industry from a strong data processing marketing position, they have set up regional teams of process control specialists, including systems engineers, control engineers, mathematicians and statisticians. Further, their field force is well trained, polished and know how to sell this type of equipment.

Their chief weakness, however, lies in their relative limited exposure and background to *general process control.* They are not close to the operating people in the customer organizations: the operating people, most of whom you know so well.

General Electric—Phoenix, Arizona

The G. E. computer system is an outgrowth of "check recognition" machines, originally sold to large banking facilities, such as the Bank of America in California. They are (and have been for some time) aggressively into CPC.

They presently have over 3,500 people in their computer facility in Phoenix. They have turned over the selling job to control specialists in their Apparatus Sales Division.

General Electric has a product line which is an outgrowth of computers designed for data processing. They are aggressive and can be counted on to be major competition on just about every negotiation in which you will be involved. Product-wise our system has been designed more for its ultimate purpose—process control—and is much faster.

Minneapolis-Honeywell—Pottstown, Pennsylvania

Minneapolis-Honeywell capitalizes on their experience with instrumentation and their long-established contacts with processing industries. Because of these advantages, they are a key factor in the computerized control industry. They manufacture a good computer system which sells in the same price range as our Prodac 500 systems.

The big advantage that this company possesses is the fact that they make, under one corporate roof, a digital control computer and a complete line of process control instrumentation.

Recently they have formed an agreement with Scientific Data Systems very similar to our relationship with UNIVAC.

Thompson-Ramo-Wooldridge—Canoga Park, California

Thompson-Ramo-Wooldridge has been a pioneer in the computerized process control industry. In order to get started they invested close to one million dollars in process analysis in the petroleum and chemical industries.

In 1957 they established a division called TRW Computer Company. Within two years they had large contracts with three companies in the chemical industry. Today they are leaders in this field.

TRW manufactures an acceptable line of equipment for today's applications. The computer system they are currently selling, the TRW330, is very slow.

Daystrom Inc.—LaJolla, California

Daystrom was one of the original companies building custom-line computers. They sold computers in electric utility, steel and chemical. These were sizable application investments, and the company earnings declined.

Daystrom is temporarily out of the market, having been purchased in 1960 by Schlumberger Well Surveying Corporation of Houston, Texas.

Undoubtedly they will reassert themselves in the computerized control industry very soon.

In addition to these companies, which are prime manufacturers of both digital computers and peripheral equipment, there have been many "marriages" between computer manufacturers and instrument companies. Three of these marriages have resulted in major competition.

RCA, Natick, Mass./Foxboro Company, Foxboro, Mass.

Foxboro Company, a leader in industrial instruments and automatic controls, joined forces with Radio Corporation of America to make computerized process control systems. Their success was somewhat limited.

As a result RCA went out of this business and Foxboro recently purchased the RCA process control computer facility at Natick, Massachusetts.

Foxboro is now offering the computer, together with complete industrial process instrument systems, assuming full responsibility for the entire engineering job, and buys computer hardware from RCA or others.

Philco, Philadelphia, Pa./Leeds & Northrup, Philadelphia, Pa.

The marriage between Philco and Leeds & Northrup is similar to that between RCA and Foxboro. Philco manufactures the digital computers for industrial process control which is assembled and sold through L&N. Philco, now with Ford backing, can be expected to aggressively enter the CPC market.

Packard Bell Computer of Los Angeles/Bailey Meter, Cleveland, Ohio

In this association, Packard Bell provides the digital computer while Bailey Meter furnishes the necessary instrumentation.

This has been a very active association in the sale of small computer and data-logging-only applications.

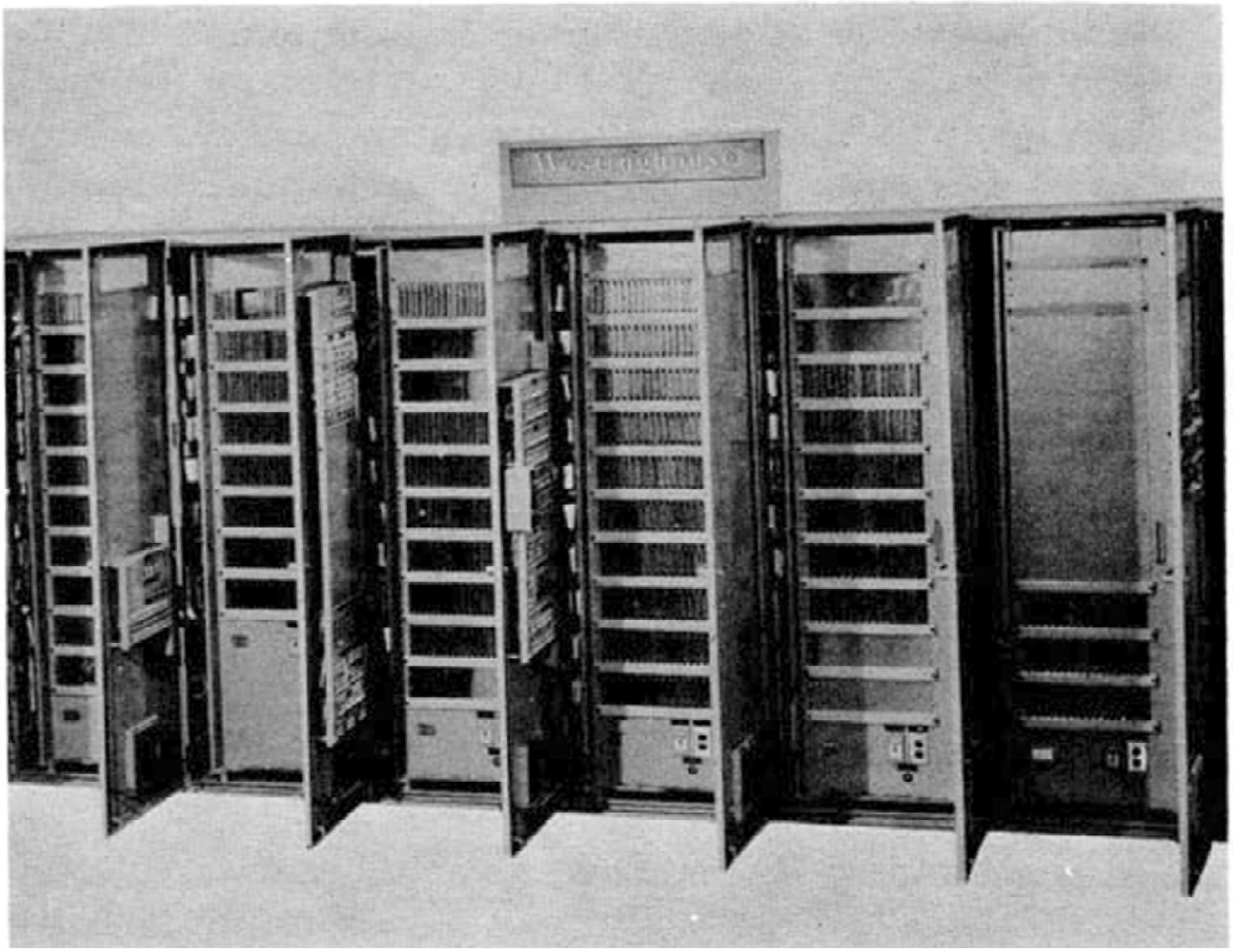
Further information will be published on all competitors just as soon as it is received.

WESTINGHOUSE COMPACT COMPUTER SYSTEM

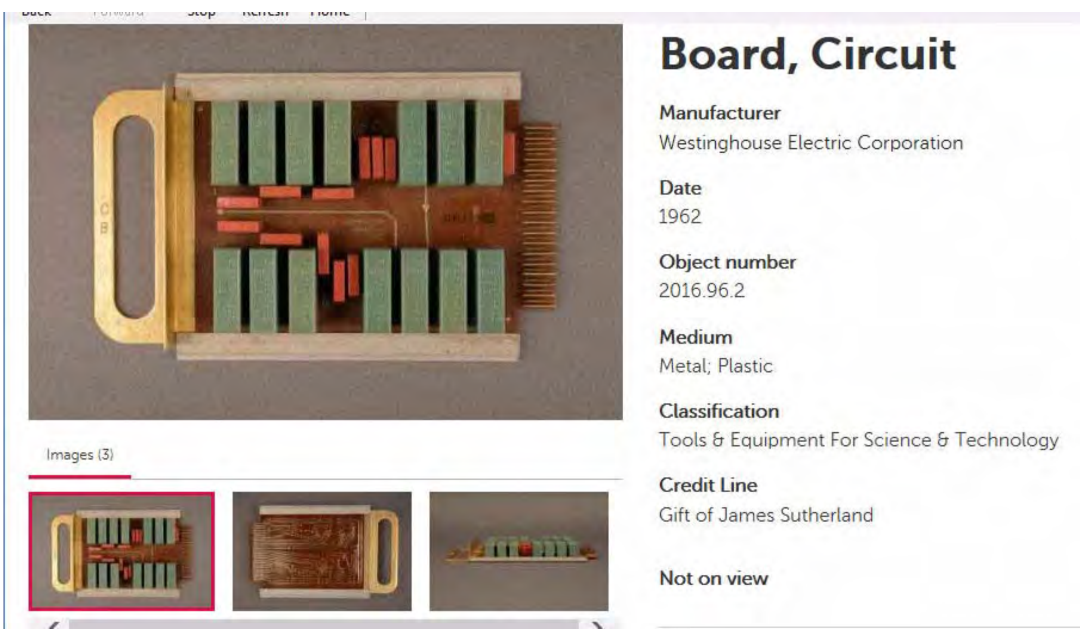
Thus far only the Prodac 500 system has been described. Now for the Westinghouse Compact Computer System—

"Why worry about developing a small computer system at a time when we're just underway with the Prodac 500 systems?"

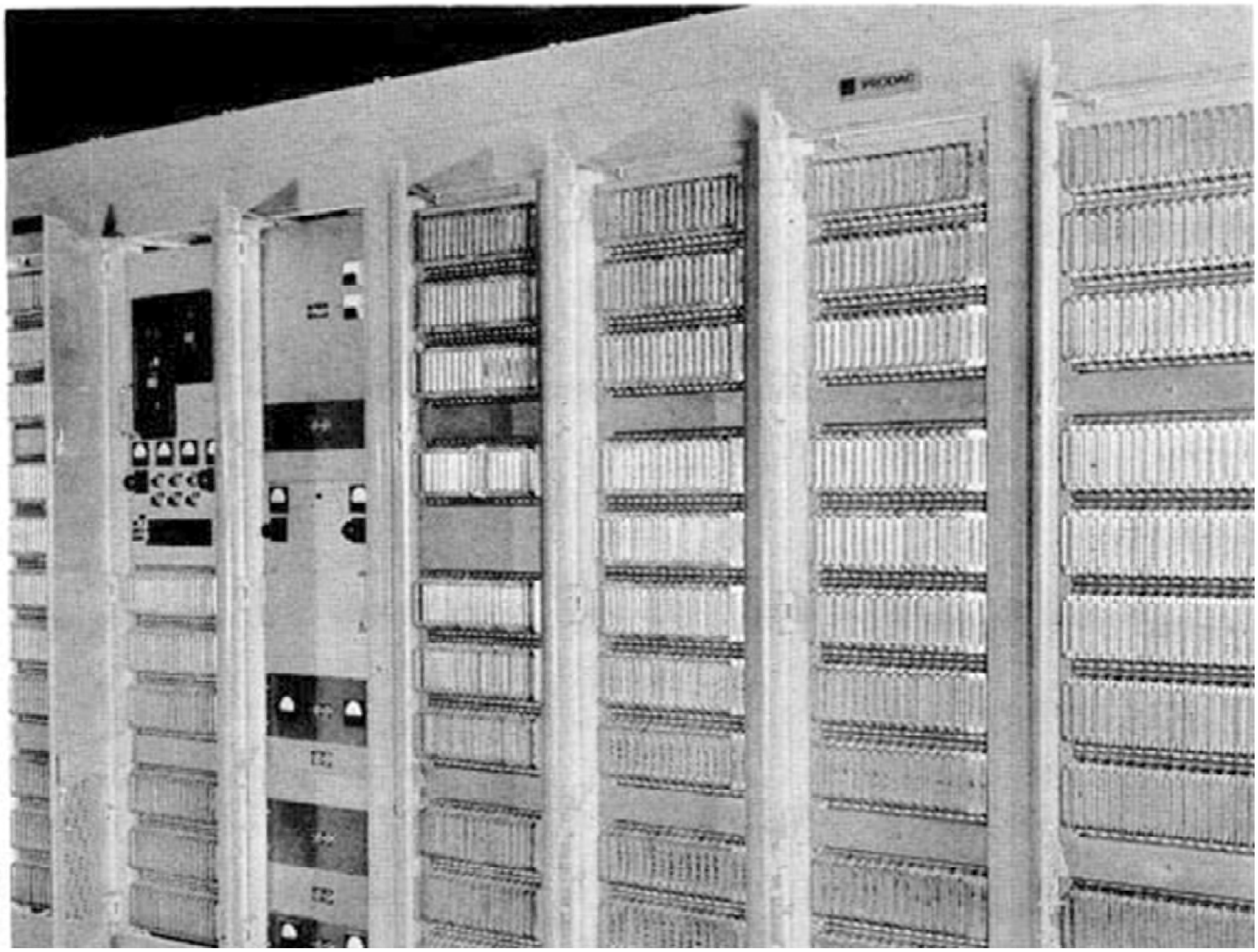
A logical question, but one which must depend on market conditions. We had been planning this development for some time, particularly as transistor prices continued down. In June, 1962, a large chemical company (who currently have four plants with CPC systems) sent Westinghouse a complete specification based on a small general-purpose digital computer controller. They asked if Westinghouse would be interested in developing such a system. At this time (about 6 months ahead of planned development schedule) we began a development program with the chemical company.



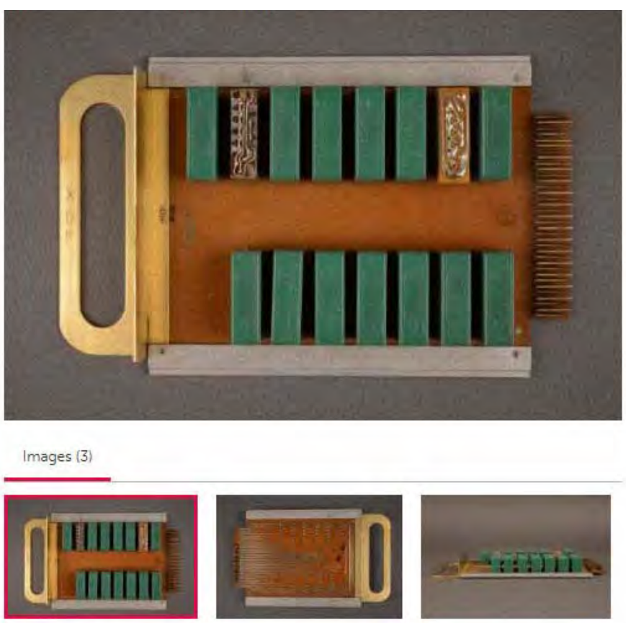
1959 - Prodac 4449



"CB" card in the Heinz History Center collection
(unknown function - it was used in both the Prodac 4449 and the Prodac IV)



1961 - Prodac IV



Board, Circuit

Manufacturer
Westinghouse Electric Corporation

Made by
James F. Sutherland

Date
1961

Object number
2016.96.1

Medium
Metal; Plastic; Graphite

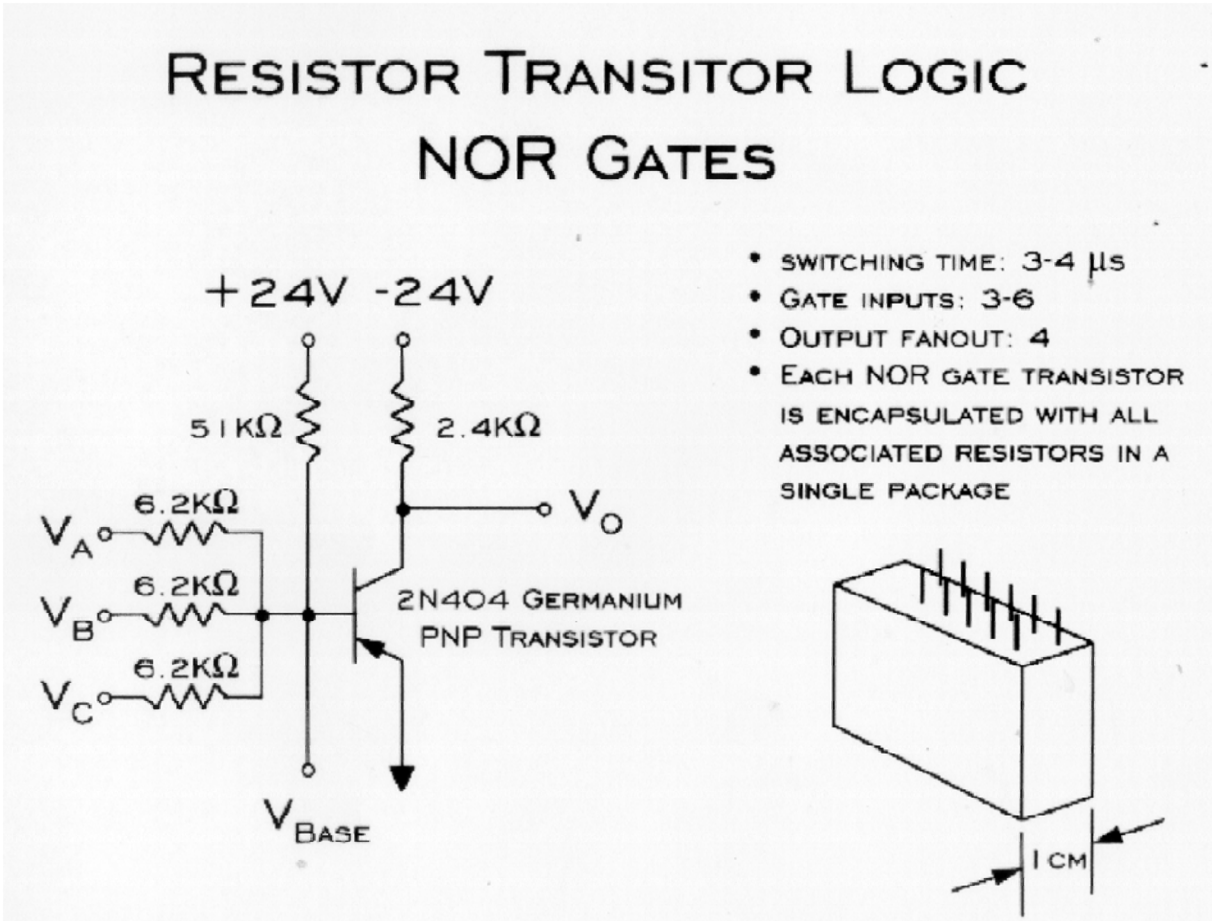
Classification
Tools & Equipment For Science & Technology

Credit Line
Gift of James Sutherland

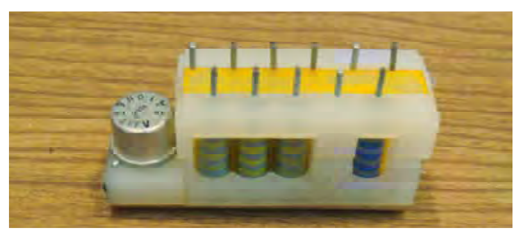
"XGF" card in the Heinz History Center collection

(This board was made for the Prodac IV computer at the New Products Lab)

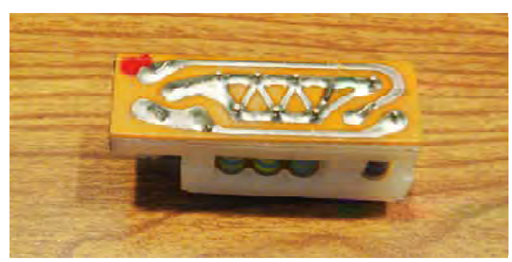
Note: Two NOR element tops have been cut away to show "V" notches and drilled holes.



NOR logic gates from the Westinghouse plant in Buffalo, NY were assembled as "cord-wood" units. Resistors were snapped into a white plastic frame before their leads were soldered in "V" notches on the edge of the small circuit board. They were then dipped into a green plastic shell that had been half-filled with epoxy. The unit on the right, above, shows a unit with the green plastic shell cut away.



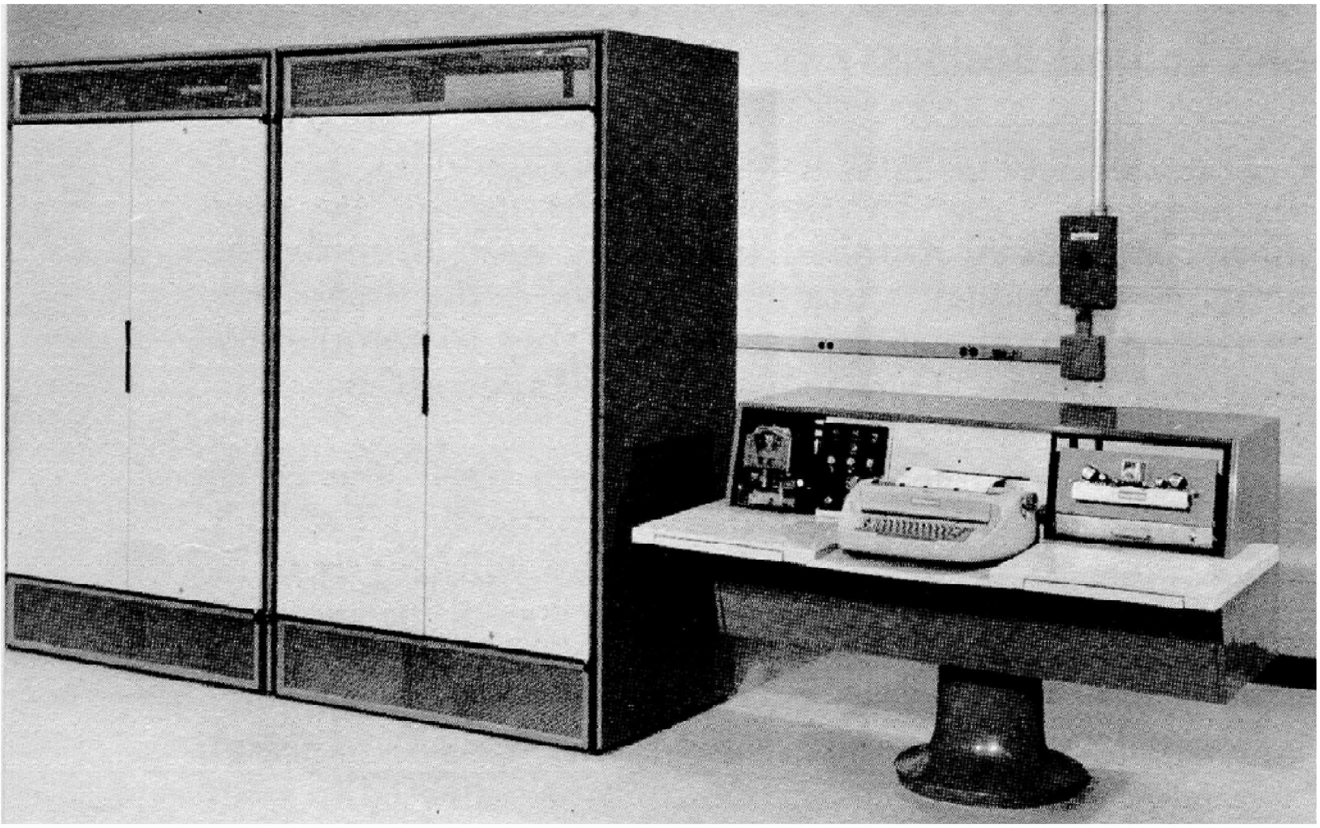
The two NORs on the right show the "drilled hole" version of the redesigned NOR unit. They were very reliable in Tesco's Prodac-IV because they were not encapsulated in epoxy.



1960 - Prodac X

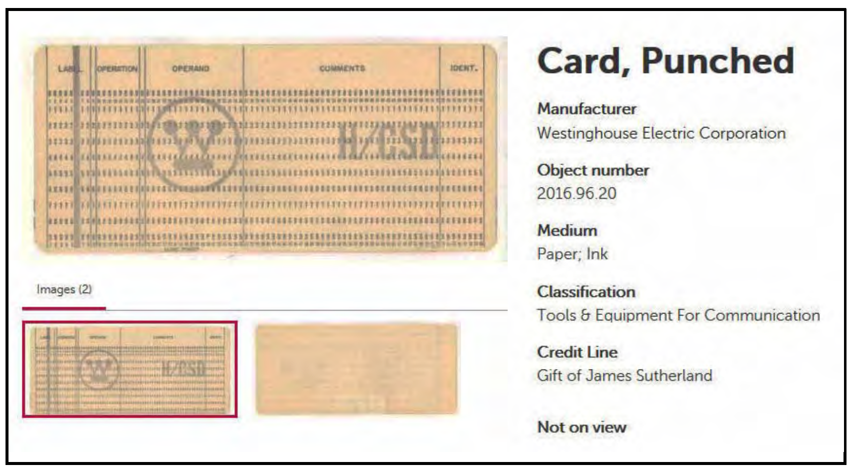
The aisle between two 12-foot rows of circuit board frames was illuminated by florescent lights and was wide enough for two teams of engineers to work with oscilloscopes at the same time. The computer was cooled by two room-sized air-conditioners, at each end, mounted over the doors.

Jim Sutherland is shown using the maintenance panel for the control unit, which interpreted each program command and executed it by sending control signals to other units, such as the arithmetic unit, the core memory, and the peripheral equipment units.



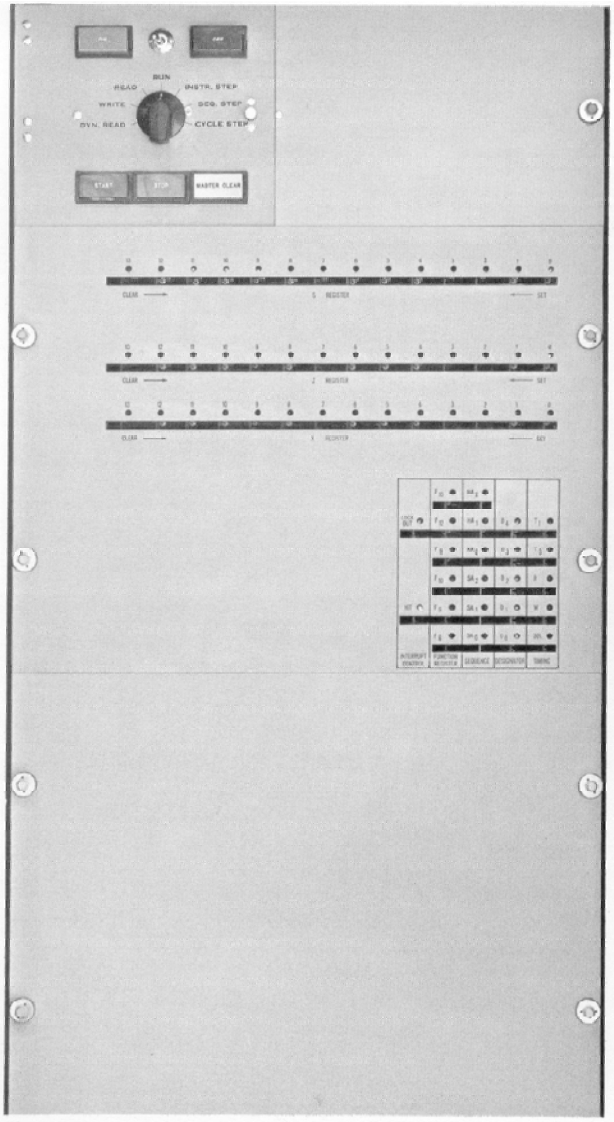
Prodac 580

Computer system and process control programs were punched into 8-channel tape and loaded into the P-500 through a tape reader on the programer's console.

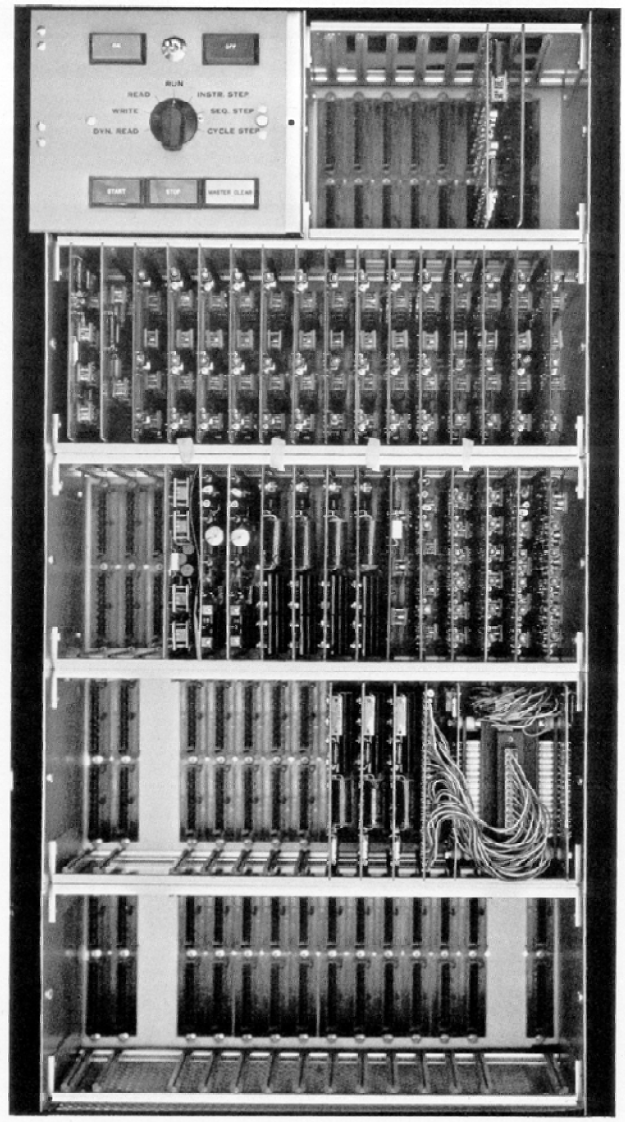


(W)H/CSD programmers used IBM punched cards for the P-500 system program instructions that were compiled by a FORTRAN compiler in the (W)H/CSD Systems Lab computer. After debugging, the program was output on punched tape and loaded into the P-500 memory through a tape reader on the programmer's console.

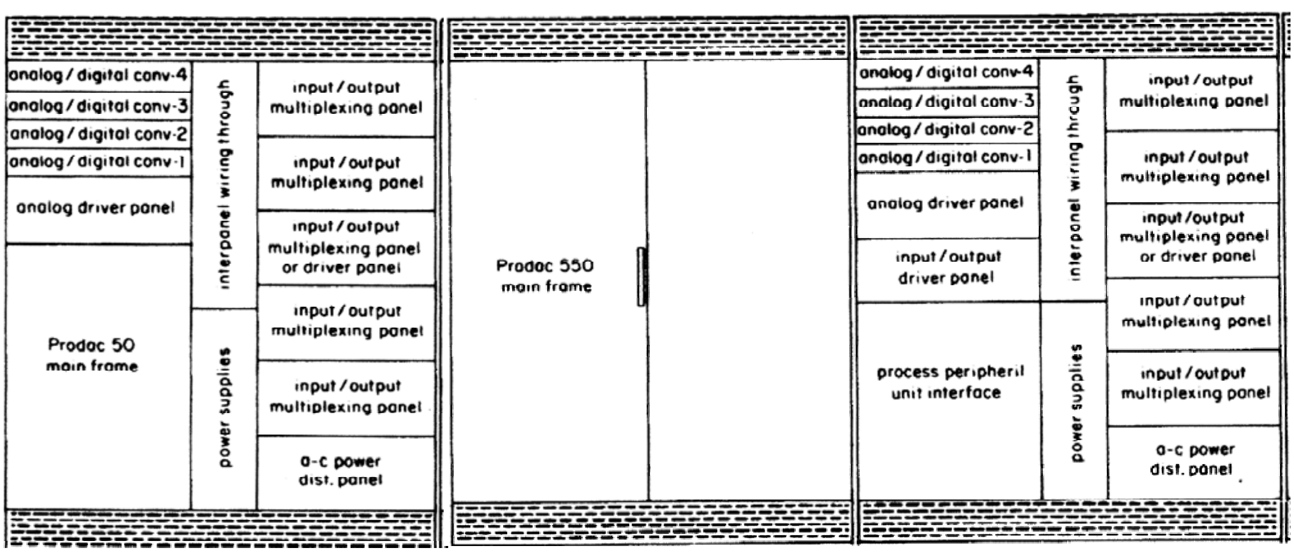
After each P-500 had been loaded with its system programming, it was transferred to (W)Electric Utility Systems programmers (EUCS later became PCD) at (W)R&D, where they loaded their process control programs into the P-500. Many hours were spent on the test floor, making sure the computer system was working properly before it was shipped to the customer.Final installation tests were performed at the customer's site.



PRODAC 50 Central Processor with Cover in Place

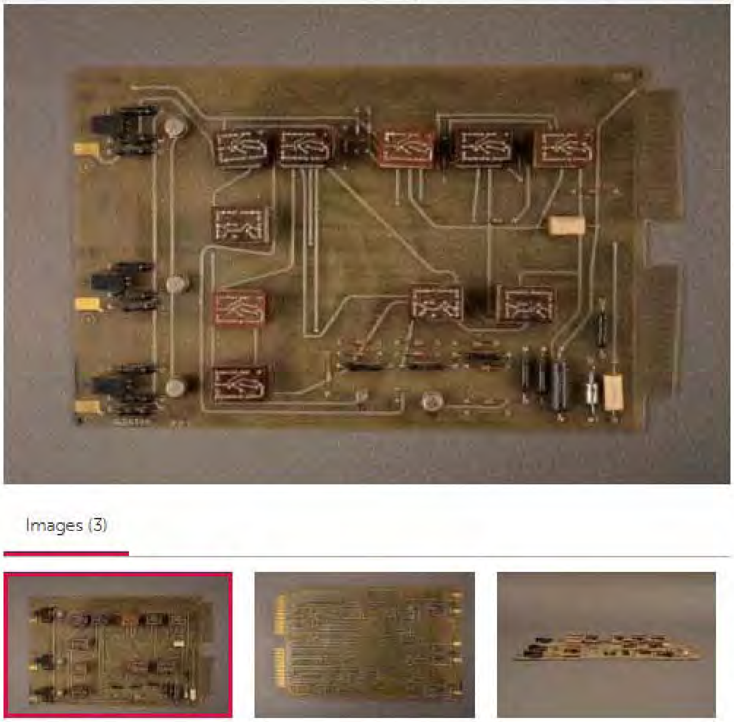


PRODAC 50 Central Processor with Cover Removed



P-50 **P-50 Input/Output**

1964 - P-50 Computer and P-550 Computer Cabinets



Board, Circuit

Manufacturer
Westinghouse Electric Corporation

Object number
2016.96.11

Medium
Metal; Plastic

Classification
Tools & Equipment For Science & Technology

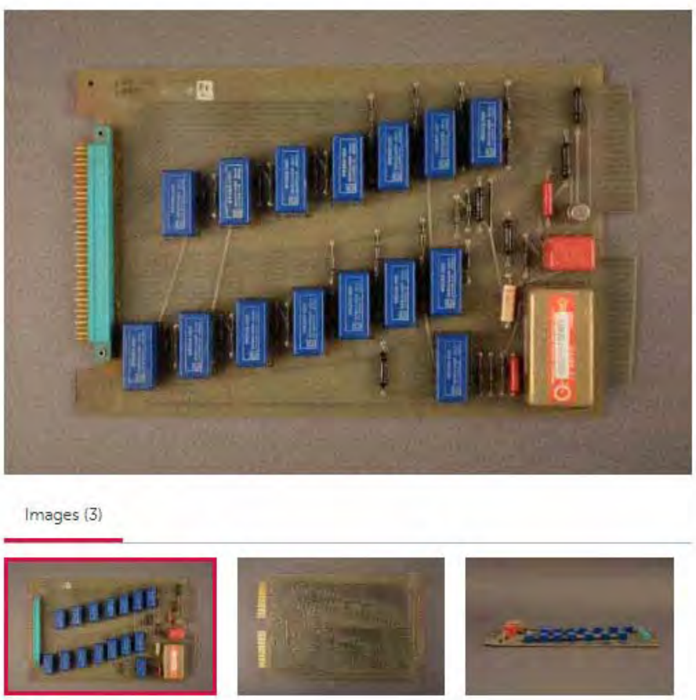
Credit Line
Gift of James Sutherland

Not on view

+ Description

P-50 bit-slice Card

14 of these cards in the top row of the P-50 chassis did all of the logic calculations and arithmatic. The indicators were visible through the front panel.



Board, Circuit

Manufacturer
Westinghouse Electric Corporation

Manufacturer
C. P. Clare and Company

Date
1966

Object number
2016.96.10

Medium
Metal; Plastic

Classification
Tools & Equipment For Science & Technology

Credit Line
Gift of James Sutherland

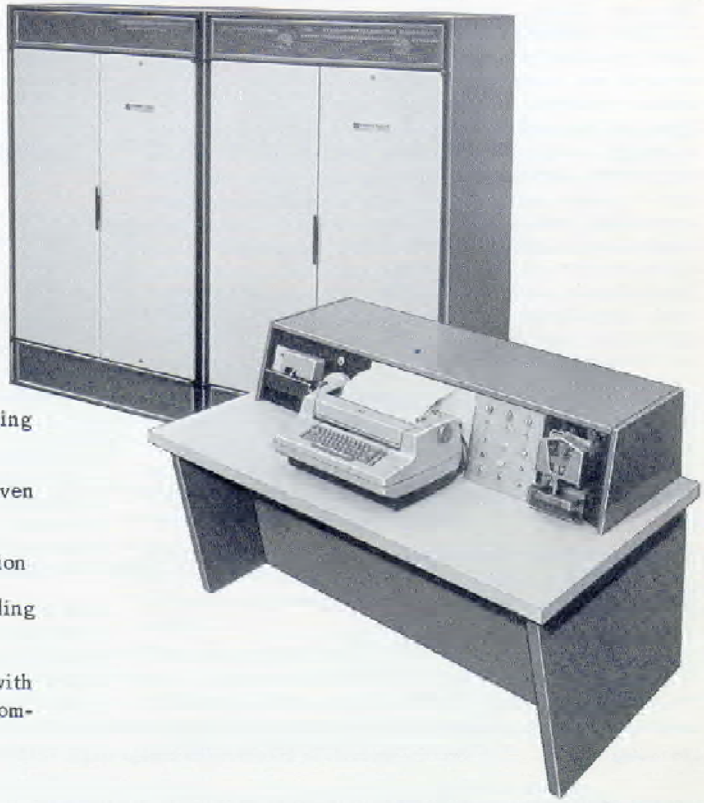
Original analog voltage input selection boards used reed relays

P-50 Circuit Boards

New Product Bulletin

PRODAC 50 and 550 Series Digital Computer Systems for Electric Utility Applications

New Product Bulletin
56-150
Page 1



advantages

- Electric Utility oriented design, programming and application engineering
- high reliability through the use of field proven concepts and highly derated components
- modular design providing for future expansion
- computational power substantially exceeding any forseeable system needs
- input/output capability commensurate with application requirements and fully utilizing computer capability

application

power generating station for:

- data logging
- performance calculations
- operating guides
- supervision and control of plant equipment
- maintenance scheduling

power system operation for:

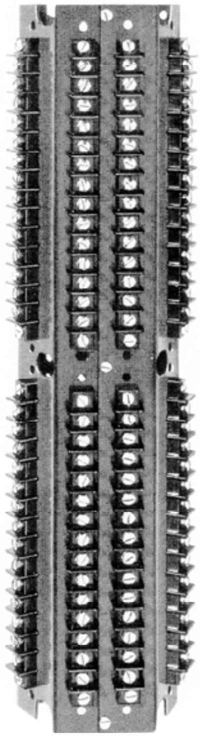
- data logging
- load frequency control
- economic dispatch
- hydroelectric dispatch
- economic interchange calculations
- unit commitment

elements of a PRODAC computer system

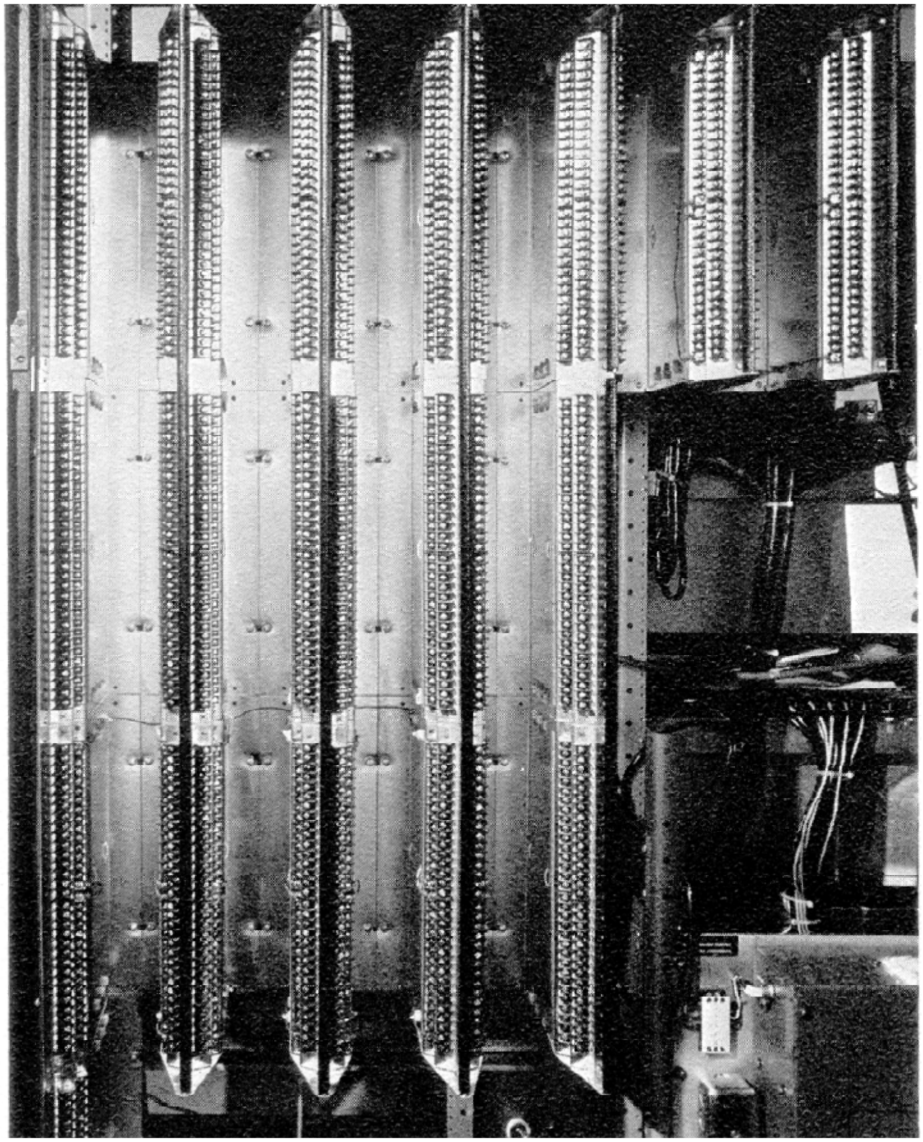
I. computer hardware
II. application engineering
III. system programming

The P-50 Input/Output system was adapted for the Prodac 500 series to make the "Prodac 550." Until the P-250 was introduced in 1967, the Prodac 550 was the workhorse for the (W)H/CSD. The P-50 continued to be a popular small computer system, and hundreds were sold over the next ten years

1965 - Prodac 550



Above - Original P-50 Customer Input/Output terminals were hard for the field electricians to reach.

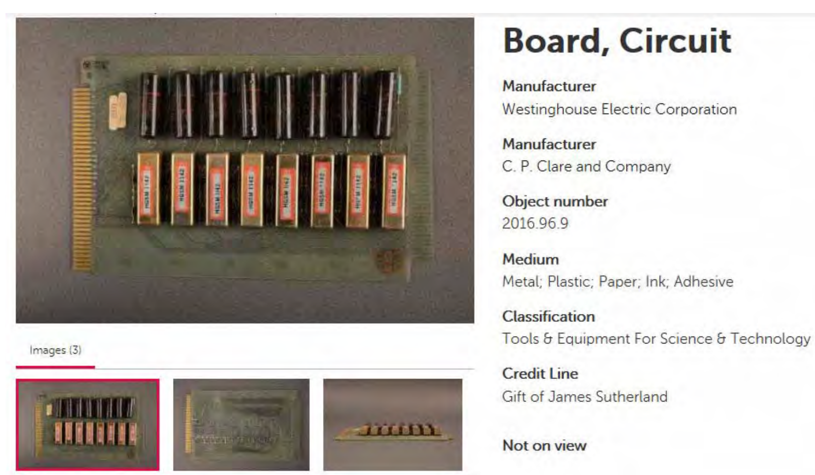


P-50/P550 Customer Terminations

Improved design of the P-50/550 terminations provided vertical channels for the field wiring so that large wires could be routed. Termination brackets were made in units called "half shells." Computer cables connected the half shells to the front edge connectors on the I/O cards on the other side of the cabinet

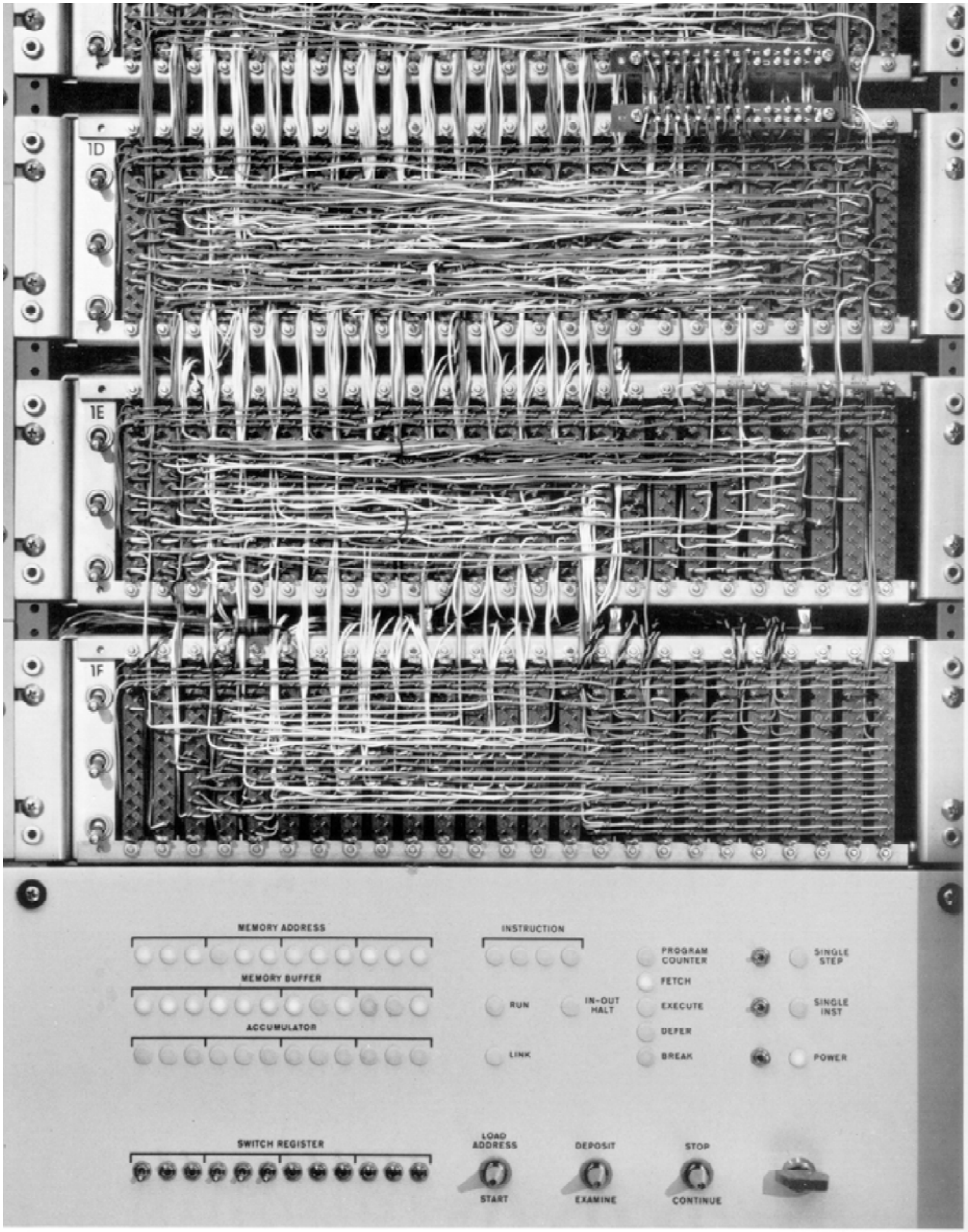
Later versions of the P550 Input/Output boards used the 42-pin connector on both ends.

Earlier P-50 I/O boards which used two 18-pin connectors from the Prodac 500 series design were compatible with the new connector.



Westinghouse Prodac 5 System

August , 1963 - The name of (W)EUCS was changed to become Westinghouse Power Control Division (W)PCD. The new manager believed that (W)CSD charges for the P-50 were too high, so he looked for a lower-cost small computer system to offer his customers. The newly introduced Digital Equipment Corp (DEC) PDP-5 computer only cost $18,000. In January, 1963, one of the first PDP-5's was delivered to (W)PCD at the (W)R&D Center, where it was mounted in (W) cabinets and became the Prodac - 5.

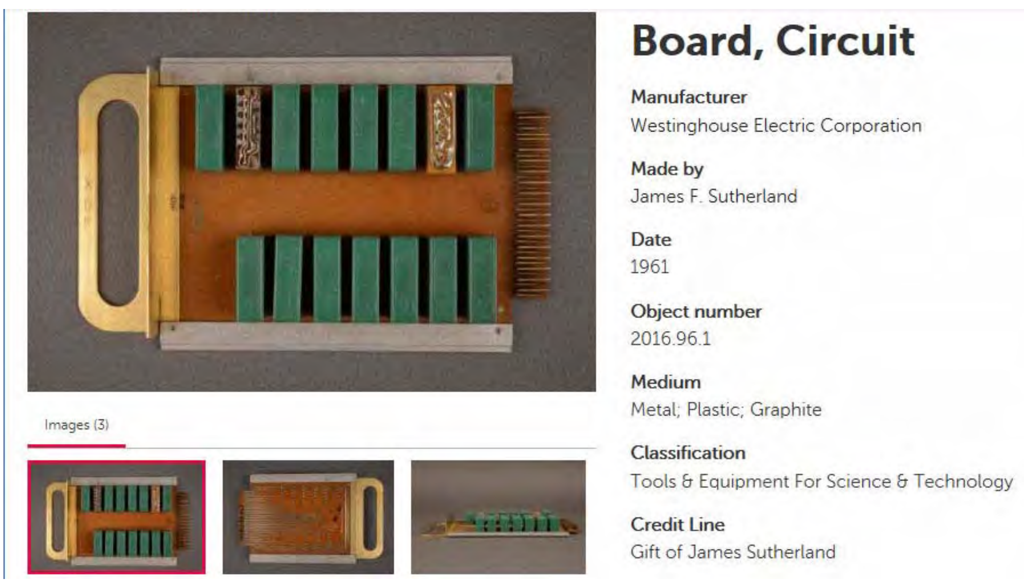


In 1964, prospective customers came to a demonstration of the Prodac-5 in the (W)PCD lab in Building 501 of the (W)R&D Center. They were impressed by what a very small computer system could do. It was programmed to speak to control room operators from encoded voice messages stored in its core memory.

A few months later, (W)CSD reduced the charge for the P-50 to (W)PCD, and the PDP-5 was dismantled and returned to DEC. The two divisions were merged in 1965.

1964 - Prodac 5

When the Prodac X at the Sewaren plant was replaced by a Prodac-500 in 1964, the circuit boards and memory system were brought back to the (W)PCD lab. Jim Sutherland asked for a property pass to take the parts home where he thought they could be made into a home computer. The Electronic Computing Home Operator (ECHO-IV) was completed in 1965 and occupied space in the Sutherland basement. Ruth is at the programmer's console while son Jay explores the memory system.



Board, Circuit

Manufacturer
Westinghouse Electric Corporation

Made by
James F. Sutherland

Date
1961

Object number
2016.96.1

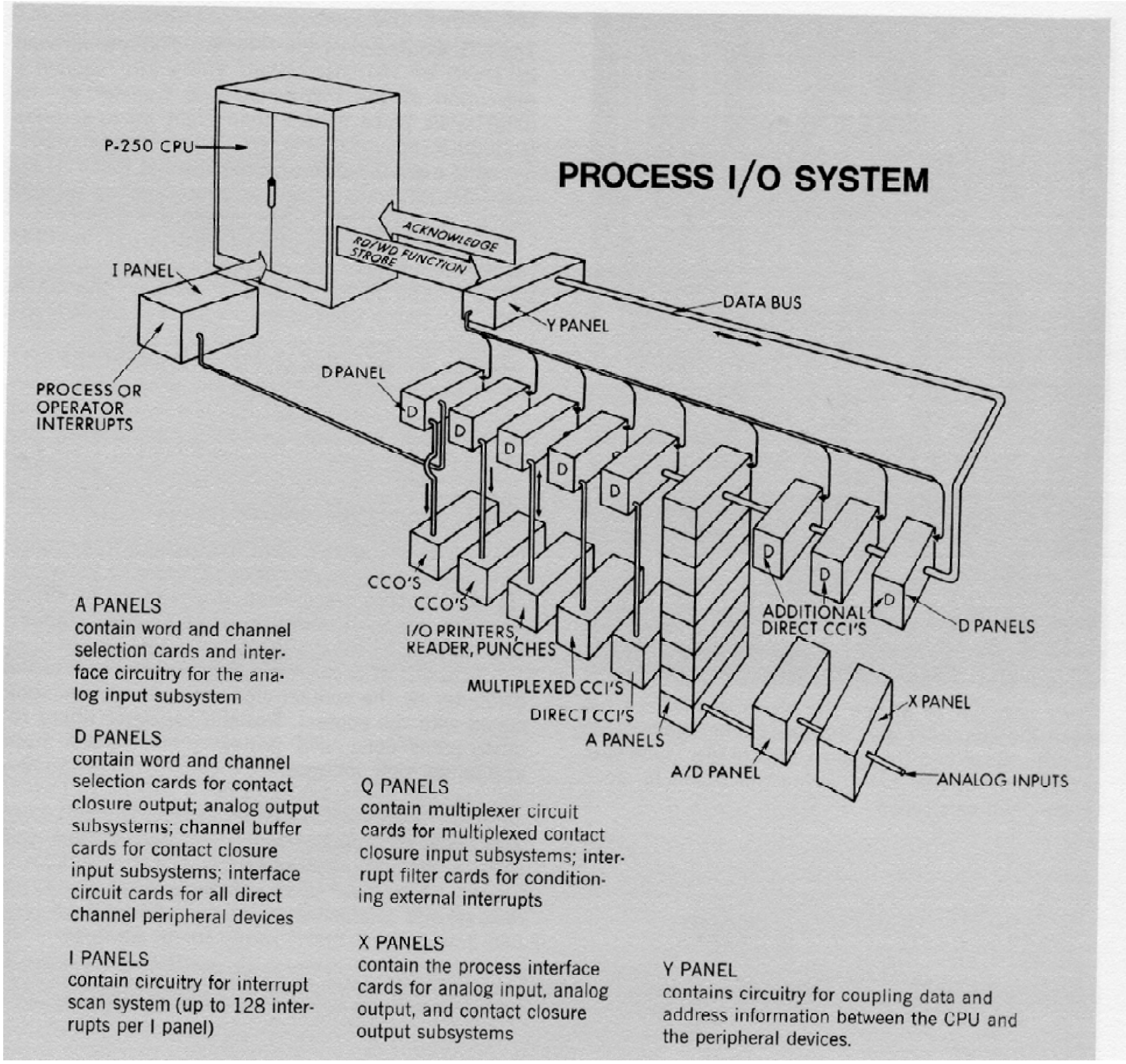
Medium
Metal; Plastic; Graphite

Classification
Tools & Equipment For Science & Technology

Credit Line
Gift of James Sutherland

The ECHO-IV system was plagued by the random failures of NOR elements. but it existed because of the Buffalo, NY "cost reduction" idea of making NORs cheaper with "V" notches.

1965 - ECHO-IV Home Computer

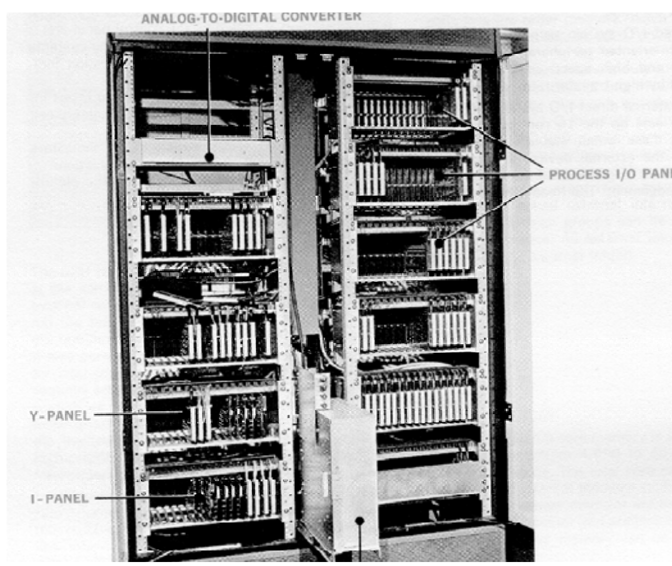


P-250 Block Diagram

The P-50 Input/Output system was added to the Scientific Data Systems (SDS) Sigma-2 computer to make the (W)ISD P-250 computer system for applications where the P-500 Series had previously been used.

A "Y" panel was designed by (W)ISD to adapt the P-50 I/O system to the Sigma-2.

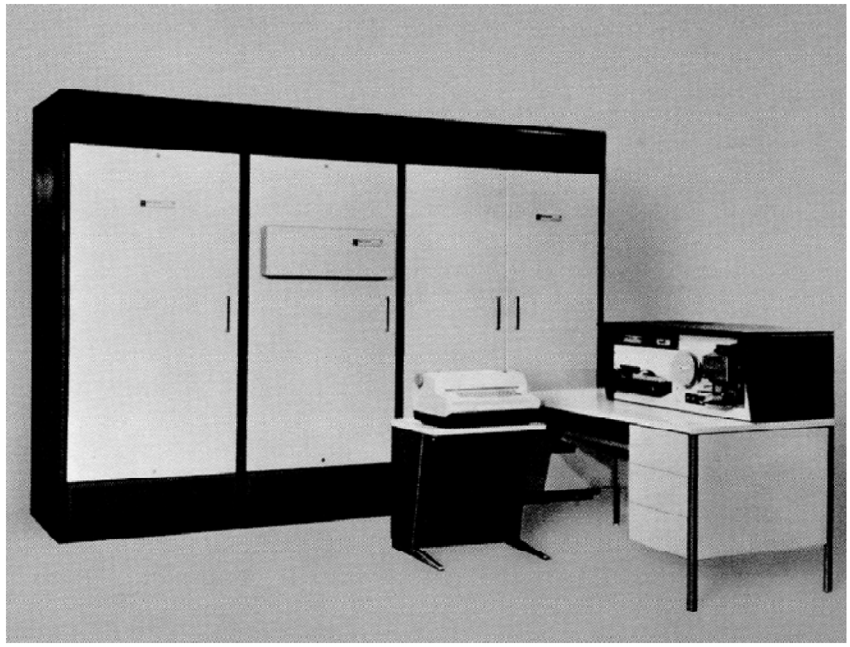
A (W)ISD "I" panel allowed process interrupts to be processed.



1967 P-250

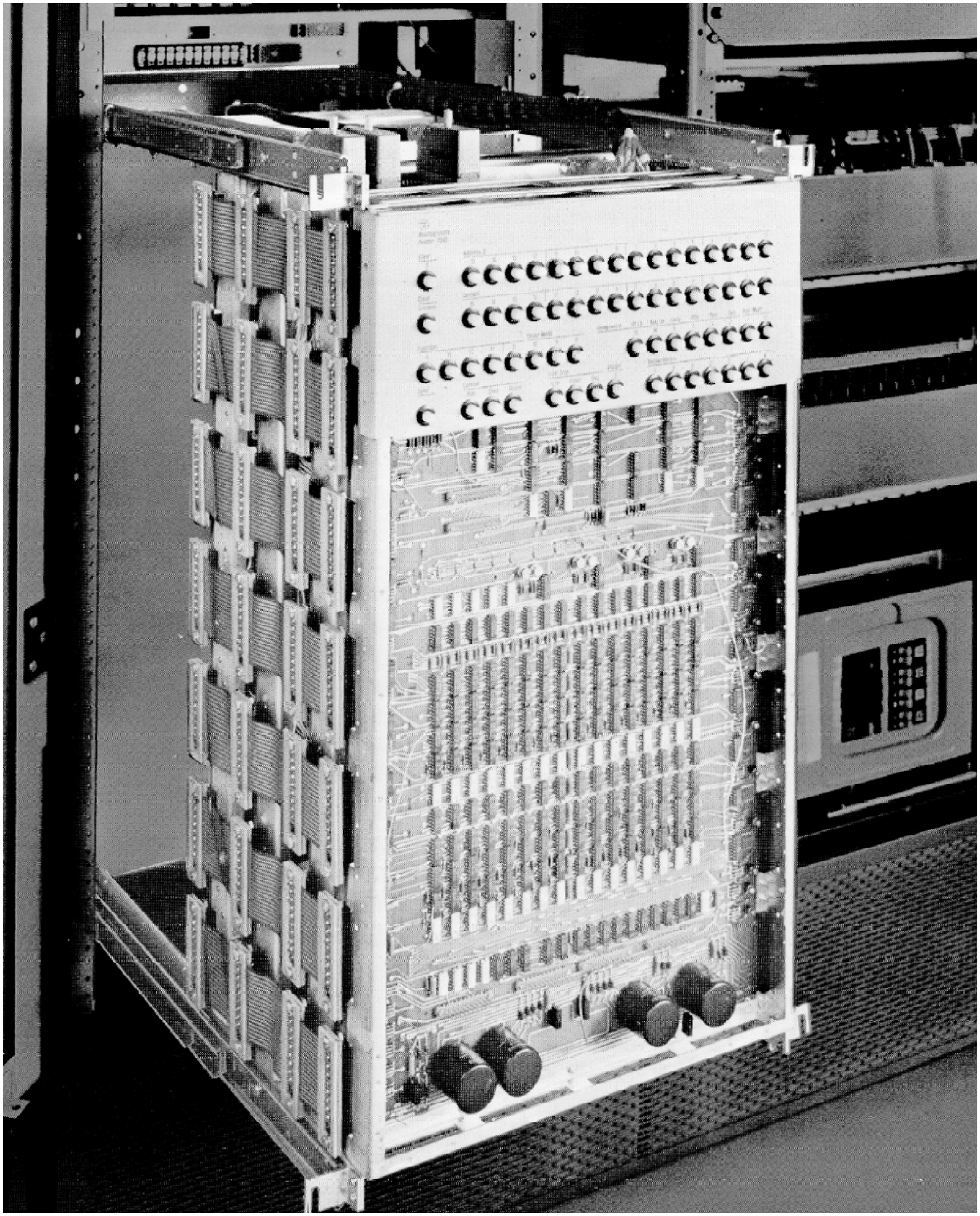
The Sigma-2 was in the cabinet behind the door with the extended panel which housed a computer maintenance panel.

The Random Access Disk (RAD) for the Sigma-2 was in the left-hand cabinet. As shown below, the RAD was huge, two feet in diameter, but it had small capacity when compared to modern hard disk drives. It stored 5 million 16-bit words.

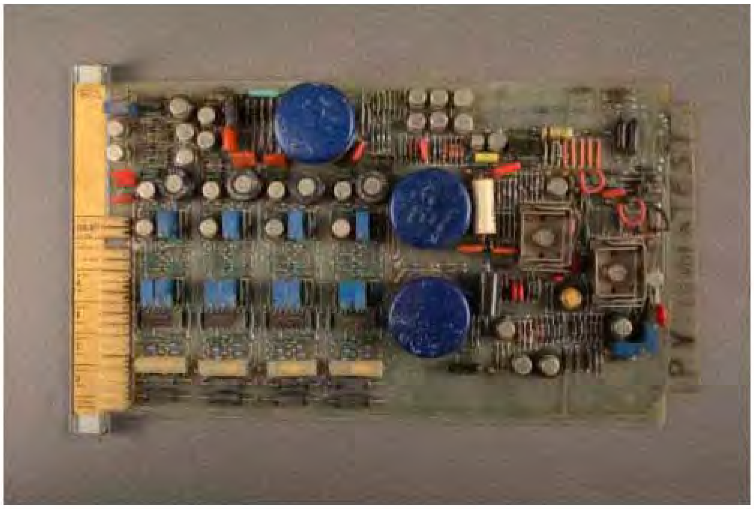


The RAD was powered by 3-phase 220-volt power and had brakes which prevented the flying-heads crashing on the disc by stopping the disc in half a revolution when power failed.

1967 P-250



The P-2000 was the last computer built by (WISD) from discrete components. Hundreds of integrated circuits were mounted on four giant printed circuit boards arranged in a vertical stack. Side connectors and ribbon cables made buses connected the boards together. When a board needed servicing, it was moved to the front of the stack, where it was accessible for test probes. Hundreds of P-2000's were sold during the 1970's.
1970 P-2000



Board, Circuit

Manufacturer
Westinghouse Electric Corporation

Object number
2016.96.8

Medium
Metal; Plastic; Ink

Classification
Tools & Equipment For Science & Technology

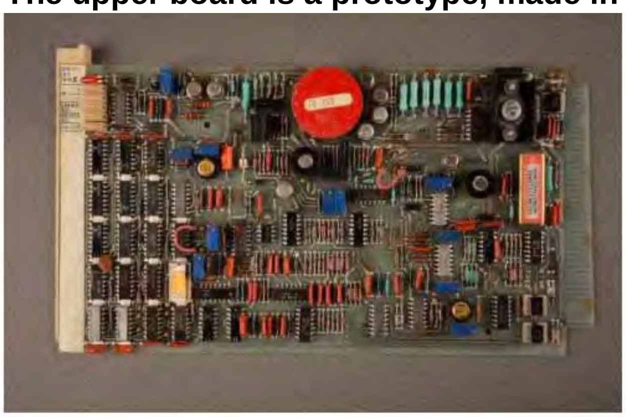
Credit Line
Gift of James Sutherland

Images (3)

Not on view

+ Description

In 1972, after the acquisition of Hagan and moving the new Industry Systems Division (W)ISD to O'Hara Township, the 7300 series of modules was designed for the Westinghouse Nuclear Systems Division (W)NSD in Monroeville. Previously, Hagan had supplied modules for PWR control systems and Protection Systems. The 7300 series used digital components, but did not use micro-computers. Therefore, the 7300 series modules continue to be used in nuclear applications. fifty years later because of their diversity.
The upper board is a prototype, made in 1972. It has a gold-plated legend on the



Board, Circuit

Manufacturer
Westinghouse Electric Corporation

Manufacturer
C. P. Clare and Company

Object number
2016.96.7

Medium
Metal; Plastic; Paper; Ink; Adhesive; Paint

Classification
Tools & Equipment For Science & Technology

Credit Line
Gift of James Sutherland

Images (3)

Not on view

front edge and a metal bracket, while the lower NTD Tracking Driver board is from later production with a white legend and a plastic mounting bracket.

1972 - 7300 Series modules

Westinghouse Electric Corporation
Computer & Instrumentation Division
Orlando, Florida 32804

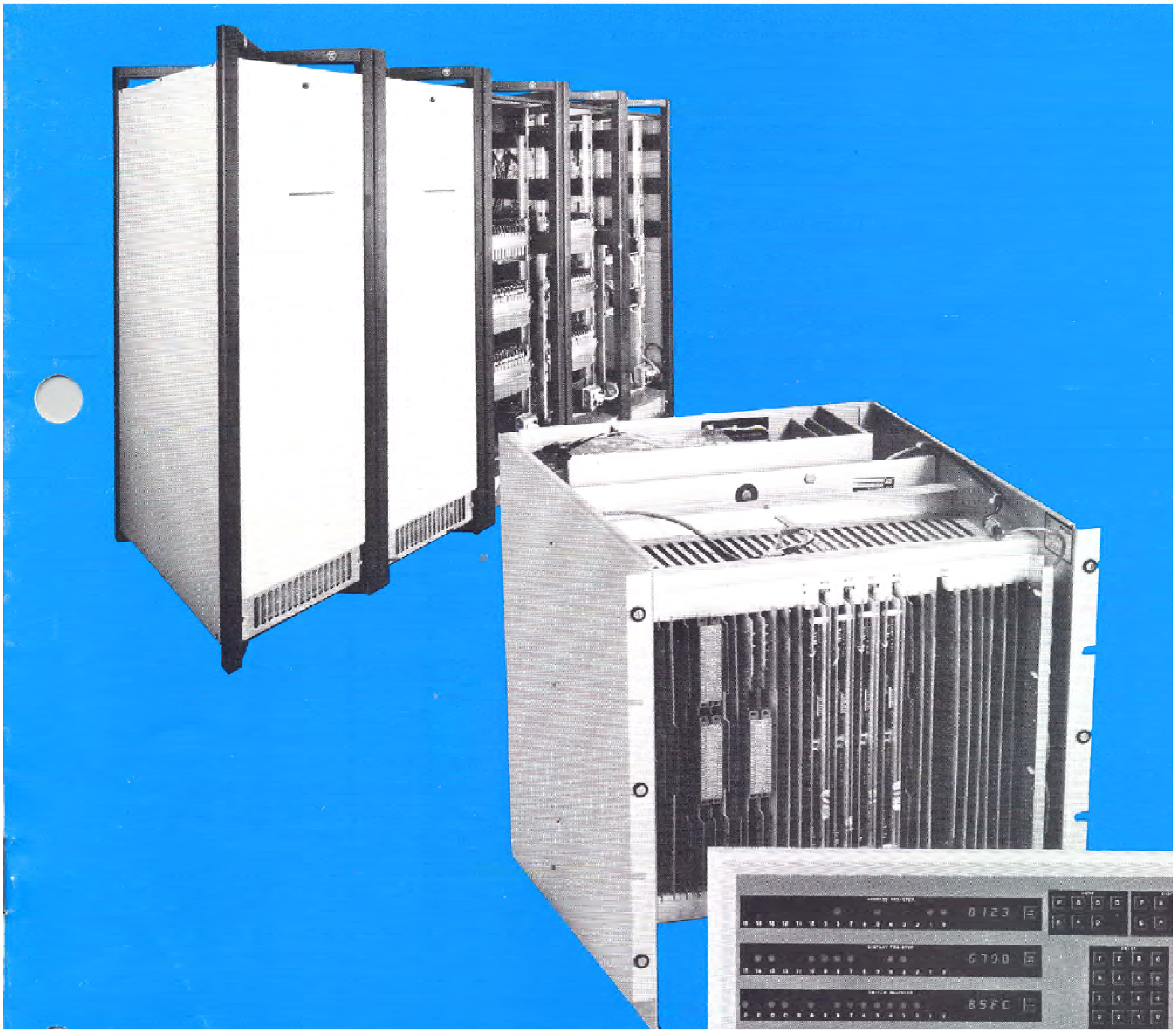
23-301 D WE A
Descriptive Bulletin

Page 1

January 1, 1976
Supersedes 23-301 D WE A
Pages 1-8 dated January 1, 1975

Central Processor Model 25CPU-04;
Memory; I/O and CPU options

Westinghouse 2500 Computer



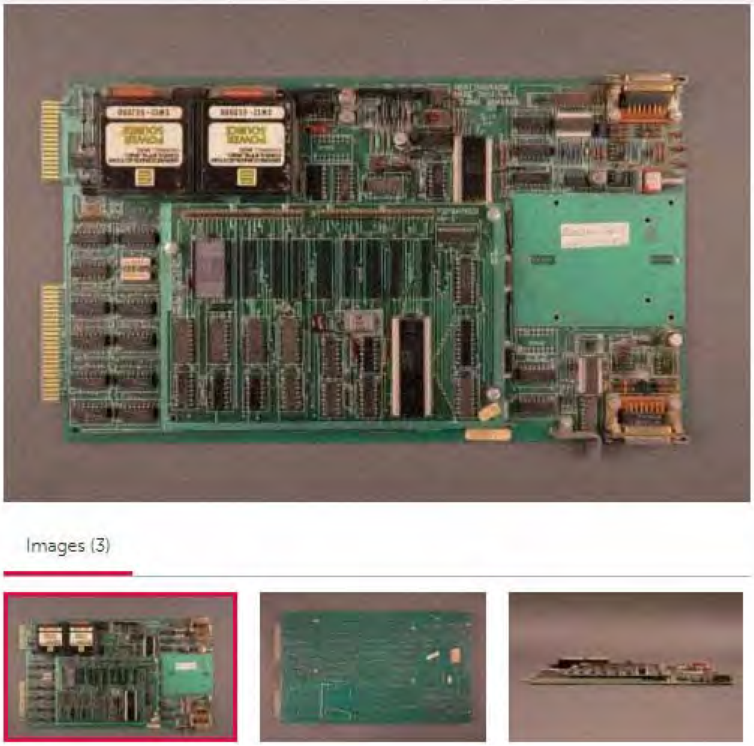
W2500 computers were designed and built at the new (W)ISD Computer Department facility in Orlando, Florida, based on the family of Intel 86xxx 16-bit micro-computers. The W2500 was a very successful product, and more than 300 were sold worldwide over the next ten years. At O'Hara Twp, (W)ISD used the W2500 computer in W25xx computer systems built there in the 1970's.

1972 W2500 Computer

1975 W2570 Computer System

W2500 computers were made in Orlando, Florida, and were used at O'Hara in computer systems called W2570. W2500 computers were also used in other complete computer systems built in Orlando.

W2500 Computer



Board, Circuit

Manufacturer
Westinghouse Electric Corporation

Manufacturer
Semiconductor Circuits, Inc.

Date
c. 1981

Object number
2016.96.3

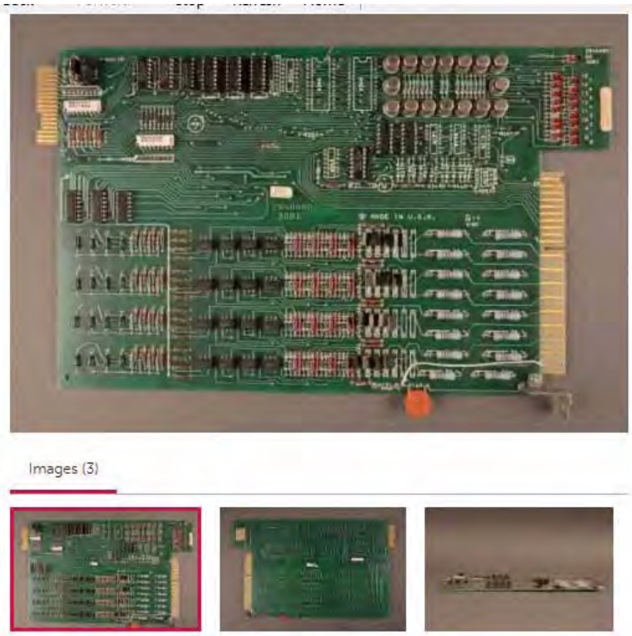
Medium
Metal; Plastic; Paper; Ink; Adhesive

Classification
Tools & Equipment For Science & Technolog

Credit Line
Gift of James Sutherland

1976 Q-Line micro-computer

The "Q-Line" modules were designed at (W)ISD for application in very small systems. 8-bit Intel microprocessors were used on the QMx cards, where Read-Only Memory (ROM) stored the control programs written at O'Hara for a specific job. Some systems needed more Random Access Memory (RAM) and ROM, so memory expansion boards were used. The Q-Line system was powered by 12-volts d.c. and followed CAMAC European design rules.



Board, Circuit

Manufacturer
Westinghouse Electric Corporation

Object number
2016.96.4

Medium
Metal; Plastic; Paper; Ink; Adhesive

Classification
Tools & Equipment For Science & Technology

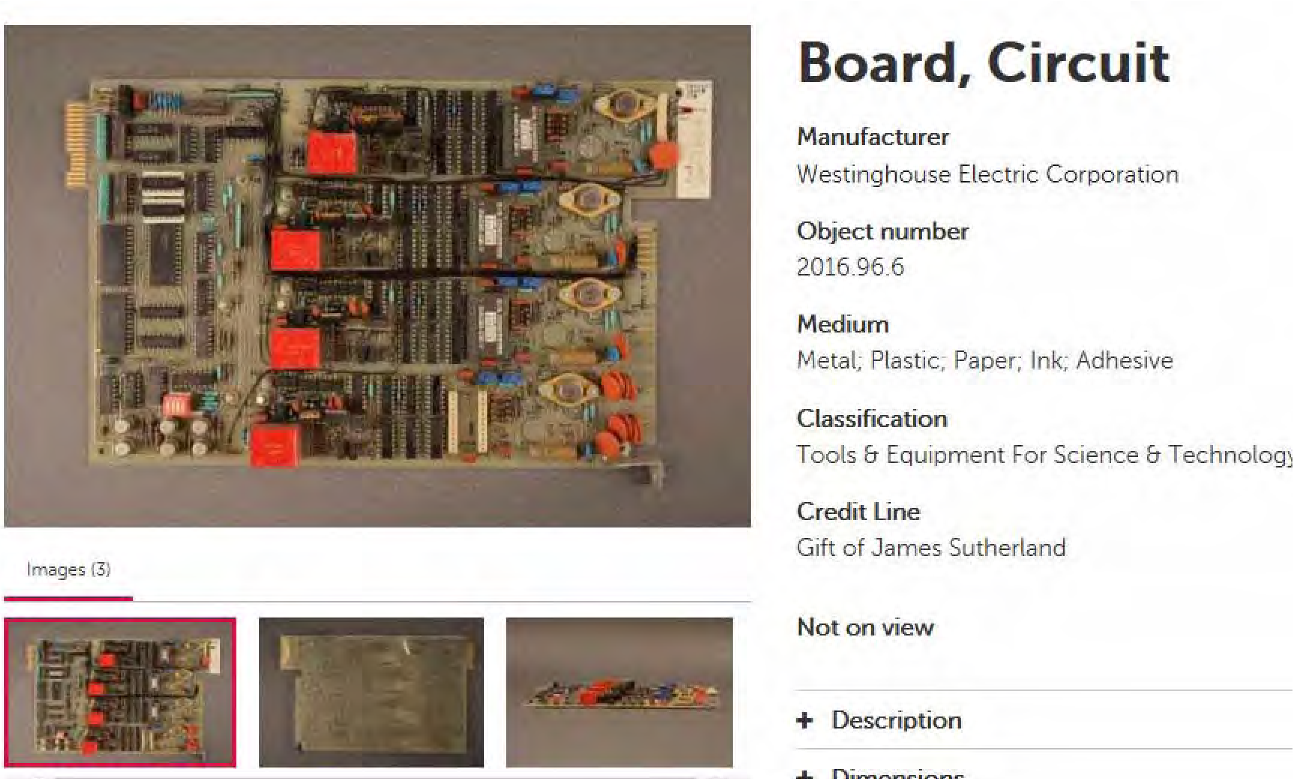
Credit Line
Gift of James Sutherland

Not on view

+ Description

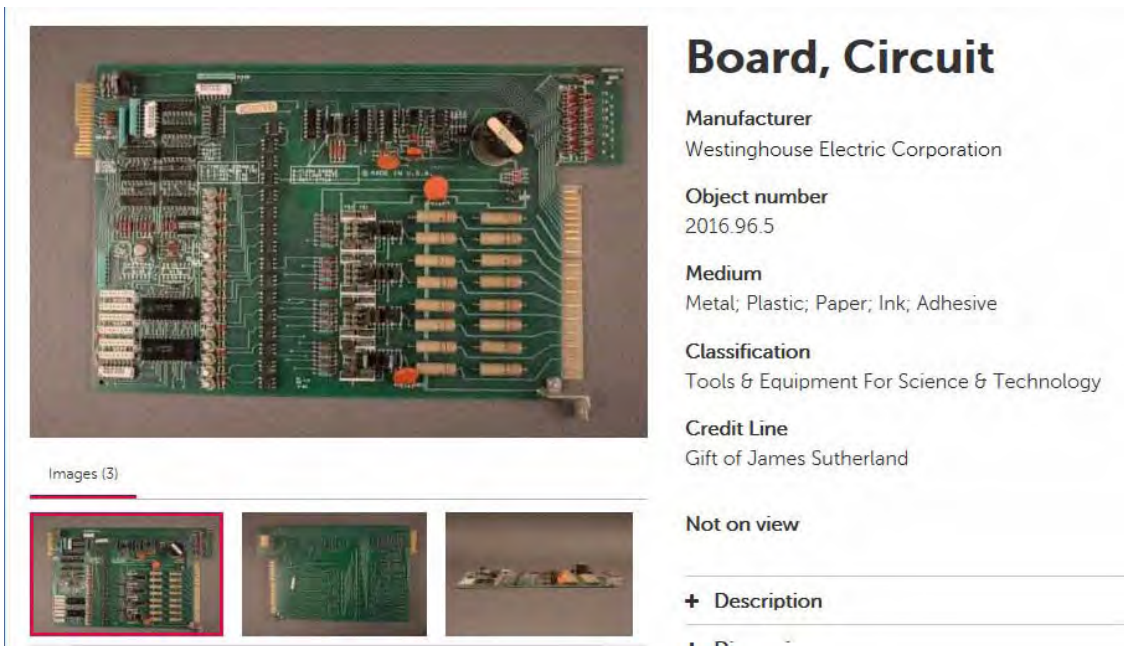
16-bit Digital input card

This is an earlier or later version of the card shown on page 28.



Analog output card

Four channels of analog outputs were provided by each of these Q-Line card. Some outputs were 0-10 volts and others were 4-20 milliampere currents for standard Instrument Society of America (ISA) modulating valves.



16-bit Digital input card

Digital input signals from the process were supplied to the Q-Line micro-computer card to maintain control.

Westinghouse Computer Systems Division
People
1960-1979

As the Westinghouse Computer Systems Division (W)CSD evolved over the years into Industry Systems Division (W)ISD, many people worked on the design, fabrication, and testing of process conrrol computer systems. The following listings are an attempt to identify them. Only four of the people who worked on the Prodac-IV prototype (Prodac-X) in Cheswick are known to be still living -- Paul Lego, Dick Madden, Jim Sutherland, and Len Szarmach.

1960 - New Products Lab in Cheswick:

The following Prodac-IV unit design assignments were made:

Computer Architecture -- Dr. R. Louis "Lou" Bright
Logic Design Manager -- Bill Ramage
Control Unit -- **Jim Sutherland**, Dr. Dick Bollinger - from R&D Math Dept
Indexing Unit -- **Jim Sutherland**, Dr. Dick Bollinger - from R&D Math Dept
Arithmetic Unit -- Clyde Booker, Dr. Terry Jeeves - from R&D Math Dept
Information Transfer System -- George Kirk - from E.Pgh
Alphanumeric Unit -- **Dick Madden** - from E.Pgh
Priority Director -- Dr. T.W. Sze, Univ. of Pittsburgh, Electrical Engrg Dept.
Power Supplies -- Bruce Dow
Magnetic Core Memory System -- Clarence Jones
Magnetic Drum Memory System -- Clarence Jones
NOR Component Tolerance Anal. -- Dr. Dick Lyman
Contact Input/Output -- E. O. Shepard - at E.Pgh
Analog Input Subsystem -- D.J. Reynolds, John Reuther - at E.Pgh
Drawings and Schematics -- Chris Litzinger, Ed Clowney, Earl Monath
Circuit Boards Fabrication -- **Len Szarmach**. Jim Barsic
Software Systems -- **Paul Lego**, Rege Herbst - from E.Pgh
Wirewrap Technicians -- Perry Hite, Steve Vargo, Bill Moore, Dick Barr, and others

1961 - (W)EUCS from East Pittsburgh and (W)NPL from Cheswick moved to new buildings 501 and 601 at the (W)R&D Center in Churchill, and (W)CSD was formed.

(W)EUCS had project responsibility for the Prodac-IV project, so during the move to (W)R&D, their engineers were in East Pittsburgh in the "L" building, doing the final check-out of the Prodac-X before it was shipped to the Sewaren plant. Rath Squires was the Engineering Manager, and S. D. Silliman was the Supervisory Engineer for the group. Paul Lego and Rege Herbst were the software engineers.

Jim Beltz
Joe Dybell
Don Noreen
D. J. Reynolds
Shep Shepard
Dave Stackpole
Jim Sutherland

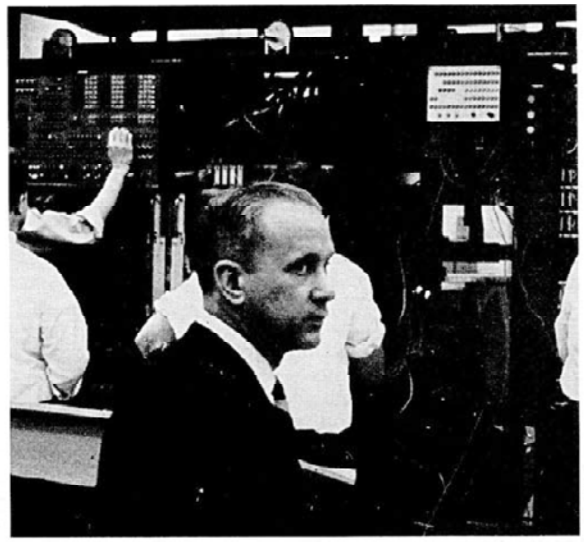
Division Personnel and Technical Capabilities

Who are the people that make up the Computer Systems Division? What is their experience? What is their background? Do they stack up with IBM, GE, TRW and other entrenched competitors? Let's look at the facts.

One of the classic ways of demonstrating superior engineering, competence in manufacturing as well as design excellence, is to point to the academic degrees which have been achieved by the members of the organization. At Computer Systems Division there certainly is no lack of degrees. Academic learning, however, can be a false guide to competence. How about experience?

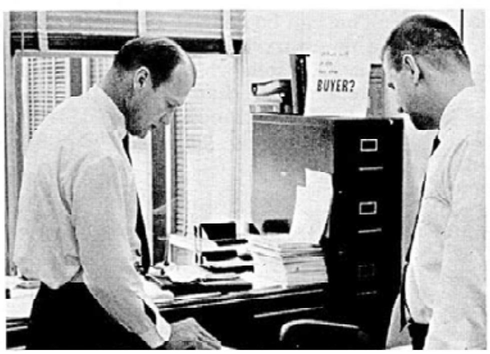
Most of the members of the organization have come from the New Products groups or from the Advanced Systems Development, Analytical Department, or from Systems Control in Buffalo. All of these organizations have had extensive experience in computers and in their applications. It would be useless to add up the total number of years of experience in computers which the Division possesses because neither the total number nor the average is a meaningful piece of information in any product line. This is particularly true in the computer business, because process control computer systems are only about 5 years old.

The Computer Systems Division is composed of the finest process control computer talent in all of Westinghouse to provide a knowledgeable, experienced, aggressive, enthusiastic, dedicated organization.



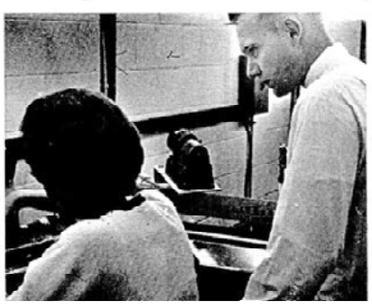
This is Paul Sprowl, General Manager of the Computer Systems Division. With experience at Sharon and East Pittsburgh, he has to call on all his experience in engineering and selling complete systems to keep Westinghouse ahead in this market.

Let's meet some of the people behind the Prodac 500



Hank Six, Sales Manager; *the* man in this Rogues Gallery *to call* on any computer question.

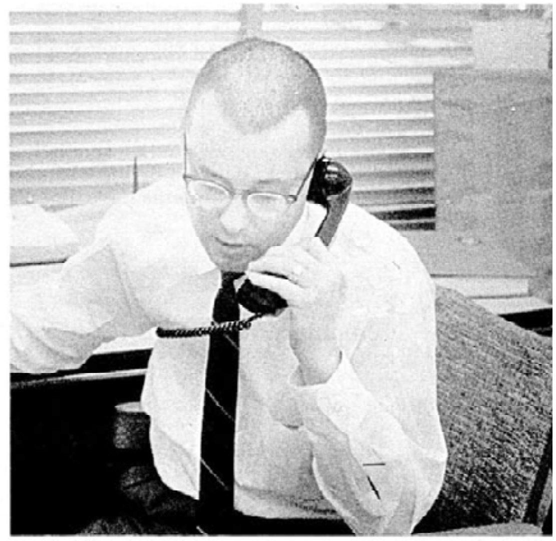
Paul Lego (left) is in charge of translating process requirements into computer programs.



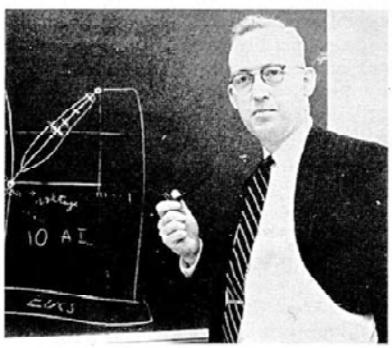
1961 - (W)CSD was formed at the (W)R&D Center in Churchill

In 1961-62, while the Prodac-IV prototype was being checked out in East Pittsburgh, other engineers from the (W)NPL design team were selected for (W)CSD.

Here is Ray Ferguson, Engineering Manager, typical of a new breed who are equally at home in the classroom, developing new hardware, discussing application problems in the customer's plant, or debating obscure mathematics with other Ph.D.'s.



Many of you have already met Marshall Brittain, Mark ing Manager. Fortunately Marshall doesn't pay his off phone bill because he has one of the most popular numb in town—calls from old buddies at Buffalo, custome salesmen, universities, IEEE, who all find the answ



Frank Willard, Advanced Engineering, who is always working for tomorrow.

Rath Squires, Design Manager, putting customers' desires into hardware.

Regis Herbst runs the Systems La where design and programs are verifi

Frank Willard, the Advisory Engineer, had worked in Buffalo on the Prodac 4449, so he was the chief designer at (W)CSD. John Deliynnides, the second person to join (W)CSD, worked with Paul Lego to design the Prodac 500 operating system and the software for the first P-580 computer system delivered for the Arizona Public Service ADDAPS in 1963.

Arnold Wayne E Jr	CSD	601-2B30	Kardos Lou	CSD	601-2B24
Arthur A J	CSD	601-2B36	Kirk George J	CSD	601-2B26
Banks R S	CSD	601-2B30	Kiss Brigitte	CSD	601-1A36
Barno Eleanor J	CSD	601-NHiBay	Kosan Mary E	CSD	601-2X18
Belz Jim C	CSD	601-2B24	Krawzak Fran	CSD	601-2B26
Blank Dave C	CSD	601-NHiBay	Lego Paul E	CSD	601-2B26B
Brinker B	CSD	601-NHiBay	Madden Richard J	CSD	601-2B26
Brittain W Marshal	CSD	601-2X18B	Matteson L Glen	CSD	601-2B30A
Burgess D R	CSD	601-2B30A	McCann John C	CSD	601-2B30
Burt Don A	CSD	601-2B24	Murphy Bates H	CSD	601-2X18
Callaghan Pat J	CSD	501-3D15	Ploeiennik F Don	CSD	601-2B24B
Cervi Donna	CSD	601-2B26A	Pollitt Joan	CSD	601-2X25
Ciccarelli D J	CSD	601-2B30	Poulsen Vaughn A D	CSD	601-2B26
Decker Richard O	CSD	601-2X18A	Powers J N	CSD	601-2B30B
Deliyannides John S	CSD	601-2B26B	Rice E A	CSD	601-NHiBay
Deramo Anhony D	CSD	601-2B30	Robertson J D	CSD	601-2B30
Dolinar Ed W	CSD	601-2B30A	Schmldt E M	CSD	601-2X18
Ehrenfeld Russ S	CSD	601-NHiBay	Setler Chuck G	CSD	601-2B26A
Fahrnkopf C Don	CSD	601-2B30	Shepard E O "Shep"	CSD	601-2B24
Fears Clois D	CSD	601-2X25	Shturtz Marlene I	CSD	601-NHiBay
Feola Donna L	CSD	601-NHiBay	Six Hank E	CSD	601-2X18C
Ferguson Ray W	CSD	601-2B24A	Smicik, Jr F	CSD	601-NHiBay
Gelorme Dianne A	CSD	601-2X18	Sprowl Paul R	CSD	601-2X27
Gomola John W	CSD	601-2B26	Squires Rath B	CSD	601-2B27
Green Art H	CSD	601-2B30A	Vansco W	CSD	601-2B26A
Herbst Rege	CSD	601-1A36	Webb Lillian	CSD	601-NHiBay
Heying Doug W	CSD	601-1A36	Willard Frank G	CSD	601-2B24
Hohmeyer R E	CSD	601-1A36	Wilson D L	CSD	601-NHiBay
Jessell Dorothy J	CSD	601-NHiBay	Zidow Tom M	CSD	601-2B26
Josephik Bill	CSD	601-NHiBay			

These names of the original employees of CSD from an R&D phone directory dated January, 1963. Initials were used for their first names in the directory, and Jim has added the names from memory 50 years later, so they may not be 100% accurate.

Most of the CSD office locations were in Building 601, with the exception of Pat Callaghan, who for some reason, was shown all by himself in 501-3D15.

The women in 601-NHiBay (North High Bay) were "wire-wrappers" who worked for Dave Blank, the foreman of the computer peripheral assemby area.

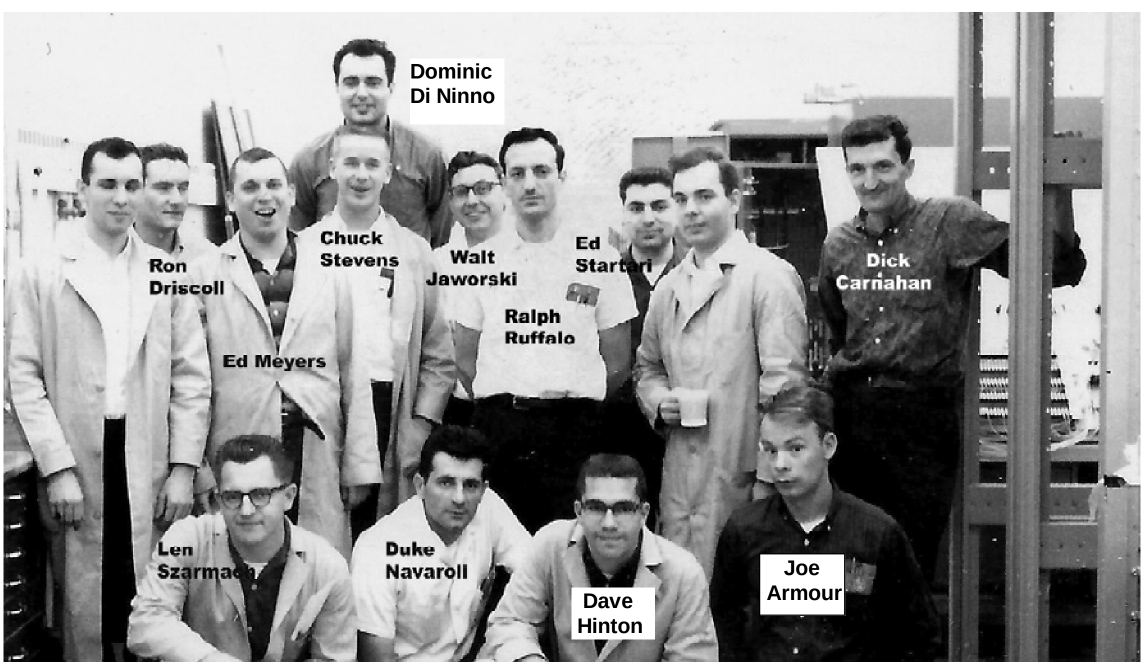
Cooper Keith R	501-3C30
Couture Paul E	501-3C30
Homberg J	501-3C30
Masterson Robert "Bat" J	501-3C30
McDermott Paul H	501-3C30
Russell Jack C	501-3C30
Shallo Frank A	501-3C30
Brockbank Jack L	501-3C32
Crane Earl D	501-3C32
Drobnitch Larry	501-3C32
Eggers Cal A	501-3C32
Hoffman Art	501-3C32
Hopkins Wally A	501-3C32
Lake Pat	501-3C32
Reeder Norma V	501-3C32
Richards Mary Ann	501-3C32
Sutherland Jim F	501-3C32
Tremaine Dick	501-3C34
Blough Gary E	501-3W5
Carnahan Dick N	501-3W5
Hall Bill G	501-3W5
Jaworski, Jr Walt H	501-3W5
Meyer E B	501-3W5
Mital R M	501-3W5
Navaroli G J "Duke"	501-3W5
Ruffolo Ralph	501-3W5
Stevens Chuck H	501-3W5
Szarmach Lenn G	501-3W5
Harper Frank J	501-3W7
McWilliams Herb H	501-3W7
Reardon Bill F	501-3W7
Ross Joann	501-3W7
Russell Lou B	501-3W7
Walsh Jim D	501-3W7
Boboth A G	501-3W9
DeRubbo Lou A	501-3W9
Knapp Jim M	501-3W9
Monath Earl F	501-3W9
Murcek Sy J	501-3W9
Oleyar Jim A	501-3W9
Roberts John C	501-3W9
Vester Bob W	501-3W9
Silliman Sheldon "Sil" D	601
Frey Andy	601-2A36
Giras Ted C	601-2A36
MacLean Jack B	601-2A36
Pope Jack R	601-2A36
Heiser Dick S	601-2A40
Kruczek R M	601-2A40
Pearson D C	601-2A40
Raczkowski Chester	601-2A40
Cappetta Patricia	601-2A42
Hackett J	601-2A42
Howell J K "Dixie"	601-2A42
Richards Bob E	601-2A42
Welsh Maury	601-2A42
Whitaker J R	602

These are the names and locations of Electric Utility Control Systems (EUCS) employees who were listed in the January, 1963 R&D phone directory.

Later in 1963, the name was changed to Power Control Divison, with Don Sauter, as General Manager. Most of the EUCS people were in Building 501.

Above - Bill Hall, the Engineer-in-Charge of the (W)EUCS Lab in 501-3W5, took this picture of the Lab Technicians in 1962. They built and tested all of the electric utility computer systems before the systems were shipped.

Below - Later, in 1963, the name of the (W)EUCS division was changed to Power Control Division (W)PCD. In 1966, (W)PCD merged with (W)CSD and the group moved to the Building 601 - North High Bay.



EUCS/PCD/CSD Locations at (W)R&D Center

(based on Westinghouse R&D Phone Directories)
Sorted by 1966Location(pri) & 1964Location(sec)

Name	January, 1963		December, 1964		February, 1966	
Moore William B			RES	601-1B59B	CSD	501-3C26
Crane Earl D	EUCS	501-3C32	PCD	501-3C30	CSD	501-3C32
Giannopoulos Tom			PCD	501-3C30	CSD	501-3C32
Nelms Warren B			PCD	501-3Y40	CSD	501-3C32
Hoffman Art G	EUCS	501-3C32	PCD	501-3Y40	CSD	501-3C34
Masterson Robert J	EUCS	501-3C30	PCD	501-3Y40	CSD	501-3C34
McDermott Paul H	EUCS	501-3C30	PCD	501-3Y40	CSD	501-3C34
Foreman Roger J			CSD	601-2B28	CSD	501-3C34
Augusty Richard M			CSD	601-NHIBAY	CSD	501-3C34
Schaer Frank R					CSD	501-3D21
Stuckey Donna					CSD	501-3D21
Benco Charlie E			CSD	501-3D21	CSD	501-3D21
Churik Don R	RES	601-2B55	CSD	501-3D21	CSD	501-3D21
Clowney Ed G	RES	601-2B33	CSD	501-3D21	CSD	501-3D21
Fisher Gloria			CSD	501-3D21	CSD	501-3D21
Ireland Norm A			CSD	501-3D21	CSD	501-3D21
Kuchinski H T	RES	601-2B55	CSD	501-3D21	CSD	501-3D21
Litzinger Chris J	RES	601-2B55	CSD	501-3D21	CSD	501-3D21
Mance Joe R	RES	501-2W9	CSD	501-3D21	CSD	501-3D21
Monath Earl F	EUCS	501-3W9	CSD	501-3D21	CSD	501-3D21
Plecs Joe			CSD	501-3D21	CSD	501-3D21
Schmandrak Steve	RES	601-2B55	CSD	501-3D21	CSD	501-3D21
Senchur Robert L	RES	601-2B55	CSD	501-3D21	CSD	501-3D21
White Richard F	RES	601-1B59A	CSD	501-3D21	CSD	501-3D21
Cilli E P			PCD	501-3W9	CSD	501-3D21
DeRubbo Lou A	EUCS	501-3W9	PCD	501-3W9	CSD	501-3D21
Knapp Jim M	EUCS	501-3W9	PCD	501-3W9	CSD	501-3D21
Murcek Sy J	EUCS	501-3W9	PCD	501-3W9	CSD	501-3D21
Roberts John C	EUCS	501-3W9	PCD	501-3W9	CSD	501-3D21
Couture Paul E	EUCS	501-3C30	PCD	501-3C30	CSD	501-3D33
Stackpole Dave A			PCD	501-3C34	CSD	501-3D33
Belz Jim C	CSD	601-2B24	CSD	501-3D21	CSD	501-3D33
Farley Earl T			CSD	501-3D21	CSD	501-3D33
Madden Rich J	CSD	601-2B26	CSD	501-3D21	CSD	501-3D33

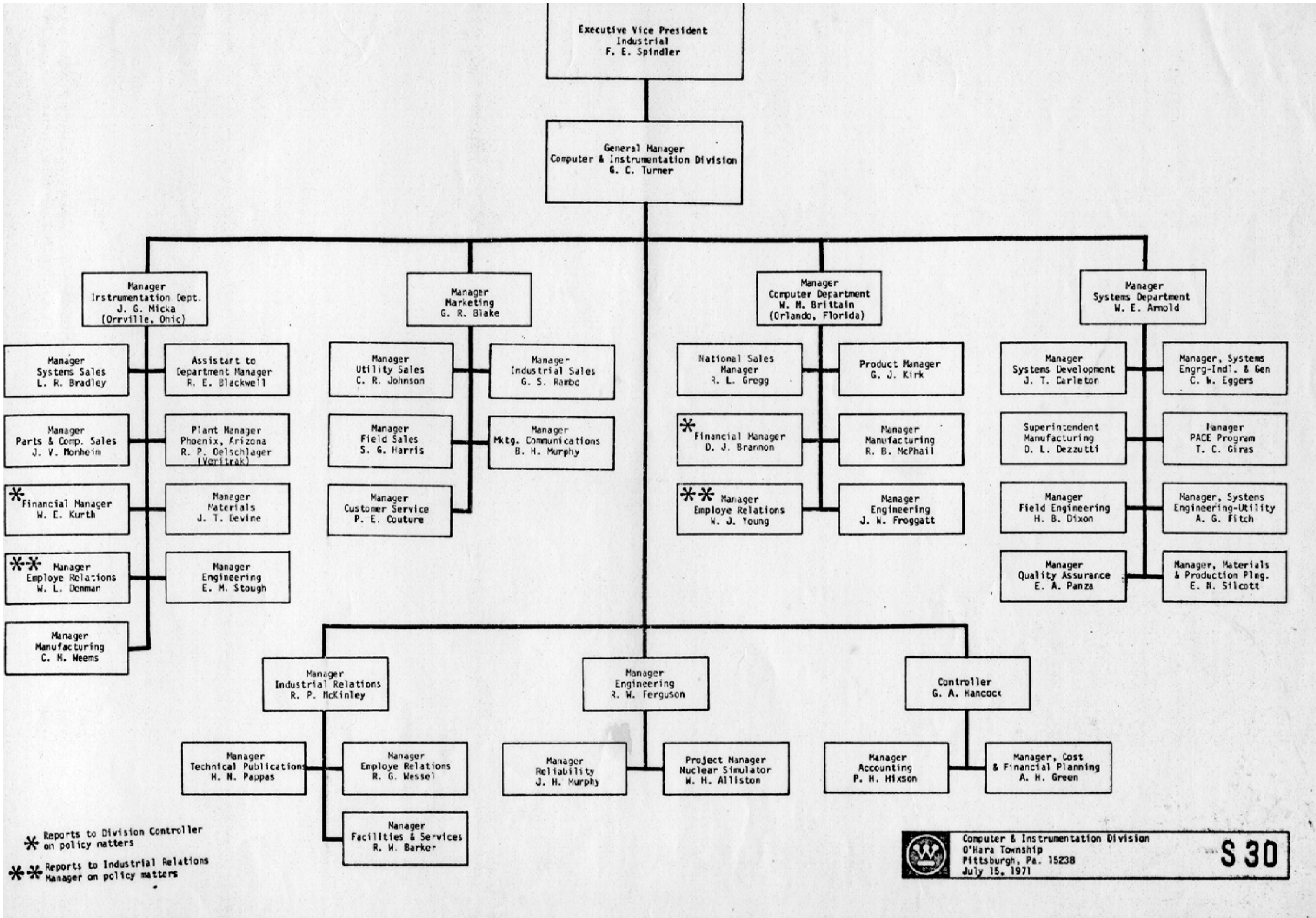
Sutherland Jim F	EUCS	501-3C32	CSD	501-3D21	CSD	501-3D33
Vesely Maryann			CSD	501-3D21	CSD	501-3D33
Willard Frank G	CSD	601-2B24	CSD	501-3D21	CSD	501-3D33
Froggatt Jack W			PCD	501-3Y31	CSD	501-3D33
Noreen Don H			PCD	501-3Y40	CSD	501-3D33
Reuther John F			PCD	501-3Y40	CSD	501-3D33
Hays L M			CSD	601-1A36	CSD	501-3D33
O'Hare Emmett E			CSD	601-1A36	CSD	501-3D33
Obenour Joanne E			CSD	601-2A40	CSD	501-3D33
Phillippi Joanne (Obenour)			CSD	601-2A40	CSD	501-3D33
Vetter Carole			CSD	601-2A40	CSD	501-3D33
Wachter Roberta			CSD	601-2A40	CSD	501-3D33
Pesavento Joe A	ISD	602	ISD	601-2B36	CSD	501-3W9
Difrango Al			ISD	601-2B37	CSD	501-3W9
Fitch Arch G	IND	601-2B40	CSD	602	CSD	501-3W9
Schmidt Warren J			PCD	501-3Y34	CSD	501-3Y34
Ferguson Ray W	CSD	601-2B24A	CSD	601-2B24	CSD	501-3Y34
Klingensmith Dolly	RES	501-1Y64	CSD	601-2B24	CSD	501-3Y34
Squires Rath B	CSD	601-2B27	CSD	501-3D21	CSD	501-3Y36
Silliman Sheldon D	EUCS	601	PCD	501-3C30	CSD	501-3Y38
Giras Ted C	EUCS	601-2A36	PCD	501-3C34	CSD	501-3Y38
Cheppa Ed			PCD	501-3Y38	CSD	501-3Y38
Frey Andy	EUCS	601-2A36	PCD	501-3Y38	CSD	501-3Y38
Heiser Richard S	EUCS	601-2A40	PCD	501-3Y38	CSD	501-3Y38
Hoover Ray C			PCD	501-3Y38	CSD	501-3Y38
Howard Ralph L			PCD	501-3Y38	CSD	501-3Y38
Marano Russ T			PCD	501-3Y38	CSD	501-3Y38
Scott Anthony I			PCD	501-3Y38	CSD	501-3Y38
Selmeczy Julius G			PCD	501-3Y38	CSD	501-3Y38
Yuile Edna			PCD	501-3Y38	CSD	501-3Y38
Blough Gary E	EUCS	501-3W5	PCD	501-3C34	CSD	501-3Y40
Brigante V A			PCD	501-3C34	CSD	501-3Y40
Lake Pat	EUCS	501-3C32	PCD	501-3C34	CSD	501-3Y40
Moley R M			PCD	501-3C34	CSD	501-3Y40
McCann John C	CSD	601-2B30	CSD	501-3D21	CSD	501-3Y40
Turner G Chris					CSD	601-2A23
Pollitt Joan	CSD	601-2X25	CSD	601-2A23	CSD	601-2A23
Murphy Jim H			PCD	501-3C34	CSD	601-2A34

Arnold Wayne E	CSD	601-2B30	CSD	601-1B35	CSD	601-2A34
Getchen J Garry			CSD	601-1B35	CSD	601-2A36
Hewitt Jim L			CSD	501-3D21	CSD	601-2A38
Green Art H	CSD	601-2B30A	CSD	601-2A34	CSD	601-2A38
Reynolds D J			PCD	501-3C30	PTL	601-2A62
Goldbach R J			CSD	501-2D21	CSD	601-2B10
Burt Don A	CSD	601-2B24	CSD	501-3D21	CSD	601-2B10
Balog R A			CSD	601-2A38	CSD	601-2B10
Graham J F			CSD	601-2B26	CSD	601-2B10
Shepard Emer Oren	CSD	601-2B24	CSD	501-3D21	CSD	601-2B24
Deliyannides John S	CSD	601-2B26B	CSD	601-2A34	CSD	601-2B24
Kilgore Gordon	RES	601-2A56	CSD	601-2B24	CSD	601-2B24
Lego Paul E	CSD	601-2B26B	CSD	601-2X23	CSD	601-2B24
Mark H	RES	401-3X8	CSD	601-2X25	CSD	601-2B24
Smith A W JR	ISD	601-2Y17T	ISD	601-2Y17T	CSD	601-2B24
Deramo Anthony D	CSD	601-2B30	CSD	501-3D21	CSD	601-2B26
Hudson Glen C			CSD	501-3D21	CSD	601-2B26
Hopkins Wally A	EUCS	501-3C32	PCD	501-3Y40	CSD	601-2B26
Dolinar Ed W	CSD	601-2B30A	CSD	601-2B26	CSD	601-2B26
Gomola John W	CSD	601-2B26	CSD	601-2B26	CSD	601-2B26
Kosco Mike A			CSD	601-2B26	CSD	601-2B26
Matteson L Glen	CSD	601-2B30A	CSD	601-2B26	CSD	601-2B26
Robertson T L			CSD	601-2B26	CSD	601-2B26
Wood Wm G			CSD	601-2B26	CSD	601-2B26
Gundlach W W			CSD	601-2B28	CSD	601-2B28
Cominio Art R			CSD	501-3D21	CSD	601-2B30
Stevens Chuck H	EUCS	501-3W5	PCD	501-3W5	CSD	601-2B30
Virostek Paul A			CSD	601-1A36	CSD	601-2B30
Setler Chuck G	CSD	601-2B26A	CSD	601-2B26	CSD	601-2B30
Bollinger R R			CSD	601-2B28	CSD	601-2B30
Forquer T J			CSD	601-2B28	CSD	601-2B30
Weaver Michael A	ISD	2B30	CSD	601-2X12	CSD	601-2B30
Hall Bill G	EUCS	501-3W5	PCD	501-3W7	CSD	601-2B09
Eggers Calvin A	EUCS	501-3C32	PCD	501-3Y40	CSD	601-2X12
Reardon Bill F	EUCS	501-3W7	PCD	501-3W7	CSD	601-2X18

Craig Floyd B	RES	601-1B59	CSD	601-2X18	CSD	601-2X18
Endean Ralph J	RES	601-2T17T	CSD	601-2X18	CSD	601-2X18
Gimesky Marie A			CSD	601-2X18	CSD	601-2X18
Raczkowski Chester	EUCS	601-2A40	PCD	501-3Y38	CSD	601-2Y17Q
Putman Richard E					CSD	601-2Y17R
Carlson Norm R					CSD	601-2Y17T
Carnahan Richard S	EUCS	501-3W5	PCD	501-3W5	CSD	601-N HIBAY
Di Ninno Dominic A			PCD	501-3W5	CSD	601-N HIBAY
Jaworski, Jr Walt H	EUCS	501-3W5	PCD	501-3W5	CSD	601-N HIBAY
McElroy J M			PCD	501-3W5	CSD	601-N HIBAY
Navaroli G J (Duke)	EUCS	501-3W5	PCD	501-3W5	CSD	601-N HIBAY
Ruffolo Ralph	EUCS	501-3W5	PCD	501-3W5	CSD	601-N HIBAY
Silvasy R P			PCD	501-3W5	CSD	601-N HIBAY
Startari Ed J			PCD	501-3W5	CSD	601-N HIBAY
Szarmach Len G	EUCS	501-3W5	PCD	501-3W5	CSD	601-N HIBAY
Holden Paul R			PCD	501-3W7	CSD	601-N HIBAY
McWilliams Herbert H	EUCS	501-3W7	PCD	501-3W7	CSD	601-N HIBAY
Lucot Jack JR			CSD	601-N HBAY	CSD	601-N HIBAY
Barker Richard B			CSD	601-N HIBAY	CSD	601-N HIBAY
Blank Dave A	CSD	601-NHiBay	CSD	601-N HIBAY	CSD	601-N HIBAY
Brendlinger Alberta			CSD	601-N HIBAY	CSD	601-N HIBAY
Buckley Gordon W	RES	601-1B19	CSD	601-N HIBAY	CSD	601-N HIBAY
Callaghan Pat J	CSD	501-3D15	CSD	601-N HIBAY	CSD	601-N HIBAY
Davis Jack A			CSD	601-N HIBAY	CSD	601-N HIBAY
Dezzutti Donald L	RES	601-1B59	CSD	601-N HIBAY	CSD	601-N HIBAY
Dillon Ed C			CSD	601-N HIBAY	CSD	601-N HIBAY
Ehrenfeld Russ S	CSD	601-NHiBay	CSD	601-NHIBAY	CSD	601-N HIBAY
Faychak Robert M			CSD	601-N HIBAY	CSD	601-N HIBAY
Josephik William	CSD	601-NHiBay	CSD	601-N HIBAY	CSD	601-N HIBAY
Longenecker Robert S			CSD	601-N HIBAY	CSD	601-N HIBAY
McBride Robert F (Flash)	RES	401-BA60	CSD	601-N HIBAY	CSD	601-N HIBAY
McKenny Vern			CSD	601-N HIBAY	CSD	601-N HIBAY
Panza Ed A Jr			CSD	601-N HIBAY	CSD	601-N HIBAY
Parrish Dan R			CSD	601-N HIBAY	CSD	601-N HIBAY
Skena Ray E	RES	501-2E26	CSD	601-N HIBAY	CSD	601-N HIBAY
Smicik, Frank Jr	CSD	601-NHiBay	CSD	601-N HIBAY	CSD	601-N HIBAY
Spataro A J			CSD	601-N HIBAY	CSD	601-N HIBAY
Steel Jim L	RES	501-3Y48	CSD	601-N HIBAY	CSD	601-N HIBAY
Wilson D L	CSD	601-NHiBay	CSD	601-N HIBAY	CSD	601-N HIBAY
Zigarovich J M (Ziggy)	RES	501-2D9	CSD	601-N HIBAY	CSD	601-N HIBAY
Hudgens Ed E			PCD	501-3C30	CSD	602
Mendez William E			PCD	501-3C32	CSD	602

Russell Lou B	EUCS	501-3W7	PCD	501-3C32	CSD	602
Ploeiennik F Donald	CSD	601-2B24B	CSD	501-3D21	CSD	602
Walsh Jim D	EUCS	501-3W7	PCD	501-3W7	CSD	602
Cappetta Patricia	EUCS	601-2A42	PCD	501-3Y40	CSD	602
Russell Jack C	EUCS	501-3C30	PCD	501-3Y40	CSD	602
Fears Clois D	CSD	601-2X25	CSD	601-2B25	CSD	602
Berkey Lila J			CSD	602	CSD	602
Brittain W Marshal	CSD	601-2X18B	CSD	602	CSD	602
Buxton Vester S	ISD	601-2B40	CSD	602	CSD	602
Canfield Ed G			CSD	602	CSD	602
Fox Ed C			CSD	602	CSD	602
Gelorme Dianne A	CSD	601-2X18	CSD	602	CSD	602
Keenon Delbert L			CSD	602	CSD	602
Murphy Bates H	CSD	601-2X18	CSD	602	CSD	602
Radcliffe Phil S			CSD	602	CSD	602
Torello A P			CSD	602	CSD	602
West Ray G			CSD	602	CSD	602

Jim Sutherland   Frank Willard   Cal Eggers   Hank Six   Shep Shepard   Jim Carleton   Arch Fitch


Executive Vice President
Industrial
F. E. Spindler
General Manager
Computer & Instrumentation Division
G. C. Turner
Manager
Instrumentation Dept.
J. G. Micka
(Orrville, Ohio)
Manager
Systems Sales
L. R. Bradley
Assistant to
Department Manager
R. E. Blackwell
Manager
Parts & Comp. Sales
J. V. Monheim
Plant Manager
Phoenix, Arizona
R. P. Oelschlager
(Veritrak)
* Financial Manager
W. E. Kurth
Manager
Materials
J. T. Devine
** Manager
Employe Relations
W. L. Denman
Manager
Engineering
E. M. Stough
Manager
Manufacturing
C. N. Weems
Manager
Marketing
G. R. Blake
Manager
Utility Sales
C. R. Johnson
Manager
Industrial Sales
G. S. Rambo
Manager
Field Sales
S. G. Harris
Manager
Mktg. Communications
B. H. Murphy
Manager
Customer Service
P. E. Couture
Manager
Computer Department
W. M. Britain
(Orlando, Florida)
National Sales
Manager
R. L. Gregg
Product Manager
G. J. Kirk
* Financial Manager
D. J. Brannon
Manager
Manufacturing
R. B. McPhail
** Manager
Employe Relations
W. J. Young
Manager
Engineering
J. W. Froggatt
Manager
Systems Department
W. E. Arnold
Manager
Systems Development
J. T. Carleton
Manager, Systems
Engrg-Indl. & Gen
C. W. Eggers
Superintendent
Manufacturing
D. L. Dezzutti
Manager
PACE Program
T. C. Giras
Manager
Field Engineering
H. B. Dixon
Manager, Systems
Engineering-Utility
A. G. Fitch
Manager
Quality Assurance
E. A. Panza
Manager, Materials
& Production Plng.
E. H. Silcott
Manager
Industrial Relations
R. P. McKinley
Manager
Technical Publications
H. N. Pappas
Manager
Employe Relations
R. G. Wessel
Manager
Facilities & Services
R. W. Barker
Manager
Engineering
R. W. Ferguson
Manager
Reliability
J. H. Murphy
Project Manager
Nuclear Simulator
W. H. Alliston
Controller
G. A. Hancock
Manager
Accounting
P. H. Hixson
Manager, Cost
& Financial Planning
A. H. Green
* Reports to Division Controller on policy matters
** Reports to Industrial Relations Manager on policy matters
Computer & Instrumentation Division
O'Hara Township
Pittsburgh, Pa. 15238
July 15, 1971
S 30

Engineer C. A. Booker and Technician L. G. Szarmach run an optimizing control test to achieve the highest profit rate for a simulated chemical distillation process.

The New Products Laboratories help the Westinghouse engineer verify his theories

The engineer at Westinghouse can rely on the New Products Laboratories to help verify his theories. These laboratories at Cheswick, Pennsylvania, contain a group of advanced engineering development personnel who can converse in both the language of the fundamental scientist and of the designer.

These laboratories, through their diverse scientific activities, aid the work of engineers in all departments of the corporation and provide a means to convert theory into proven equipment. Among the many projects which have come into being through the New Products Laboratories are thermoelectric power generation, thermoelectric refrigation, ultrasonic cleaning, and OPCON, a new concept in process control systems. OPCON (optimizing control) has proven successful in the chemical processes industry. Other possible applications include the petroleum, steel and paper industries.

The young engineer at Westinghouse isn't expected to know all the answers . . . our work is often too advanced for that. Instead, his abilities and knowledge are backed up by specialists like those in the New Products Laboratories.

If you have ambition and ability, you can have a rewarding career with Westinghouse. Our broad product line, decentralized operations, and diversified technical assistance provide hundreds of challenging opportunities for talented engineers.

Want more information? Write today to Mr. L. H. Noggle, Westinghouse Educational Department, Ardmore and Brinton Roads, Pittsburgh 21, Pennsylvania.

YOU CAN BE SURE...IF IT'S

Westinghouse

This 1958 advertisement from the *Cooperative Engineer* magazine featured Clyde Booker and Len Szarmach with OPCON, a digital optimizing controller for chemical processes. It was several years before (W)CSD was formed, but it shows why the New Products Laboratory was selected to design and build the Prodac-IV computer in 1960.

PROCESS CONTROL DIVISION
O'HARA SITE PHONE DIRECTORY
February 23, 1993

In 1989, the Westinghouse divisions at O'Hara and Monroeville merged to form the Process Control Division (PCD), with headquarters at 200 Beta Drive, in the RIDC Park in O'Hara Twp. The name, (W)PCD, should not be confused with the name of the Power Control Division, which joined (W)CSD at the R&D Center in 1965.

The following phone list shows the names of 889 (W)PCD employees who were working at O'Hara on February 23, 1993.

When compared with the 1993 (W)PCD listing, the 1963 R&D Center phone list for (W)CSD and (W)EUCS (which became the Power Control Division later in 1963) identifies twelve employees who were still building computer systems after 30 years of service.

Gordon Buckley	EUCS	Just-In-Time Process Engineering
Pat Callahan	CSD	Renewal Parts
Don Churik	EUCS	Applications Drafting
Jack Davis	EUCS	Just-In-Time Process Engineering
Lou Derubbo	EUCS	Design and Drafting Services
Russ Ehrenfeld	CSD	Test Engineering
Walt Jaworski	EUCS	System Test
John McCann	CSD	Test Engineering Manager
Bill Josefick	EUCS	Test Engineering
Frank Smicik	EUCS	Test Engineering
Jim Sutherland	EUCS	Protection Systems Engineering
Len Szarmach	EUCS	WISCO Computer Applications

Jim Sutherland and Len Szarmach retired in April, 1993, and the "Process Control Division" was sold to Emerson Electric in 1998, for $265 million. In 2002, Emerson renamed the O'Hara Twp PCD site, "Process Management Power and Solutions."

ANSELL	LORA	LLA	241-4285	OHA	ACCOUNTING SEC
LARKIN	DEBORAH	D L	241-4871	OHA	ACCOUNTING SECRETARY
BENCO	CHARLES	CEB	241-4945	OHA	APPLICATIONS DRAFTING
BIRES	JAMES	JAB	241-4738	OHA	APPLICATIONS DRAFTING
BLANEY	JOHN	JKB	241-4405	OHA	APPLICATIONS & PROPOSALS
BOYD	GREG	G B	241-4403	OHA	APPLICATIONS & PROPOSALS
BOYD	RONALD	R B	241-4686	OHA	APPLICATIONS DRAFTING
CEPULL	LINDA	L C	241-4738	OHA	APPLICATIONS DRAFTING
CHRISTOFORETTI	CATHY	CJC	241-4451	OHA	APPLICATIONS & PROPOSALS SEC
CHURIK	DONALD	ORC	241-4944	OHA	APPLICATIONS DRAFTING
COLBORN	E(DICK)	ERC	241-4300	OHA	APPLICATIONS & PROPOSALS MGR

DANZIGER	HENRY	HDD	241-4670	OHA	APPLICATIONS & PROPOSALS
DASCN	JOYCE	JD	241-3670	OHA	APPLICATIONS & PROPOSALS
DOBROWOLSKI	DAVID	DAD	241-4555	OHA	APPLICATIONS DRAFTING
EDWARDS	DEAN	D E	241-4436	OHA	APPLICATIONS & PROPOSALS
ENGLAND	NORMAN	NIE	241-4944	OHA	APPLICATIONS DRAFTING
FRASER	GREG	G F	241-4738	OHA	APPLICATIONS DRAFTING
GENBERG	PAM	P G	241-4738	OHA	APPLICATIONS DRAFTING
GUERRIERI	PHILIP	P G	241-4844	OHA	APPLICATIONS DRAFTING
HARRBY	KENNETH	KRW	241-4945	OHA	APPLICATIONS DRAFTING
LAI	STEVE	S L	241-4162	OHA	APPLICATIONS & PROPOSALS
MANCE	JOSEPH	JRM	241-4945	OHA	APPLICATIONS DRAFTING
MARANDWSKI	DAVID	D M	241-4945	OHA	APPLICATIONS DRAFTING
POPENDIEKER	WALTER	WPP	241-4738	OHA	APPLICATIONS DRAFTING
RICHARDSON	ROBERT	RCR	241-4945	OHA	APPLICATIONS DRAFTING
SCHAER	FRANK	FRS	241-4945	OHA	APPLICATIONS DRAFTING
SCHEESTEL	MARK	MCS	243-4738	OHA	APPLICATIONS DRAFTING
SELLMAN	JOHN	JLS	241-4738	OHA	APPLICATIONS DRAFTING
SHARP	MARK	MSS	241-4738	OHA	APPLICATIONS DRAFTING
SIMONCIC	DONALD	DAS	241-4738	OHA	APPLICATIONS DRAFTING
SMITH	MARVIN	MGS	241-4738	OHA	APPLICATIONS DRAFTING
SOLEMA	JOHN	JFS	241-4930	OHA	APPLICATIONS DRAFTING MGR
BENNERMAN	CAROL	CJB	241-4759	OHA	CABINET ASSEMBLY
BODY	THOMAS	TRB	241-4759	OHA	CABINET ASSEMBLY
BRACCO	MARY	MEB	241-4759	OHA	CABINET ASSEMBLY
BROWN	JAMES	JEB	241-4759	OHA	CABINET ASSEMBLY
BROWN	LINDA	LSB	241-4759	OHA	CABINET ASSEMBLY
CAPPONE	ANDREW	ALC	241-4759	OHA	CABINET ASSEMBLY
COLE	GARY	GNC	241-4759	OHA	CABINET ASSEMBLY
COURY	FRANCES	FLC	241-4759	OHA	CABINET ASSEMBLY
DEL VECCHIO	CHERYL	CAD	241-4759	OHA	CABINET ASSEMBLY
GARDNER	D(GARY)	DOG	241-4759	OHA	CABINET ASSEMBLY
GRAHAM-CLINE	SUSAN	S G	241-4759	OHA	CABINET ASSEMBLY
HARVEY	KENNETH	KAH	241-4759	OHA	CABINET ASSEMBLY
HILL	LYNN	LRH	241-4759	OHA	CABINET ASSEMBLY
KALTENBOCK	KAREN	KLK	241-4759	OHA	CABINET ASSEMBLY
LEE	CHARLES	CTL	241-4759	OHA	CABINET ASSEMBLY
MANNING	JACQUELINE	JGM	241-4759	OHA	CABINET ASSEMBLY
MARSHALL	DEIDRE	DAM	241-4759	OHA	CABINET ASSEMBLY
MONFREDI	MICHAEL	MPM	241-4759	OHA	CABINET ASSEMBLY
NANC1	JOAN	JTN	241-4759	OHA	CABINET ASSEMBLY
NEVOLNIK	J(DAVID)	JDN	241-4759	OHA	CABINET ASSEMBLY
PETTY JR	JOHN	JAP	241-4759	OHA	CABINET ASSEMBLY
RHULE	CARL	CWR	241-4759	OHA	CABINET ASSEMBLY
ROTTO, JR	JOHN	JJR	241-4759	OHA	CABINET ASSEMBLY
SKENA	RON	RES	241-4759	OHA	CABINET ASSEMBLY
SMITH	DARRYL	DDS	241-4759	OHA	CABINET ASSEMBLY
STANGA	DENNIS	D S	241-4759	OHA	CABINET ASSEMBLY
STOVES	ROY	RWS	241-4759	OHA	CABINET ASSEMBLY
TRUVER	THOMAS	TET	241-4759	OHA	CABINET ASSEMBLY

WILKERSON	STEPHEN	SGW	241-4759	OHA	CABINET ASSEMBLY
WILLIAMS	LEVY	LMW	241-4759	OHA	CABINET ASSEMBLY
WILLIAMS	ROSE	RMW	241-4759	OHA	CABINET ASSEMBLY
BUCZKOWSKI	DENISE	DEB	241-4034	OHA	CARD TEST
DUFFY	JAMES	JMD	241-4034	OHA	CARD TEST
HAVELKA	RON	R H	241-4034	OHA	CARD TEST
KELTZ	MIKE	M K	241-4034	OHA	CARD TEST
KEPLINGER	MICHAEL	MEK	241-4034	OHA	CARD TEST
LAGER	TIMOTHY	TJL	241-4034	OHA	CARD TEST
LAVER	PATRICK	PAL	241-4034	OHA	CARD TEST
LOGAN	ARTHUR	A L	241-4034	OHA	CARD TEST
LYNCH	MARGARET	MAL	241-4034	OHA	CARD TEST
RAY	KEN	KPR	241-4034	OHA	CARD TEST
RETTIG	ERIC	E R	241-4034	OHA	CARD TEST
SNYDER	RICK	RLS	241-4034	OHA	CARD TEST
TODD	GARY	GMT	241-4034	OHA	CARD TEST
TORISKY	MARK	M T	241-4863	OHA	CARD TEST
TVRDOVSKY	RONALD	RLT	241-4034	OHA	CARD TEST
WALIGURA	DANIEL	D W	241-4034	OHA	CARD TEST
ENGLAND	WILLIAM	WEE	566-2907	OHA	CENTRAL REGION SALES MGR
FREEMAN	PAULA	PJF	241-4619	OHA	CENTRAL RECORDS
KOVACS	MARILYN	M K	241-4469	OHA	CNTL INFO SYS INTEGRATION
MENTEN	CHARLES	CHM	241-4286	OHA	CNTL INFO SYS INTEGRATION
MICHEL	DIANNE	DEM	241-4506	OHA	CNTL INFO SYS INTEGRATION
PATNESKY	JAMES	J P	241-4358	OHA	CNTL INFO SYS INTEGRATION
SCHILLING	STEVE	S S	241-3688	OHA	CNTL INFO SYS INTEGRATION
SIMPSON	GREGORY	GJS	241-3968	OHA	CNTL INFO SYS INTEGRATION
VLAH	CARYL	CLV	241-3979	OHA	CNTL INFO SYS INTEGRATION SEC
MOORE	BETH	BAN	241-3972	OHA	COMMUNICATION SPECIALIST
NAUGHTON	MIKE	MTN	241-4490	OHA	COMPENSATION EMPL SVCS MGR
BAER	JOHN	J B	241-4390	OHA	COMPUTER SYSTEMS
BIER	KAREN	KEB	241-4726	OHA	COMPUTER SYSTEMS
BRADLEY	RICK	RAB	241-4662	OHA	COMPUTER SYSTEMS
BREIDE	BOB	BJB	241-4682	OHA	COMPUTER SYSTEMS
FINLAY	KEVIN	K F	241-3655	OHA	COMPUTER SYSTEMS
GEORGE	AUBREY	ANG	241-4722	OHA	COMPUTER SYSTEMS
KANG	SAM	S K	241-3827	OHA	COMPUTER SYSTEMS
KOSKI	SUE	SMK	241-4911	OHA	COMPUTER SYSTEMS
KUCZINSKI	BOB	BTK	241-4674	OHA	COMPUTER SYSTEMS
LEAHY	WILLIAM	WEL	241-4346	OHA	COMPUTER SYSTEMS MGR
LUCHS	ROBERT	RJL	241-4638	OHA	COMPUTER SYSTEMS
MURPHY	JOSEPH	J M	241-4691	OHA	COMPUTER SYSTEMS
NODVIK	RICHARD	RJN	241-4290	OHA	COMPUTER SYSTEMS
PAINTER	KAREN	K P	241-4741	OHA	COMPUTER SYSTEMS
POLLARD	ED	E P	241-4760	OHA	COMPUTER SYSTEMS
RANKIN	BILL	BDR	241-4864	OHA	COMPUTER SYSTEMS
REED	DAVE	DAR	241-4848	OHA	COMPUTER SYSTEMS
SHAW	LEE	L S	241-4845	OHA	COMPUTER SYSTEMS

SHOUPE	JUDY	JAS	241-4228	OHA	COMPUTER SYSTEMS
STORMER	DALE	D S	241-3647	OHA	COMPUTER SYSTEMS
BLONAR	JANIS	JAB	241-3865	OHA	CONTRACT MANAGEMENT
CARICATO	FRANK	F C	241-4424	OHA	CONTRACT MANAGEMENT
FULLEN	JOHN	JCF	241-3978	OHA	CONTRACT MANAGEMENT
STRONG	JOHN	JHS	241-4466	OHA	CONTRACT MANAGEMENT
BURGOON	FRANCIS	F B	241-4591	OHA	CONTROL ENGINEERING
CAPANI	INNOCENZO	I D	241-4661	OHA	CONTROL ENGINEERING
COTTEN	DAVID	D C	241-3965	OHA	CONTROL SYSTEMS ENGINEERING
EDBLAD	WARREN	WAE	241-4660	OHA	CONTROL ENGINEERING MGR
GANCAS	ROBERT	RAG	241-2711	OHA	CONTROL ENGINEERING
GUTMAN	JERRY	J G	241-4914	OHA	CONTROL ENGINEERING
HARSHBERGER	JOEL	JEH	241-3907	OHA	CONTROL SYSTEMS ENGINEERING
HAWKINS	MARIANN	M H	241-4398	OHA	CONTROL SYSTEMS ENGINEERING
HAYES	FRED	FEH	241-4669	OHA	CONTROL ENGINEERING
HERRON	PATRICK	P H	241-4667	OHA	CONTROL ENGINEERING
IVAN	G, PAUL	G I	241-4142	OHA	CONTROL SYSTEMS ENGINEERING
JURCZAK	JOHN	JAJ	241-4877	OHA	CONTROL SYSTEMS ENGINEERING
KLEIN	FRED	F K	241-4518	OHA	CONTROL ENGINEERING
MALVESTUTO	MICHAEL	M M	241-4556	OHA	CONTROL ENGINEERING
MATOUSEK	FRANK	FJM	241-2729	OHA	CONTROL ENGINEERING
MOSCHAK	LISA	L M	241-4105	OHA	CONTROL SYSTEMS ENGINEERING
POLLINS	JOSEPH	JAP	241-3904	OHA	CONTROL SYSTEMS ENGINEERING
ROSLUND	CHARLES	CJR	241-4212	OHA	CONTROL SYSTEMS ENGINEERING
SHOPE	AMY	A S	241-4275	OHA	CONTROL ENGINEERING
SHROLL	NANCY	N S	241-4622	OHA	CONTROL ENGINEERING
SLOBADA	JOHN	JRS	241-3758	OHA	CONTROL SYSTEMS ENGINEERING
SMEE	ROBERT	RAS	241-3871	OHA	CONTROL SYSTEMS ENGINEERING
SMITH	CHUCK	C S	241-4878	OHA	CONTROL SYSTEMS ENGINEERING
STAAD	CARL	CJS	241-4677	OHA	CONTROL ENGINEERING
TAKACS	DAVE	D T	241-4579	OHA	CONTROL ENGINEERING
TREBLOW	MARSHALL	M T	241-4653	OHA	CONTROL ENGINEERING
VENKAT	PADMA	P V	241-4907	OHA	CONTROL ENGINEERING
VENKATESAN	MAHARAJ	M V	241-3963	OHA	CONTROL SYSTEMS ENGINEERING
VUKOTICH	JANET	JLV	241-4334	OHA	CONTROL SYSTEMS ENGINEERING
RITZ	EDWARD	EBR	241-4502	OHA	CONTROLLER
BORGO	JOHN	JAB	241-4573	OHA	COST ACCOUNTING
CURRY	NORMA	NJC	241-4587	OHA	COST ACCOUNTING
EHNI	GERALD	GEE	241-4572	OHA	COST ACCOUNTING
FANTUZZO	D(ROXANNE)	DRF	241-4571	OHA	COST ACCOUNTING
FERICH	ANGELA	AJF	241-4583	OHA	COST ACCOUNTING
LAMB	JONATHON	JKL	241-4315	OHA	COST ANALYSIS MGR
ROBBINS	DEBBIE	DAR	241-4235	OHA	COST ACCOUNTING
SARVER	DAN	D S	241-4589	OHA	COST ACCOUNTING
CHIUSANO	SUE	S C	241-4120	OHA	CREDIT UNION OFFICE
LEASURE	LES	L L	241-4057	OHA	CUSTODIAL SERVICES MGR
SUWALSKI	IRENE	I S	241-4057	OHA	CUSTODIAL SERVICES
ANSILIO	JOSEPH	JFA	241-4570	OHA	CUSTOMER ORDER ADMIN MGR

BROZICK	TERRY	TFB	241-4854	OHA	CUSTOMER ORDER ADMINISTRATION
DOUMONT	DANNY	DJD	241-3911	OHA	CUSTOMER TRAINING
ENGELHARD	ROBERT	RCE	241-3914	OHA	CUSTOMER TRAINING
FLAHERTY	MIKE	M F	241-4767	OHA	CUSTOMER ORDER ADMIN
HARSHMAN	ANN	AGH	241-4258	OHA	CUSTOMER ORDER ADMINISTRATION
HEINL	GLENN	GLH	241-3835	OHA	CUSTOMER TRAINING
HILL	JOANN	JAH	241-3841	OHA	CUSTOMER ORDER ADMINISTRATION
HOCHBERG	RICHARD	RLH	241-4423	OHA	CUSTOMER ORDER ADMINISTRATION
KOHN	ROBERT	RPK	241-4808	OHA	CUSTOMER ORDER ADMINISTRATION
KONDIS	DAVE	D K	241-3923	OHA	CUSTOMER ORDER ADMINISTRATION
LEE	DONNA	DSL	241-4584	OHA	CUSTOMER ORDER ADMIN
LUCOT	JOHN	J L	241-3912	OHA	CUSTOMER TRAINING
MARCUS	MARC	M M	241-2755	OHA	CUSTOMER TRAINING
MORGAN	JAMES	JNM	241-3982	OHA	CUSTOMER TRAINING
OVERMYER	RAY	RAO	241-3991	OHA	CUSTOMER TRAINING
PISON	JOHN	J P	241-3935	OHA	CUSTOMER TRAINING
RIGGS	LINDA	L R	241-4236	OHA	CUSTOMER ORDER ADMIN
SATZGER	ROBERT	RJS	241-3925	OHA	CUSTOMER ORDER ADMINISTRATION
SCHOOHE	REMY	R S	241-3964	OHA	CUSTOMER TRAINING
SIBOLE	ROBERT	R S	241-3908	OHA	CUSTOMER TRAINING
SMITH	DAWN	DLS	241-3720	OHA	CUSTOMER TRAINING DEPT SEC
SMITH (RANDY)	DALTON	DRS	241-4517	OHA	CUSTOMER ORDER ADMIN
SZELC	THADDEUS	TES	241-3733	OHA	CUSTOMER TRAINING
TIMMERMAN	ROBERT	RLT	241-4252	OHA	CUSTOMER ORDER ADMINISTRATION
WICKLUND	SUZANNE	SMW	241-4592	OHA	CUSTOMER ORDER ADMIN
ADLOF	JAMES	JPA	241-4739	OHA	DESIGN & DRAFTING SERVICES
APPEL	JOSEPH	J A	241-4632	OHA	DESIGN & DRAFTING SERVICES
BLAIR	LARRY	LAB	241-4627	OHA	DESIGN & DRAFTING SVCS
CATHELL	RONALD	RJC	241-4628	OHA	DESIGN & DRAFTING SVCS
DERUBBO	LOUIS	LAD	241-4945	OHA	DESIGN & DRAFTING SVCS
DISPENZA	FRANK	FJO	241-4122	OHA	DESIGN & DRAFTING SVCS
GILLOTT	HOWARD	HJG	241-4620	OHA	DESIGN & DRAFTING SVC MGR
KISSELL	ROBERT	RTK	241-4172	OHA	DESIGN & DRAFTING SVCS
PHIPPS	VIRGINIA	V P	241-4102	OHA	DESIGN & DRAFTING SVCS SEC
SINGLETON	DALE	DCS	241-4984	OHA	DESIGN & DRAFTING SVCS
STRAIN	KENNETH	KRS	241-4642	OHA	DESIGN & DRAFTING SVCS
VOKES	ARTHUR	AJV	241-4617	OHA	DESIGN & DRAFTING SVCS
WASSEL	RICHARD	ROW	841-4942	OHA	DESIGN & DRAFTING SVCS
SANCHEZ	HERMAN	B S	241-4901	OHA	DIRECTOR BUSINESS DEV EUROPE
GRUBER	LEN	L G	241-4455	OHA	EASTERN REGION SALES
KOVACS	RICHARD	RFK	421-0294	OHA	EASTERN REGION SALES
SWARTZ	DAN	D S	241-4452	OHA	EASTERN REGION SALES
BRANNAGAN	DEBBI	D B	241-4482	OHA	EMPLOYEE SERVICES SEC
BROGNERI	ANITA	ASB	241-4483	OHA	EMPLOYEE SERVICES SEC
CHARLTON	RENEE	R C	241-4481	OHA	EMPLOYEE RELATIONS & DEV SEC
CONNELLY	RITA	RKC	241-4456	OHA	EMPLOYEE RELATIONS & DEV SEC
KOLENClK	LYNN	L K	241-4233	OHA	EMPLOYEE DEV SPECIALIST
MILLER	TIM	T M	241-4484	OHA	EMPLOYEE RELATIONS & DEV MGR
EMARK	LARRY	LWE	241-2703	OHA	EMS PROJECTS

BINSTOCK	MORTON	MHB	241-4404	OHA	ENERGY APPLICATIONS MKTG
CIKOVIC	ELIZABETH	EMC	241-4919	OHA	ENERGY APPLICATIONS MKTG
DIXON	GARY	GMD	241-4446	OHA	ENERGY APPLICATIONS MKTG
ENNIS	TAMALYN	T E	241-4357	OHA	ENERGY APPLICATIONS MKTG
FRANKS	THOMAS	TJF	241-3672	OHA	ENERGY APPLICATIONS MKTG
GOLDBERG	ROBERT	RLG	241-3997	OHA	ENERGY APPLICATIONS MKTG
KARL	LAWRENCE	LJK	241-4270	OHA	ENERGY SYS APPLICATIONS MGR
KELLY	PAUL	PDK	241-4316	OHA	ENERGY APPLICATIONS MKTO
LIPPERT	GREGORY	G L	241-4147	OHA	ENERGY APPLICATIONS MKTG
MCNAVISH	DAVID	DEM	241-4093	OHA	ENERGY APPLICATIONS MKTG
SMOKONICB	PAULA	PTS	241-3867	OHA	ENERGY APPLICATIONS MKTG
TURKOWSKI	ANNE	AET	241-3938	OHA	ENERGY APPLICATIONS MKTG
WEIGAND	THOMAS	TJW	241-4859	OHA	ENERGY APPLICATIONS MKTG
ANDERSON	MARK	MDA	241-4457	OHA	ENERGY/UTILITY PROJECTS
AYA	L(GABE)	LGA	241-4255	OHA	ENERGY/UTILITY PROJ.
BEVERIDGE	ROBERT	RAB	241-4813	OHA	ENERGY/UTILITY PROJECTS
BUCHHOLZ	RON	RWB	241-4169	OHA	ENERGY/UTILITY PROJECTS
BUKOWSKI	JAMES	JMB	241-4842	OHA	ENERGY/UTILITY PROJECTS
CHRISTENSON	PATRICIA	PMC	241-4317	OHA	ENERGY/UTILITY PROJECTS
COOK	DAVID	DSC	241-4758	OHA	ENERGY/UTILITY PROJECTS
FENNEL	ALAN	A F	241-4941	OHA	ENERGY/UTILITY PROJECTS
HRYCKO	BOB	B H	241-4870	OHA	ENERGY/UTILITY PROJECTS
LEHMER	ROBERT	RCL	241-4926	OHA	ENERGY/UTILITY PROJECTS
LENDL	LISA	LML	241-4274	OHA	ENERGY/UTILITY PROJECTS
LOROW	JERRY	JML	241-4663	OHA	ENERGY/UTILITY PROJECTS
MIELE	MICHAEL	MRM	241-4916	OHA	ENERGY/UTILITY PROJECTS
PAZO	EDWARD	E P	241-3782	OHA	ENERGY/UTILITY PROJECTS
PERRY	DIANE	D P	241-4887	OHA	ENERGY/UTILITY PROJECTS
PETERS	ERIC	E P	241-3740	OHA	ENERGY/UTILITY PROJECTS
RAPACUK	CONSTANCE	CLR	241-4321	OHA	ENERGY/UTILITY PROJECTS SEC
SPELLMAN	ROBERT	RWS	241-2733	OHA	ENERGY/UTILITY PROJECTS MGR
VARISCO	FRANK	F V	241-2754	OHA	ENERGY/UTILITY PROJECTS
WILLIAMS	JEFF	JJW	241-4068	OHA	ENERGY/UTILITY PROJECTS
MEYERS	BERNARD	BJM	241-4129	OHA	FACILITIES/JIT PROCESS ENG
CARPENTER	MARILYN	MAC	241-4603	OHA	FIELD SVC ENG EUROPE MGR
MCKEE	CHERYL	CAM	241-3648	OHA	FIELD ENGINEERING
MURDY	JOAN	JMM	241-3931	OHA	FIELD ENGINEERING SECRETARY
SUWANBOSI	CHAYUT	C S	773-9880	OHA	FIELD ENG WESTERN AREA
CALABRESE	ANTHONY	AJC	241-4590	OHA	FINANCIAL PLANNING MGR
COYNE	TOM	T C	241-4585	OHA	FINANCIAL PLANNING
NOCLEG	DEBBIE	D N	241-4575	OHA	FINANCIAL PLANNING
ORLOSKY	JOYCE	J O	241-4560	OHA	FINANCIAL PLANNING
RENDA	LORI	L R	241-4428	OHA	FINANCIAL PLANNING
DICK	THOMAS	TDD	241-4276	OHA	GENERATION/TURBINE CNTL MGR
MCCHESNEY	GARY	GWM	241-3909	OHA	H.Q. OPERATIONS FLD SVC MGR
SIWICKI	TERESA	TLS	241-4505	OHA	H.Q. OPERATIONS FLD ENG
WABY	RAY	R W	241-3963	OHA	H.Q. OPERATIONS FIELD ENG
ANDERSON	CATHY	C A	241-4041	OHA	HALL-MARK REP
LYONS	PAUL	P L	241-4041	OHA	HALL-MARK REP

ASCENZI	MICHAEL	M A	241 4626	OHA	HARDWARE ENGINEERING
HORNE	MATTHEW	MBH	241-4625	OHA	HARDWARE ENGINEERING MGR
HOSKO	DANIEL	DAH	241-4929	OHA	HARDWARE ENGINEERING
KRAL	ROBERT	RAK	241-4614	OHA	HARDWARE ENGINEERING
LE	TAM	TVL	241-4636	OHA	HARDWARE ENGINEERING
MORTON	RICHARD	RCM	241-4659	OHA	HARDWARE ENGINEERING
PIPER	TIMOTHY	TRP	241-4624	OHA	HARDWARE ENGINEERING
VANCSA	GEORGE	GIV	241-4641	OHA	HARDWARE ENGINEERING
WALKER	ROBERT	RBW	241-4782	OHA	HARDWARE ENGINEERING
ANDERSON	GLENN	GAA	241-3932	OHA	HDQ OPERATIONS FLD SVC
VARGO	DONNA	DMV	241-4111	OHA	HEALTH SERVICES
BUTLER	DAVID	DPB	241-4264	OHA	HQ OPERATIONS FLD SVC
DANG	NHUAN	NDD	241-4860	OHA	HQ OPERATIONS FLD ENG
HAGGARD	WILLIAM	WTH	241-3929	OHA	HQ OPERATIONS FLD SVC
HAMM	RICHARD	RDH	241-4921	OHA	HQ OPERATIONS FLD SVC
HICKS	ERNEST	EBH	241-3981	OHA	HQ OPERATIONS FLD ENG
HIETSCH	MICHAEL	M H	241-3931	OHA	HQ OPERATIONS FLD SVC
PEARCE	RALPH	RPP	241-366I	OHA	HQ OPERATIONS FLD SVC
PETH	KENNETH	KJP	241-3605	OHA	HQ OPERATIONS FLD SVC
SMITH	WILLIAM	WJS	241-3936	OHA	HQ OPERATIONS FLD SVC
STAAS	GEORGE	G S	241-3971	OHA	HQ OPERATIONS FLD SVC
STAFFORD	RICHARD	RDS	241-3951	OHA	HQ OPERATIONS FLD SVC
STOFAN	GARY	GJS	241-3954	OHA	HQ OPERATIONS FLD SVC
WAGNER	GLEN	GCW	241-3949	OHA	HQ OPERATIONS FIELD ENG
WHEELER	IRWIN	IGW	241-4601	OHA	HQ OPERATIONS FLD SVC
ALLISON	BONNIE	BCA	241-4621	OHA	HUMAN RESOURCES SECRETARY
FRATTO	FRED	FJF	241-4504	OHA	HUMAN RESOURCES MGR
EBERLE	ROBERT	ROE	241-4839	OHA	INDUSTRIAL SYSTEMS SALES
JACOBSEN	JEFFREY	JCJ	241-4280	OHA	INDUSTRIAL SYSTEMS SALES
JOHNSON	S(DOUG)	SOJ	241-4851	OHA	INDUSTRIAL SYSTEMS APPL MGR
PAVLOVIC	ANTHONY	A P	241-4678	OHA	INDUSTRIAL SYSTEMS SALES
REDMAN	SHIRLEY	SAR	241-4119	OHA	INDUSTRIAL SYS MKTG SEC
REINHART	JACK	J R	241-2722	OHA	INDUSTRIAL SYSTEMS SALES
SCHIRM	GREG	GAS	241-3854	OHA	INDUSTRIAL SYSTEMS SALES
MASCI	EUGENE	E M	241-4557	OHA	INFDRMATION SYSTEMS TECH
AMSLER	ROBERT	RHA	241-4217	OHA	INFORMATION SYSTEMS TECH
BACHOR	STEVE	S B	241-4666	OHA	INFORMATION ENGINEERING
BERGEY	RONALD	RSB	241-3664	OHA	INFORMATION ENGINEERING
BOSTON	ORVILLE	OAB	241-4525	OHA	INFORMATION ENGINEERING
BOYDE	RICHARD	R B	241-3610	OHA	INFORMATION ENGINEERING
BUCK	LINDA	LED	241-4553	OHA	INFORMATION SYSTEMS TECH
CASTEEL	ERIC	E C	241-3666	OHA	INFORMATION ENGINEERING
CHITTESTER	MARCELLA	MLC	241-4553	OHA	INFORMATION SYSTEMS TECH
FRENCHKO	RONALD	RAF	241-4553	OHA	INFORMATION SYSTEMS TECH
GAGE	ED	E G	241-4216	OHA	INFORMATION SYSTEMS
GEHM	DAVID	DJG	241-4552	OHA	INFORMATION SYSTEMS TECH
GILLESPIE	JAMES	J G	241-4110	OHA	INFORMATION SYSTEMS TECH
GUZIK	LORRAINE	LCG	241-4522	OHA	INFORMATION SYSTEMS TECH
HARVEY	JACQUELINE	JSH	241-4553	OHA	INFORMATION SYSTEMS TECH

HILL	MIKE	M H	241-2726	OHA	INFORMATION ENGINEERING
KELLY	GARY	G K	241-2726	OHA	INFORMATION ENGINEERING
LOWENADLER	JONAS	JKL	241-4706	OHA	INFORMATION SYSTEMS TECH
LYNCH	KEVIN	KPL	241-4658	OHA	INFORMATION ENGINEERING
MCGARY	LINDA	LLM	241-4211	OHA	INFORMATION SYSTEMS TECH
MCGRAIL	SCOTT	SJM	241-4462	OHA	INFORMATION ENGINEERING
ONTENTO	JAMES	JLC	241-4684	OHA	INFORMATION ENGINEERING
PELUSI	JEFF	J P	241-4475	OHA	INFORMATION ENGINEERING MGR
PIERANI	PATRIZIA	P P	241-4228	OHA	INFORMATION ENGINEERING
PILLAR	RICHARD	RJP	241-4218	OHA	INFORMATION SYSTEMS TECH
RICE	JUDY	JKR	241-4345	OHA	INFORMATION SYSTEMS TECH MGR
RITCHIE	MARK	MAR	241-4649	OHA	INFORMATION ENGINEERING
STIRLING	JAMES	JCS	241-4377	OHA	INFORMATION SYSTEMS TECH
TRAN	THUY	TTT	241-4683	OHA	INFORMATION ENGINEERING
ZHAO	MICHELLE	M Z	241-4697	OHA	INFORMATION ENGINEERING
BETZ	GREGORY	GWB	241-4478	OHA	INTERNATIONAL CNTL SYSTEMS
BORDELON	FRANK	FMB	241-4700	OHA	INTERNATIONAL PROJECTS MGR
BORGO	MERLINA	MSB	241-4271	OHA	INTERNATIONAL CNTL SYS SEC
BULLION	PATRICK	PDB	241-4180	OHA	INTERNATIONAL CNTL SYSTEMS
D'ASCENZO	FRED	FLD	241-4336	OHA	INTERNATIONAL CNTL SYSTEMS
DEL SIGNORE	STEPHEN	SPD	241-3892	OHA	INTERNATIONAL CNTL SYSTEMS
EDMONDS	LIAM	LJE	241-3947	OHA	INTERNATIONAL CNTL SYSTEMS
ERDAMAR	HAKAN	HME	241-4792	OHA	INTERNATIONAL CNTL SYSTEMS
FERRONI	PEDRO	P F	241-4445	OHA	INTERNATIONAL MARKETING
GUPTA	RASH	RBG	241-4289	OHA	INTERNATIONAL CNTL SYSTEMS
HERTZ	RICHARD	RJH	241-4265	OHA	INTERNATIONAL CNTL SYSTEMS
KENNEDY	STEPHANIE	S K	241-2770	OHA	INTERNATIONAL CNTL SYSTEMS
LAWLOR	DENIS	DML	241-3942	OHA	INTERNATIONAL CNTL SYS MGR
MARSCHER	MARK	M M	241-4007	OHA	INTERNATIONAL CNTL SYSTEMS
MCBRIDE	ROBERT	RKM	241-4368	OHA	INTERNATIONAL CNTL SYSTEMS
MEYERS	CELESTE	C M	241-4761	OHA	INTERNATIONAL CNTL SYSTEMS
POLITO	MICHAEL	M P	241-4676	OHA	INTERNATIONAL CNTL SYSTEMS
STANGA	LEONARD	LVS	241-4812	OHA	INTERNATIONAL CNTL SYSTEMS
BENCO	ROBERT	RSB	241-4125	OHA	JIT PROCESS ENGINEERING
BLOMGREN	GREGORY	GRB	241-3675	OHA	JIT PROCESS ENGINEERING
BUCKLEY	GORDON	GWB	241-4756	OHA	JIT PROCESS ENGINEERING
CALBWELL	EARL	EMC	241-4131	OHA	JIT PROCESS ENG/INST CAL LAB
DAVIS	JACK	JAD	241-3735	OHA	JIT PROCESS ENGINEERING
FERCHAW	ERIC	E F	241-4740	OHA	JIT PROCESS ENGINEERING
GATES	DAVID	DOG	241-4757	OHA	JIT PROCESS ENGINEERING
GLASSER	RANDY	RMG	241-4131	OHA	JIT PROCESS ENG/INST CAL LAB
HAUENSTEIN	CRYSTAL	C H	241-4254	OHA	JIT PROCESS ENGINEERING
HOLIHAN	THOMAS	T H	241-4751	OHA	JIT PROCESS ENGINEERING
PUHALIA	CRAIG	CJP	241-4487	OHA	JIT PROCESS ENGINEERING
SPROUSE	KENNETH	KRS	241-4194	OHA	JIT PROCESS ENGINEERING
STEEL	JAMES	JES	241-4125	OHA	JIT PROCESS ENGINEERING
THOMAS	LYLE	LET	241-4126	OHA	JIT PROCESS ENGINEERING
YURECHKO	JOHN	JVY	241-4857	OHA	JIT PROCES ENG/FACILITIES MGR

ZOLTAK	DEAN	DEZ	241-4126	OHA	JIT PROCESS ENGINEERING
BELEY	BRIAN	BS8	241-4031	OHA	MAJOR PROJECTS MARKETING
HORD	JOHN	JEH	241-2743	OHA	MAJOR PROJECTS MARKETING MGR
TRUVER	MARTHA	MAT	241-4242	OHA	MANUFACTURING SECRETARY
ACKER	CONRAD	CJA	241-2727	OHA	MARKETING COMMUNICATIONS
BABSON	JOHN	JRB	241-2767	OHA	MARKETING
BURLEY	THOMAS	TBB	241-3645	OHA	MARKETING MGR
COTTON	JARVIS	JDC	241-4580	OHA	MARKETING MANAGER
DREYER	SUSAN	SND	241-4485	OHA	MARKETING COMMUNICATIONS MGR
GIULIANELLI	M(CHOOKIE)	MAG	241-4197	OHA	MARKETING COMMUNICATIONS
JOHNSON	CARL	CRJ	241-4745	OHA	MARKETING COMMUNICATIONS
SCHLEMMER	AMY	A S	241-4912	OHA	MARKETING COMMUNICATIONS
SIMMERS	DEBBIE	DAS	241-4949	OHA	MARKETING COMMUNICATIONS
SMITH	DEBRA	DKS	241-4391	OHA	MARKETING SECRETARY
WALMSLEY	CARLEEN	CCW	241-4442	OHA	MARKETING COMMUNICATIONS SEC
ANDERSON	JOHN	JLA	241-4128	OHA	MERA
GUZAK	JOHN	JJG	241-4128	OHA	MERA
LEMANSKI	ALEXANDER	AJL	241-4128	OHA	MERA
LLOYD	JAMES	JDL	241-4128	OHA	MERA
POWELL	DARRELL	DCP	241-4128	OHA	MERA
TRAINI	ROBERT	RDT	241-4128	OHA	MERA
EVANS	RICK	RLE	241-4759	OHA	MERA/CABINET ASSEMBLY MGR
AUGUSTINE	LISA	LAA	241-4904	OHA	MMI ENGINEERING
BOSCO	PATTI	P B	241-2724	OHA	MMI ENGINEERING
BUZZA	SHERRI	SKB	241-4673	OHA	MMI ENGINEERING
DURBIN	MIKE	M D	241-3961	OHA	MMI ENGINEERING
GARDNER	MIKE	MJG	241-4654	OHA	MMI ENGINEERING
GROTT	JEFF	JJG	241-4694	OHA	MMI ENGINEERING
HAMROCK	STEVE	SJH	241-4220	OHA	MMI ENGINEERING MGR
JESSO	LOUIS	LCJ	241-4249	OHA	MMI ENGINEERING
JOHNSON	KATHY	KLJ	241-4672	OHA	MMI ENGINEERING
KRAWCZAK	ROBERT	RKK	241-4646	OHA	MMI ENGINEERING
MCMASTER	JAMES	JAM	241-4679	OHA	MMI ENGINEERING
NARUTSCH	EDWARD	EHN	241-4385	OHA	MMI ENGINEERING
PATEL	SUNIL	S P	241-4633	OHA	MMI ENGINEERING
PLYMIRE	AL	AWP	241-4513	OHA	MMI ENGINEERING
RYGG	STEVE	S R	241-4671	OHA	MMI ENGINEERING
SOLOMON	JAMES	JWS	241-4384	OHA	MMI ENGINEERING
SPILLANE	DDNAL	D S	241-2761	OHA	MMI ENGINEERING
UNDERWOOD	WILLIAM	WCU	241-4297	OHA	MMI ENGINEERING
VASILOFF	KAREN	KLV	241-3855	OHA	MMI ENGINEERING
YOST	CHERYL	CJY	241-3830	OHA	MMI ENGINEERING
BUFF	WAYNE	WEB	241-4681	OHA	NOK PROJECT
CHIODO	SANDRA	SJC	241-4025	OHA	NOK PROJECT
ERNE	GEORGE	G E	241-3746	OHA	NOK PROJECT
FRANKEL	STAN	S F	241-4861	OHA	NOK PROJECT
GREENBERG	LES	L G	241-4852	OHA	NOK PROJECT
JENNI	SIMON	S J	241-3746	OHA	NOK PROJECT
KIENER	WERNER	W K	241-3742	OHA	NOK PROJECT

LIMMER	KENNETH	KSL	241-4325	OHA	NOK PROJECT
MERICHKO	JIM	JAM	241-4230	OHA	NOK PROJECT
OSLOSKY	HENRY	H O	241-4855	OHA	NOK PROJECT
PIETERS	CLAUDE	C P	241-4906	OHA	NOK PROJECT
SHEMONY	ROBERT	RAS	241-4799	OHA	NOK PROJECT
STANGA	JOSEPH	JJS	241-4294	OHA	NOK PROJECT
VOGLIANO	RICHARD	RCV	241-3910	OHA	NOK PROJECT MGR
WOLFSON	BETH	B W	241-3646	OHA	NOK PROJECT
TAYLOR	RENEE	RDT	241-3928	OHA	HQ OPERATIONS FLD SVC
BEHANNA	DEBORAH	DLB	241-4411	OHA	NUCLEAR PRODUCTS MKTG SEC
BERESFORD	NIGEL	N B	241-4381	OHA	NUCLEAR ELECTRIC ENGINEERING
BURLAS	THOMAS	TCB	241-4261	OHA	NUCLEAR APPLICATIONS
COOK	HENRY	HFC	241-3604	OHA	NUCLEAR PROCESS CNTL ENG
DAILEY	DAVE	DAD	241-3614	OHA	NUCLEAR APPLICATIONS
DOYLE	JAMES	JPD	241-4764	OHA	NUCLEAR APPLICATIONS
FEDERICO	PANFILO	PAF	241-4947	OHA	NUCLEAR APPLICATIONS
GAUSSA	WILLIAM	WPG	241-4124	OHA	NUCLEAR APPLICATIONS
LOFTUS	PATRICA	PAL	241-3750	OHA	NUCLEAR PRODUCTS MKTG MGR
LOHR	TIMOTHY	TSL	241-3831	OHA	NUCLEAR APPLICATIONS
LONG	SUSAN	SEL	241-4752	OHA	NUCLEAR PRODUCTS MARKETING
MILLER	WILLIAM	WLM	241-4754	OHA	NUCLEAR APPLICATIONS MGR
MRAZIK	AMY	A M	241-4474	OHA	NUCLEAR PRODUCTS MARKETING
MURPHY JR	HUGH	HJM	241-3833	OHA	NUCLEAR APPLICATIONS
POTOCHNIK	LAWERENCE	LMP	241-3996	OHA	NUCLEAR APPLICATIONS
ROONEY	JOHN	J R	241-4796	OHA	NUCLEAR PRODUCTS MARKETING
SMITH	JOHN	JRS	241-3665	OHA	NUCLEAR APPLICATIONS
STANTON	SCOTT	S S	241-4607	OHA	NUCLEAR APPLICATIONS
WITT	REBECCA	RMW	241-4480	OHA	NUCLEAR APPLICATIONS
YACKOVICN	HIM KRON	KKY	241-3879	OHA	NUCLEAR PRODUCTS MARKETING
COSTELLIC	BETSY	B C	241-3820	OHA	OPERATIONS SECY
JUDD	ROBERT	RAJ	241-4770	OHA	OPERATIONS DEPT MGR
VASUDEVAN	V	V V	241-4599	OHA	OPTIMIZAT
CHILDS	MARTIN	ML6	241-4313	OHA	OPTIMIZATION SOFTWARE
FRUHLINGER	GRETCHEN	GLF	241-3660	OHA	OPTIMIZATION SOFTWARE
GAZDA	ELIZABETH	EJG	241-4660	OHA	OPTIMIZATION SOFTWARE
HUFF	FREDERICK	FCH	241-4319	OHA	OPTIMIZATION SOFTWARE
NICHOLSON	ROBERT	REN	241-4449	OHA	OPTIMIZATION SOFTWARE
NOVACEK	MELANIE	MJN	241-4221	OHA	OPTIMIZATION SOFTWARE
PATERNI	RONALD	RMP	241-4259	OHA	OPTIMIZATION SOFTWARE MGR
SCARDINA GAZZO	CHRISTINE	CPS	241-4386	OHA	OPTIMIZATION SOFTWARE
WINN	HARRY	HRW	241-4214	OHA	OPTIMIZATION SOFTWARE
ARBUCKLE	MARY	MCA	241-4038	OHA	PCA
CODELKA	PAULINE	PHC	241-3669	OHA	PCA
FORREST	CASSANDRA	C F	241-4038	OHA	PCA
GENGLER	MICHAEL	MTG	241-4038	OHA	PCA
GLENN	ENID	ELG	241-4038	OHA	PCA
HAMPSON	BRADLEY	BJH	241-4038	OHA	PCA
HARRISON	JULIA	JAH	241-4038	OHA	PCA

KEVICKY	WILLIAM	W K	241-4038	OHA	PCA
KOPACZYNSKI	LAUREL	LAK	241-4038	OHA	PCA
LEWIS	CLARA	CLL	241-4038	OHA	PCA
LEWIS	LATRICIA	L L	241-4038	OHA	PCA
MANGINI	DEBBIE	DLM	241-3678	OHA	PCA
MATOR	ROSE	R M	241-4038	OHA	PCA
MCGEE	JOSIE	JAM	241-3678	OHA	PCA
MICKLOW	THELMA	T M	241-4038	OHA	PCA
MUSZYNSKI	JOHN	JJM	241-4038	OHA	PCA
PATRICK	KEVIN	KJP	241-4038	OHA	PCA
PFAFF	KATHY	KMP	241-4038	OHA	PCA
ROSENBERGER	RICHARD	RAR	241-4038	OHA	PCA
ROYDES	RATRICIA	PLR	241-4038	OHA	PCA
STANLEY	ELIZABETH	ELS	241-4038	OHA	PCA
SUTARA	DIANE	DLS	241-4038	OHA	PCA
SWOAGER	JOHN	J S	241-4038	OHA	PCA
TU	CONNIE	C T	241-4038	OHA	PCA
WALKER	CAROLYN	C W	241-4775	OHA	PCA
WILKERSON	JACQUELINE	J W	241-4038	OHA	PCA
ZABIELSKI	REGIS	RWZ	241-4038	OHA	PCA
BUSBEY	ALICE	AMB	241-3698	OHA	PCD GENERAL MGR SECRETARY
JACKSON	LAURA	LAJ	241-4746	OHA	PHOTOGRAPHER
ALWAY	LARRY	LDA	241-4608	OHA	PLANNING & MATERIAL CONTROL
BENCO	MARY LYNN	M B	241-4723	OHA	PLANNING & MATERIAL CONTROL
BOHATCB	CATHY	CBB	241-473I	OHA	PLANNING & MATERIAL CONTROL
CHISHOLM	JAMES	JTC	241-4702	OHA	PLANNING & MATERIAL CONTROL
CONKLIN	DONNA	D C	241-4728	OHA	PLANNING & MATERIAL CONTROL
FORAN	RUSSELL	RAF	241-3940	OHA	PLANNING & MATERIAL CONTROL
GRAHAM	BRUCE	B G	241-4714	OHA	PLANNING & MATERIAL CONTROL
HOLETICH	LIN	LMH	241-4727	OHA	PLANNING & MATERIAL CONTROL
LONGENECKER	ROBERT	RSL	241-4718	OHA	PLANNING & MATERIAL CONTROL
MATTHEWS	MARLENE	MAM	241-4847	OHA	PLANNING & MATERIAL CONTROL
MILLER	J(WARD)	JWM	241-4779	OHA	PLANNING & MATERIAL CONTROL
SIMMONS	CHARLES	CES	241-4716	OHA	PLANNING & MATERIAL CONTROL
SMITH	ROBERT	RFS	241-4191	OHA	PLANNING & MATERIAL CONTROL
THOMAS	PAM	P T	241-4101	OHA	PLANNING & MATERIAL CNTL SEC
WELKER	RON	R W	241-4688	OHA	PLANNING & MATERIAL CONTROL
WILLSON	JOSEPH	JDW	241-47IB	OHA	PLANNING & MATERIAL CONTROL
WOODS	GERALD	GLW	241-4076	OHA	PLANNING & MATERIAL CONTROL
BUSH	RICHARD	R B	241-4205	OHA	PLANT SERVICES FOREMAN
PAULEY	ANN	AEP	241-3801	OHA	PROCESS CONTROL DIV GEN MGR
BOSLER	DRAKE	DBB	241-4330	OHA	PRODUCT MARKETING
BREZNICAN	STEPHEN	SJB	241-4856	OHA	PRODUCT SUPPORT ENG MGR
COPETAS	DINO	D C	241-4818	OHA	PRODUCT SUPPORT ENGINEERING
COSTLOW	KIM	K C	241-4224	OHA	PRODUCT SUPPORT ENG
DELUCIA	RALPH	R D	241-4862	OHA	PRODUCT SUPPORT ENGINEERING
EGELSTON	DAVID	DME	241-4437	OHA	PRODUCT MARKETING
ERB	ROBIN	RLE	241-4241	OHA	PRODUCT MARKETING SEC
FITZPATRICK	JEAN ANNE	J F	241-4823	OHA	PRODUCT SUPPORT ENGINEERING
FORNEY	ROBERT	REF	241-3913	OHA	PRODUCT MARKETING

GIARAMORE	DAVID	D G	241-4431	OHA	PRODUCT MARKETING
HUNT	JAY	J H	241-3821	OHA	PRODUCT SUPPORT ENGINEERING
LUNZ	KENNETH	KGL	241-3876	OHA	PRODUCT MARKETING
MANKOWSKI	BOB	BEM	241-3817	OHA	PRODUCT SUPPORT ENGINEERING
MATTESON	GLENN	LGM	241-4497	OHA	PRODUCT SUPPORT ENG
MELSON	THURMAN	T M	241-4227	OHA	PRODUCT MARKETING
MEYERS	CONSTANCE	C M	241-4928	OHA	PRODUCT SUPPORT ENGINEERING
RAO	MADHU	M R	241-3819	OHA	PRODUCT SUPPORT ENGINEERING
REVILLA	EMILY	EAR	241-4092	OHA	PRODUCT SUPPORT ENGINEERING
RITENBAUGH	DAVID	DWR	241-4709	OHA	PRODUCT SUPPORT ENGINEERING
SIMON	DAN	B S	241-3952	OHA	PRODUCT MARKETING
TKACS	DENNIS	DPT	241-4414	OHA	PRODUCT MARKETING
TRAFALSKI	TIMOTHY	TST	241-4675	OHA	PRODUCT SUPPORT ENGINEERING
TUITE	TERRY	T T	241-4763	OHA	PRODUCT SUPPORT ENGINEERING
WOODWARD	GARY	GCW	241-4137	OHA	PRODUCT MARKETING MGR
WOZNIAK	DIANE	DMW	241-4459	OHA	PRODUCT SUPPORT ENGINEERING
YOHE	ROB	R Y	241-4894	OHA	PRODUCT SUPPORT ENG
BISKUP	JEFF	J B	241-3761	OHA	PROTECTION SYSTEMS ENG
ESPARRA	RAMON	R E	241-3609	OHA	PROTECTION SYSTEMS ENG
KREPENEVICH	MICHAEL	M K	241-4476	OHA	PROTECTION SYSTEMS ENG
LEWIS	JAMES	JEL	241-4225	OHA	PROTECTION SYSTEMS ENG
MCDONOUGH	MARK	MFM	241-4742	OHA	PROTECTION SYSTEMS ENG
PRESUTTI	ROBERT	RDP	241-4875	OHA	PROTECTION SYSTEMS ENG
SCOTT	CHESTER	CDS	241-4268	OHA	PROTECTION SYSTEMS ENG
SUTHERLAND	JAMES	JFS	241-4016	OHA	PROTECTION SYSTEMS ENG
WEISNER	RONALD	RJW	241-4876	OHA	PROTECTION SYSTEMS ENG
ZLOTKOWSKI	STANLEY	S Z	241-4881	OHA	PROTECTION SYSTEMS ENG
BACON	BEVERLY	BAB	241-4747	OHA	PURCHASING SEC
COLE	JANE	JEC	241-4692	OHA	PURCHASING
CONJELKO	MICHAEL	M C	241-4116	OHA	PURCHASING
KAMENICKY	JENNIFER	J K	241-4109	OHA	PURCHASING
MORABITO	DEBBIE	D M	241-4749	OHA	PURCHASING SEC
MORITZ	DALE	DJM	241-4114	OHA	PURCHASING
MOSSNER	JOHN	JMM	241-4118	OHA	PURCHASING
POLLICK	GERALDINE	GMP	241-4047	OHA	PURCHASING
RYABY	JOHN	J R	241-4113	OHA	PURCHASING
SHEDLOCK	DAVID	DAS	241-4177	OHA	PURCHASING
SMITH	VELVAYNE	VCS	241-2760	OHA	PURCHASING
TATKOVSKI	CATHY	CMT	241-4106	OHA	PURCHASING
WELLS	KRISTEN	KAW	241-4108	OHA	PURCHASING MGR
ALLEN	TOM	T A	241-4328	OHA	PWR ENVIRONMENTAL PROJECTS
BLYTHE	DAVE	D 8	241-4868	OHA	PWR GEN TURBINE CNTL
BOWAN	BRETT	DAB	241-4665	OHA	PWR ENVIRONMENTAL PROJECTS
BROWN	MIKE	MQB	241-4363	OHA	PWR GEN TURBINE CNTL
CAMEROTA	PAUL	PAC	241-4298	OHA	PWR ENVIRONMENTAL PROJECTS
CAPANI	AL	A C	241-4687	OHA	PWR GEN TURBINE CNTL
CONNORS	GRANT	GRC	241-4133	OHA	PWR GEN TURBINE CNTL
COOK	BRUCE	BMC	241-4467	OHA	PWR ENVIRONMENTAL PROJECTS
DONATELLI	RON	R D	241-4548	OHA	PWR GEN TURBINE CNTL

DUFFY	CLARK	C D	241-4159	OHA	PWR ENVIRONMENTAL PROJECTS
FALISE	RICK	RDF	241-4496	OHA	PWR ENVIRONMENTAL PROJECTS
FATTAHI	MASOUD	M F	241-3747	OHA	PWR ENVIRONMENTAL PROJECTS
GAMBINO	JOSEPH	J G	241-4834	OHA	PWR ENVIRONMENTAL PROJECTS
GIANGIULIO	TONY	TFG	241-4816	OHA	PWR GEN TURBINE CNTL
HOFFMANN	NANCY	NAH	241-4915	OHA	PWR ENVIRONMENTAL PROJECTS
HUGHES	PEGGY	P H	241-4251	OHA	PWR GEN TURBINE CNTL
MURRAY	DAVID	DAM	241-4331	OHA	PWR GEN TURBINE CNTL
REMIORZ	JOHN	JHR	241-4339	OHA	PWR ENVIRONMENTAL PROJECTS
RUMSEY	THOMAS	TAR	241-4260	OHA	PWR ENVIRONMENTAL PROJ MGR
SARACENO	JAMES	JES	241-4850	OHA	PWR GEN TURBINE CNTL
SHALTES	WALTER	WBS	241-4278	OHA	PWR GEN TURBINE CNTL
SHERER	ROBERT	RFS	241-4299	OHA	PWR ENVIRONMENTAL PROJECTS
SMITH	WALTER	WWS	241-4843	OHA	PWR ENVIRONMENTAL PROJECTS
SNYDER	JEFFREY	JTS	241-4301	OHA	PWR ENVIRONMENTAL PROJECTS
ST. ONGE	PAUL	PLS	241-3939	OHA	PWR GEN TURBINE CNTL
SUNDO	PAUL	PFS	241-4332	OHA	PWR GEN TURBINE CNTL
THOMAS	KAREN	KLT	241-4262	OHA	PWR GEN TURBINE CNTL
THOMAS	TIMOTHY	TDT	241-4378	OHA	PWR GEN TURBINE CNTL
TOPOLOSKY	JOHN	JJT	241-4837	OHA	PWR GEN TURBINE CNTL
TZANAKIS	JOHN	JMT	241-4668	OHA	PWR GEN TURBINE CNTL
VUKMIR	MEL	MSV	241-4351	OHA	PWR ENVIRONMENTAL PROJECTS
WAIGHT	ROBERT	RAW	241-4306	OHA	PWR ENVIRONMENTAL PROJECTS
WOOD	THOMAS	TTW	241-4869	OHA	PWR GEN TURBINE CNTL
ZABELSKY	GREGG	GAZ	241-4371	OHA	PWR GEN TURBINE CNTL
ZIBRAT	DAVID	DGZ	241-4360	OHA	PWR ENVIRONMENTAL PROJECTS
BOZIK	ANTHONY	A B	241-4173	OHA	QUALITY ASSURANCE SERVICES
DEUTSCH	WILLIAM	WCD	241-4795	OHA	QUALITY ASSURANCE SERVICES
HURLEY	ROBERT	RJH	241-4139	OHA	QUALITY ASSURANCE SERVICES
KAMENICKY	LARRY	LSK	241-3713	OHA	QUALITY ASSURANCE SVCS MGR
LAUBHAM	MIKE	M L	241-4509	OHA	QUALITY ASSURANCE SERVICES
MARTIN	STEPHEN	SJM	241-4065	OHA	QUALITY ASSURANCE SERVICE
MCCOLLUM	ROBERT	RAM	241-4830	OHA	QUALITY ASSURANCE SERVlCES
MCCRADY	MERRILL	M M	241-4708	OHA	QUALITY ASSURANCE SERVICES
MCELROY	WILLIAM	WSM	241-3781	OHA	QUALITY ASSURANCE SERVICES
MERCURIO	KATHY	KAM	241-4065	OHA	QUALITY ASSURANCE SERVICES
NOECHEL	EILEEN	EJN	241-4795	OHA	QUALITY ASSURANCE SERVICES
ROTH	RICHARD	RMR	241-3712	OHA	QUALITY ASSURANCE SERVICES
STEIN	RAYMOND	RGS	241-3743	OHA	QUALITY ASSURANCE SERVICES
SUTTON	NANCE	NIS	241-3764	OHA	QUALITY ASSURANCE SVCS SEC
SADOWSKY	CLARA	CLS	241-4004	OHA	RECEPTIONIST
CALLAGHAN	PATRICK	PJC	241-4248	OHA	RENEWAL PARTS
KOEHLER	LORRAINE	LMK	241-4234	OHA	RENEWAL PARTS
MEYERS	MARY JO	MAN	241-4247	OHA	RENEWAL PARTS
MORRIS	CAROL	CGM	241-3770	OHA	RENEWAL SVCS & TRAINING MGR
STEIBEL	WAYNE	WJS	241-4246	OHA	RENEWAL PARTS
BRICKER	DORIS	DAB	241-4088	OHA	REPAIR DEPT
BROWN	DEAN	D B	241-4244	OHA	REPAIR DEPT

BUTLER	AMY	ALB	241-4223	OHA	REPAIR DEPT
DANIEL	GLORIA	GD	241-4244	OHA	REPAIR DEPT
DEFORNO	MARK	MWD	241-4244	OHA	REPAIR DEPT
FAZZINI	JAMES	JJF	241-4244	OHA	REPAIR DEPT
GEYER	JEFFREY	JBG	241-4244	OHA	REPAIR DEPT
HIETSCH	KEVlN	K H	241-4244	OHA	REPAIR DEPT
IRWIN	CONSTANCE	CAI	241-4244	OHA	REPAIR DEPT
JAWORSKI	RENEE	R J	241-4244	OHA	REPAIR DEPT SEC
KOUPJACK	MICHAEL	M K	241-4127	OHA	REPAIR DEPT
MADONI	JEFFREY	JJM	241-4244	OHA	REPAIR DEPT
MASSE	JODI	J M	241-4238	OHA	REPAIR DEPARTMENT
MCCULLOUGH	PATRICK	PJM	241-4244	OHA	REPAIR DEPT
MCFADDEN	WILLIAM	W M	241-4244	OHA	REPAIR DEPT
NAUGHTDN	IDA	ILN	241-3636	OHA	REPAIR DEPT
PATZ	DAVID	DAP	241-4244	OHA	REPAIR DEPT
PICONE	LISA	L P	241-4244	OHA	REPAIR DEPT
PUSKAR	JANET	JLP	241-4244	OHA	REPAIR DEPT
RENTLER	MARK	MER	241-4244	OHA	REPAIR DEPT
SCOTT	ART	ALS	241-4244	OHA	REPAIR DEPT
SWAN	JAMES	JRS	241-3926	OHA	REPAIR DEPT
TURNER	SANDRA	SLT	241-4088	OHA	REPAIR DEPT
WEAVER	CHARLES	CEW	241-4244	OHA	REPAIR DEPT
ZINI	MARIO	M Z	241-4200	OHA	REPAIR DEPT MGR
BALDWIN	WILLIAM	W B	241-4273	OHA	SIZEWELL SYSTEMS ENG
BEDNAR	FREDERICK	FHB	241-4923	OHA	SIZEWELL SUPPORT ENGINEERING
BYRNES	BRIAN	BRB	241-4036	OHA	SIZEWELL SUPPORT ENGINEERING
CHAMBERS	GEORGE	GMC	241-4087	OHA	SIZEWELL SYSTEMS ENG MGR
CHIZMAR	JAMES	JPC	241-3863	OHA	SIZEWELL SYSTEMS ENGINEERING
FORKER	JAMES	JMP	241-4766	OHA	SIZEWELL SUPPORT ENGINEERING
GIBSON	ROBERT	RJG	241-4058	OHA	SIZEWELL SUPPORT ENGINEERING
GILBERT	CARL	CRG	241-4721	OHA	SIZEWELL SYSTEMS ENGINEERING
GISONI	GREGORY	GAG	241-4892	OHA	SIZEWELL SYSTEMS ENGINEERING
HANTZ	BARBARA	B H	241-417I	OHA	SIZEWELL SUPPORT ENGINEERING
HORNER	LARRY	LEH	241-2730	OHA	SIZEWELL SUPPORT ENG MGR
KOHLI	RAJEEV	R K	241-3771	OHA	SIZEWELL SUPPORT ENGINEERING
MADDEN	GEORGE	GNM	241-3840	OHA	SIZEWELL SYSTEMS ENGINEERING
MASSARELLI	LINDA	LGM	241-3844	OHA	SIZEWELL ENGINEERING SEC
MATTHEWS	JAN	JPM	241-3868	OHA	SIZEWELL SYSTEMS ENGINEERING
NATH	RAYMOND	RJN	241-3806	OHA	SIZEWELL I&C DEPT MGR
RAJAGOPALAN	RAVI	R R	241-4348	OHA	SIZEWELL SUPPORT ENGINEERING
RAWLINS	DAVID	DHR	241-4705	OHA	SIZEWELL PSE ENGINEERING MGR
REMLEY	GILBERT	GWR	241-4382	OHA	SIZEWELL DESIGN ENG MGR
REPPERMOUND	JOHN	J R	241-4549	OHA	SIZEWELL SUPPORT ENGINEERING
RUFFING	LOU	L R	241-3772	OHA	SIZEWELL SUPPORT ENGINEERING
SANDERS	NANCY	NLS	241-4701	OHA	SIZEWELL I&C SECRETARY
STATHIS	GEORGE	G S	241-3618	OHA	SIZEWELL SUPPORT ENGINEERING
THERIAULT	DAVID	DGT	241-4463	OHA	SIZEWELL SYSTEMS ENGINEERING
VANDZURA	JAMES	JMV	241-4884	OHA	SIZEWELL SUPPORT ENGINEERING
CREW	AL	A C	241-3687	OHA	SOFTWARE DEVELOPMENT
ABRUZERE	EUGENE	ELA	241-3966	OHA	SPCL PROD & APPL MKTG MGR

BROOKS	GREG	GAB	241-4936	OHA	SPCL PROD & APPL MARKETING
BURKHART	RAYMOND	RLB	241-4464	OHA	SPCL PROD & APPLICATIONS
CIARAMITARO	WILLIAM	W C	241-4927	OHA	SPCL PROD & APPLICATIONS
FROHN	JANICE	JEF	241-3957	OHA	SPCL PROD & APPLICATIONS
GAUSSA JR	LOUIS	LWG	241-4010	OHA	SPCL PROD & APPLICATIONS
GORMAN	JOHN	JFG	241-3977	OHA	SPCL PROD & APPLICATIONS
GRAHAM	KINGSLEY	KFG	241-4202	OHA	SPCL PROD & APPLICATIONS
HOWELL	WILLIAM	WJH	241-3641	OHA	SPCL PROD & APPLICATIONS
HRIVNAK	MICHAEL	MJH	241-3958	OHA	SPCL PROD & APPLICATIONS
JACOBOVITZ	RONALD	RMJ	241-4027	OHA	SPCL PROD & APPLICATIONS
KENDRA	JOHN	JPK	241-3946	OHA	SPCL PROD & APPLICATIONS
MILLER	JAN	JDM	241-4184	OHA	SPCL PROD/APPLICATIONS SEC
PEROEUS	MATTHEW	M P	241-3927	OHA	SPCL PROD & APPL MARKETING
PYSNIN	JOSEPH	J P	241-3719	OHA	SPCL PROD & APPLICATIONS
RITTER	WILLIAM	WJR	241-4263	OHA	SPCL PROD & APPLICATIONS
SAHASRABUDHE	ARUN	A S	241-3710	OHA	SPCL PROD & APPLICATIONS MGR
THOMPSON	JAMES	JHT	241-3959	OHA	SPCL PROD & APPLICATIONS
ELLIOTT	NORMAN	NSE	241-3828	OHA	SPDL PROD & APPLICATIONS MKTG
BREITENBACH	JUDITH	JAB	241-4073	OHA	STOREROOM
CAMPBELL	R	RKC	241-4073	OHA	STOREROOM
CRAWFORD	CAROL	C C	241-4046	OHA	STOREROOM
CRAWFORD	PATSY	PAC	241-4073	OHA	STOREROOM
CROWLEY	THOMAS	TRC	241-4073	OHA	STOREROOM
FISHER	CYNTHIA	C F	241-4073	OHA	STOREROOM
GESSELMAN	MARIA	MAG	241-4495	OHA	STOREROOM
GRAHAM	HAROLD	HWG	241-4073	OHA	STOREROOM
GRAZIANO	TONY	TJG	241-4073	OHA	STOREROOM
HARPSTER	JAMES	JAH	241-4099	OHA	STOREROOM
HARTMANN	FRANK	FCH	241-4060	OHA	STOREROOM MGR
JACKO	KAREN	KAJ	241-4768	OHA	STOREROOM
JEFFRIES	REBECCA	R J	241-4135	OHA	STOREROOM
JOHNSON	CAROL	CAJ	241-4327	OHA	STOREROOM
KNOX	BEVERLY	BAK	241-4518	OHA	STOREROOM
MADDEN	MARK	MPM	241-4073	OHA	STOREROOM
MANGINO	DIANE	DLM	241-4073	OHA	STOREROOM
MASSARELLI	DENNIS	D M	241-4096	OHA	STOREROOM
MCCALL	HELEN	HEM	241-4037	OHA	STOREROOM
MORELAND	KAREN	KRM	241-4073	OHA	STOREROOM
MRAKICH	SANDRA	SJM	241-4073	OHA	STOREROOM
SHIELDS	MARGARET	MMS	241-4073	OHA	STOREROOM
SMITH	JAY	JBS	241-4073	OHA	STOREROOM
STOVER	WENDY	WJS	241-4073	OHA	STOREROOM
SUBLINSKY	SANDRA	SAS	241-4073	OHA	STOREROOM
TESTA	DANIEL	DRT	241-4071	OHA	STOREROOM
AGNEW	PAUL	PEA	241-4266	OHA	STRATEGIC PROJECTS
CLAUS	DOROTHY	DTC	241-4239	OHA	STRATEGIC PROJECTS
DANG	K	KKO	241-3683	OHA	STRATEGIC PROJECTS
DAVIS	FRED	FD	241-3607	OHA	STRATEGIC QUALITY PROGRAMS
GABOR	JOHN	JGG	241-4250	OHA	STRATEGIC PROJECTS MGR

GRAVATT	LAURA	LJG	241-4935	OHA	STRATEGIC PROJECTS
JOHNS	MICHAEL	M J	241-3895	OHA	STRATEGIC PROJECTS
KUZNIARSKI	EDWARD	ERK	241-2765	OHA	STRATEGIC PROJECTS
MCMANUS	PHILIP	PTM	241-4BI5	OHA	STRATEGIC QUALITY PROGRAMS
SKLENAR	MARK	MJS	241-3625	OHA	STRATEGIC PROJECTS
WILK	JOYCE	JLW	241-4814	OHA	STRATEGIC ENGINEERING SEC
YEAGER	ROBERT	RLY	241-3934	OHA	STRATEGIC ENGINEERING MGR
BROWN	MARK	M B	241-4034	OHA	SUB-ASSEMBLY, SWAT
CHRIST	BRIAN	BDC	241-4034	OHA	SUB-ASSEMBLY, SWAT
DERCQU	NANCY	NJD	241-4034	OHA	SUB-ASSEMBLY, SWAT
FINCH	RUBY	RJF	241-4034	OHA	SUB-ASSEMBLY, SWAT
FISHER	MARY	MGF	241-4034	OHA	SUB-ASSEMBLY, SWAT
FRANKLIN	KATHRYN	KAF	241-4069	OHA	SUB-ASSEMBLY, SWAT
GRAHAM	KAREN	KAG	2~I-4403	OHA	SUB-ASSEMBLY, SWAT
HYSONG	NORMA	NJH	241-4034	OHA	SUB-ASSEMBLY, SWAT
JONES	DARLENE	DPJ	241-4034	OHA	SUB-ASSEMBLY, SWAT
LAW	SYLVIA	SAL	241-4034	OHA	SUB-ASSEMBLY, SWAT
LEYLAND	JOAN	JEL	241-4039	OHA	SUB-ASSEMBLY, SWAT
MOSLEY	JEAN	JEM	241-4034	OHA	SUB-ASSEMBLY, SWAT
MURRAY	JENNIFER	JSM	241-4034	OHA	SUB-ASSEMBLY, SWAT
NICHOLSON	KIRK	K N	241-4034	OHA	SUB-ASSEMBLY, SWAT
ROKOSKI	DENISE	DCR	241-4039	OHA	SUB-ASSEMBLY, SWAT
SABO	KATHY	KKS	241-4034	OHA	SUB-ASSEMBLY, SWAT
SCRATCHARD	ROBERTA	RFS	241-4072	OHA	SUB-ASSEMBLY, SWAT
SHIELDS	SYLVIA	SES	241-4034	OHA	SUB-ASSEMBLY, SWAT
CHAFFMAN	BRENDA	B C	241-4034	OHA	SUB-ASSEMBLY, SWAT
NASSE	ADELINE	ATN	241-4034	OHA	SUB-ASSEMBLY, SWAT
DVORABIC	DAVE	D D	241-4293	OHA	SYSTEMS APPLICATIONS ENG
DIETRICH	DWIGHT	D D	241-4349	OHA	SYSTEM DESIGN ENG
FECZKO	ALBERT	AGF	241-4355	OHA	SYSTEM DESIGN ENG
GOPAL	RAM	R G	241-4387	OHA	SYSTEM DESIGN ENG
JAWDRSKI	WALTER	WHJ	241-4149	OHA	SYSTEM TEST
KALNAS	MARY	M K	241-4397	OHA	SYSTEM DESIGN ENG
MCCRADY	ROD	R M	241-4318	OHA	SYSTEM DESIGN ENG
MOONEY	KEN	K M	241-4880	OHA	SYSTEM DESIGN ENG
ANDERSON	JAY	JJA	241-4296	OHA	SYSTEMS APPLICATIONS ENG
ARNOLD	JANE	J A	241-4372	OHA	SYSTEMS APPLICATIONS ENG
CLARK	GLENN	GRC	241-4143	OHA	SYSTEMS TEST
DEHAVEN	DAVE	DD	241-4291	OHA	SYSTEMS APPLICATIONS
DEVLIN	JAMES	JRD	241-4143	OHA	SYSTEMS TEST
DICK	JOHN	JED	241-4143	OHA	SYSTEMS TEST
GHRIST III	WILLIAM	WDG	241-4048	OHA	SYSTEMS DESIGN ENGINEERING
GILLIS	GREGORY	GHG	241-4461	OHA	SYSTEMS DESIGN ENGINEERING
GINSBURG	LAWRENCE	LHG	241-4143	OHA	SYSTEMS TEST
GROSS	DAVE	D G	241-4867	OHA	SYSTEMS APPLICATIONS ENG
HANTZ	TIM	T H	241-3751	OHA	SYSTEMS DESIGN ENGINEERING
HARTER	TERRY	T H	241-4143	OHA	SYSTEMS TEST
HARVEY	GEORGE	GWH	241-4305	OHA	SYSTEMS TEST
HASENKOPF	JOEL	JEH	241-3601	OHA	SYSTEMS APPLICATIONS ENG MGR
HELTZEL	RICK	R H	241-4302	OHA	SYSTEMS APPLICATIONS ENG

HYSONG	RAY	RAM	241-4143	OHA	SYSTEMS TEST
JORSTAD	JOHN	JKJ	241-4143	OHA	SYSTEMS TEST
KAMPERT	AL	ALK	241-4374	OHA	SYSTEMS DESIGN ENGINEERING
KELLER	DAVID	DBK	241-4179	OHA	SYSTEMS APPLICATIONS ENG
LASKOWSKI	STEPHEN	S L	241-4143	OHA	SYSTEMS TEST
LAWRY	BRIAN	B L	241-3870	OHA	SYSTEMS APPLICATIONS ENG
LAZARSKI	JOSEPH	JAL	241-4783	OHA	SYSTEMS TEST
LOVING	ROD	RLL	241-3804	OHA	SYSTEMS INTEGRATION MGR
LUFFEY	ILA	ILL	241-4143	OHA	SYSTEMS TEST
MACKENROTH	WILLIAM	WAM	241-4143	OHA	SYSTEMS TEST
MAKER	KENNETH	KGM	241-4143	OHA	SYSTEMS TEST
MANNELLA	EDMOND	EAM	241-4143	OHA	SYSTEMS TEST
MARIANI	ARLENE	A M	241-4030	OHA	SYSTEMS DESIGN SEC
MCWILLIAMS	GARY	GBM	241-4450	OHA	SYSTEMS APPLICATIONS ENG
MILLER	DAVID	DLM	241-4143	OHA	SYSTEMS TEST
MONFREDI	MICHAEL	MCM	241-4143	OHA	SYSTEMS TEST
MORRISON	GARY	GLM	241-3864	OHA	SYSTEMS DESIGN ENGINEERING
MUSICANTE	NEIL	NJM	241-4132	OHA	SYSTEMS DESIGN ENGINEERING
MUSK	EDWARD	EDM	241-4144	OHA	SYSTEMS TEST
RAMSEY	CLARENCE	CAR	241-4143	OHA	SYSTEMS TEST
REYNOLDS	NANCY	NLR	241-431I	OHA	SYSTEMS INTEGRATION SEC
ROBISON	BETTY	B R	241-4473	OHA	SYSTEMS APPLICATIONS ENG
ROGINSKI	CHARLES	CFR	241-4143	OHA	SYSTEMS TEST
ROLLINS	LEO	L R	241-4890	OHA	SYSTEMS APPLICATIONS ENG
ROYALL	MARY ANN	M.R	241-2769	OHA	SYSTEMS DESIGN ENGINEERING
SANTOLINE	LINDA	L S	241-3845	OHA	SYSTEMS DESIGN ENGINEERING
SAYERS	RONALD	RLS	241-4314	OHA	SYSTEMS TEST MGR
SCHATZER	SUE ELLEN	S S	241-4310	OHA	SYSTEMS APPLICATION ENG
SCHINDHELM	EDWARD	EPS	241-4772	OHA	SYSTEMS DESIGN ENGINEERING
SOBOTKA	ANTHONY	AFS	241-4143	OHA	SYSTEMS TEST
SRINIVASAN	RAMGOPAL	R S	241-4387	OHA	SYSTEMS DESIGN ENGINEERING
STEVENS	MARK	MAS	241-4061	OHA	SYSTEMS APPLICATIONS ENG
SWACKHAMMER	IRENE	IAS	241-4305	OHA	SYSTEMS TEST
SZWARC	JANET	J S	241-4366	OHA	SYSTEMS APPLICATIONS ENG
TRAINI	DEWEY	DJT	241-4143	OHA	SYSTEMS TEST
WACLO	JOHN	JBW	241-4380	OHA	SYSTEMS APPLICATIONS ENG
WEST	ROBERT	RTW	241-4143	OHA	SYSTEMS TEST
WETMORE, JR	JAMES	JPW	241-4143	OHA	SYSTEMS TEST
WITHERSPOON	JOHN	JTW	241-4295	OHA	SYSTEMS TEST
ZIGLER	RICHARD	R Z	241-4143	OHA	SYSTEMS TEST
POSTAVA JR	FRANK	FAP	241-4703	OHA	T Q SUGGESTION COORDINATOR
CARTER	BARBARA	B C	241-4167	OHA	TECH SUPPORT SVC MAILROOM
ALGAS	EDWARD	EJA	241-3718	OHA	TECHNICAL SUPPORT SERVICES
BIRES	SUE	SJB	241-4811	OHA	TECHNICAL SUPPORT SERVICES
DAILEY	DIANE	DMD	241-4393	OHA	TECHNICAL SUPPORT SERVICES
DANSAK	VIRGINIA	VMD	241-4820	OHA	TECHNICAL SUPPORT SVCS MGR
KIER	TERRI	TAK	241-4811	OHA	TECHNICAL SUPPORT SERVICES
KOVACH	SUSAN	S K	241-4393	OHA	TECHNICAL SUPPORT SERVICES

MONFREDI	JOSEPH	JLM	241-4204	OHA	TECHNICAL SUPPORT SERVICES
WEINZIERL	DAVID	DW	241-3718	OHA	TECHNICAL SUPPORT SERVICES
WYANT	BRENDA	BKW	241-4190	OHA	TECHNICAL SUPPORT SERVICES
EVANS	DAN	D E	241-4140	OHA	TELEPHONE SWITCHROOM
JAROSH	DAVID	DAJ	241-4866	OHA	TEMELIN I&C PROJECT
KATZ	DAVID	DNK	241-4104	OHA	TEMELIN I&C PROJECT
MCMUNN	JANE	J M	241-3643	OHA	TEMELIN I&C PROJECT SEC
WASSEL	WILLIAM	WW	241-4183	OHA	TEMELIN I&C PROJECT
WERNER	SKIP	S W	241-4847	OHA	TEMELIN I&C PROJECT MGR
CEPULL	DALE	DBC	241-4718	OHA	TEST ENGINEERING
EHRENFELD	RUSSELL	RSE	241-4762	OHA	TEST ENGINEERING
GERTSCHER	THOMAS	TLG	241-4774	OHA	TEST ENGINEERING
JOSEFICK	WILLIAM	WFJ	241-4755	OHA	TEST ENGINEERING
MCCANN	JOHN	JCM	241-4780	OHA	TEST ENGINEERING MGR
RILEY	COLE	C R	241-3752	OHA	TEST ENGINEERING
SIGUT	BAN	B S	241-3692	OHA	TEST ENGINEERING
SMICIK	FRANK	F S	241-4784	OHA	TEST ENGINEERING
SMITH	DONALD	DRS	241-4771	OHA	TEST ENGINEERING
SANDERS	JOSEPH	JES	241-4034	OHA	TEST/SUB-ASSEMBLY MGR
TORRES	EPI	E T	241-3659	OHA	TOTAL QUALITY MGR
BIELICK	DANIEL	DTB	241-4158	OHA	TRAFFIC
COOK	MIMI	M C	241-4064	OHA	TRAFFIC
DUSE	GEORGIA	GMD	241-4064	OHA	TRAFFIC
GRAHAM	MICHAEL	MRG	241-4051	OHA	TRAFFIC
GUMBERT	REBECCA	RAG	241-4051	OHA	TRAFFIC SEC
HENDERSON	ROBERT	R H	241-4051	OHA	TRAFFIC
JANOSIK	MIKE	M J	241-3788	OHA	TRAFFIC MGR
MARHEFKY	TOM	T M	241-4158	OHA	TRAFFIC
MCEVOY	JEFF	J M	241-4158	OHA	TRAFFIC
PAOUNCIC	JOHN	J P	241-4051	OHA	TRAFFIC
PATTERSON	GERALDINE	GFP	241-4064	OHA	TRAFFIC
RICHARDSON	JEROME	JDR	241-4158	OHA	TRAFFIC
ROBINSON	BETH ANN	B R	241-4052	OHA	TRAFFIC
SEIGFREID	DAVID	DCS	241-4158	OHA	TRAFFIC
SHERRIEB	JOANNE	JPS	241-4052	OHA	TRAFFIC
SHERRIEB	RONALD	RJS	243-4051	OHA	TRAFFIC
WELLS	DORA	DPW	241-4158	OHA	TRAFFIC
ZOLTAK	MARGARET	MMZ	241-4064	OHA	TRAFFIC
FIELDS	KELLY	K F	241-4146	OHA	TTI REP (PURCHASING)
BLYTHE	J(BEN)(II)	JBB	241-4750	OHA	U S. REGIONAL OPERATIONS MGR
ANTHONY	JANE	JLA	241-4781	OHA	U.S. REGIONAL OPERATIONS SEC
BATE	JAMES	JCB	241-4283	OHA	UNIVERSAL/CABLE
BENCO	DONNA	D B	241-4283	OHA	UNIVERSAL/CABLE
BENCO	WILLIAM	WJB	241-4283	OHA	UNIVERSAL/CABLE
BONNER	JO ELAINE	J B	241-4283	OHA	UNIVERSAL/CABLE
BOSSART	DAVE	DJB	241-4283	OHA	UNIVERSAL/CABLE
BRICK	JOANN	J B	241-4283	OHA	UNIVERSAL/CABLE
BRICK	ROBERT	R B	241-4283	OHA	UNIVERSAL/CABLE

CAMPANEO	RUDOLPH	R C	241-4283	OHA	UNIVERSAL/CABLE
CAMPBELL	JAMES	JWC	241-4283	OHA	UNIVERSAL/CABLE
DAVIS	ROBERT	RLD	241-4283	OHA	UNIVERSAL/CABLE
DOUMONT	DAVID	D D	241-4283	OHA	UNIVERSAL/CABLE
EVANS	ANNA	AHE	241-4283	OHA	UNIVERSAL/CABLE
FASSETT	WILLIAM	WEF	241-4283	OHA	UNIVERSAL/CABLE
GILLARD	KATHLEEN	KMG	241-4283	OHA	UNIVERSAL/CABLE
GRIGGS	SHIRLEY	SMG	241-4283	OHA	UNIVERSAL/CABLE
HOLETICH	JOHN	JCH	241-4283	OHA	UNIVERSAL/CABLE
HOLLENCAMP	DAVID	B H	241-4283	OHA	UNIVERSAL/CABLE
HRITZ	DAVE	D H	241-4283	OHA	UNIVERSAL/CABLE
JONES	ROSE	RMJ	241-4283	OHA	UNIVERSAL/CABLE
KUCHARSKI	RELLA	R K	241-4283	OHA	UNIVERSAL/CABLE
LAYHEW	THELMA	TJL	241-4283	OHA	UNIVERSAL/CABLE
MATOR	JOAN	JMM	241-4283	OHA	UNIVERSAL/CABLE
MATOR	NANCY	NLM	241-4045	OHA	UNIVERSAL/CABLE
MORSON	SHARON	SAM	241-4156	OHA	UNIVERSAL/CABLE
OLESKY	KENNETH	KPO	241-4283	OHA	UNIVERSAL/CABLE
PASTVA	MARY	MEP	241-4283	OHA	UNIVERSAL/CABLE
PFEIL	GLENN	GEP	241-4283	OHA	UNIVERSAL/CABLE
POCSATKO	NATALIE	NMP	241-4283	OHA	UNIVERSAL/CABLE
RICHARDSON	BRENDA	B R	241-4283	OHA	UNIVERSAL/CABLE
SAMAJ JR	ANDREW	A S	241-4283	OHA	UNIVERSAL/CABLE
SHANK	MARLENE	MMS	241-4283	OHA	UNIVERSAL/CABLE
SLACK	KAREN	KMS	241-4283	OHA	UNIVERSAL/CABLE
STANLEY	VIRGINIA	VLS	241-4283	OHA	UNIVERSAL/CABLE
SUMPTER	JULIE	JAS	241-4283	OHA	UNIVERSAL/CABLE MGR
SWARTZ	DUANE	D S	241-4283	OHA	UNIVERSAL/CABLE
TAMBURRO	NICK	N T	241-4283	OHA	UNIVERSAL/CABLE
WASIL	RALPH	RTW	241-4883	OHA	UNIVERSAL/CABLE
WILLIAMS	DONALD	DDW	241-4283	OHA	UNIVERSAL/CABLE
WILSON	CRAWFORD	CNW	241-4283	OHA	UNIVERSAL/CABLE
YAKIMCZYK	PATRICIA	PMY	241-4029	OHA	UNIVERSAL/CABLE
ZUK	LOUIS	LMZ	241-4283	OHA	UNIVERSAL/CABLE
DZIAMA	FRANK	FRD	241-4148	OHA	WISCO COMPUTER APPLICATIONS
PISTORIA	LEN	L P	241-4420	OHA	WISCO COMPUTER APPLICATIONS
REED	ROY	RFR	241-4853	OHA	WISCO COMP APPLICATIONS MGR
REIFENSTEIN	EILEEN	EKR	241-4734	OHA	WISCO RECORDS SEC
SCHRATZ	WILLIAM	WRS	241-4409	OHA	WISCO COMPUTER APPLICATIONS
SHOUPE	JEFF	JAS	241-2716	OHA	WISCO COMPUTER APPLICATIONS
SZARMACH	LEONARD	LGS	241-4149	OHA	WISCO COMPUTER APPLICATIONS
VIGLIONE	MIKE	M V	241-4435	OHA	WISCO COMPUTER APPLICATIONS
WILSON, JR	KENNETH	KJW	241-4759	OHA	CABINET ASSEMBLY
SPAN	ROBERT	RJS	241-4640	OHA	DESIGN & DRAFTING SVCS
WINDSOR	ROBIN	R W	241-4367	OHA	NUCLEAR ELECTRIC ENGINEERING
WILSON	TIMOTHY	TCW	241-3734	OHA	SYSTEMS APPLICATIONS ENG
SMITH	DON	DLS	241-4051	OHA	TRAFFIC

Westinghouse Computers Installed Between 1960 and 1978										
Customer Categories	4449 Buffalo	Prodac 4	P 500 Univac	P 510 CSD	P 580 CSD	P 50 CSD	P 550 CSD	P 250 CSD	P 2000 ISD	W2500 Orlando
Metals Industries	3		2	4	3	43	4	14	29	69
Power Generation		2		7		13	6	29	30	35
Turbine DEH Governor									68	
Gas Turbine Control						180				
Power System Dispatch				5	1	13		6	12	20
Process Industries					2	42			2	23
Data Management										30
Manufacturing						6			30	42
Manufacturing - (W)						5			50	24
Automatic Warehousing						5			4	5
Industrial Energy Mgt										12
Miscellaneous				1		4		5	10	52
Westinghouse						3			7	61
Totals	3	2	2	17	6	316	10	54	252	373

Note that only one P-580 computer system was sold for Power System Dispatch, and it was in the Arizona Public Service ADDAPS project.

More than 300 P-50's were sold, exceeding the number of P-2000's, but fewer than the W-2500's, which were designed, built, and marketed by the Computer Department in Orlando, FL.

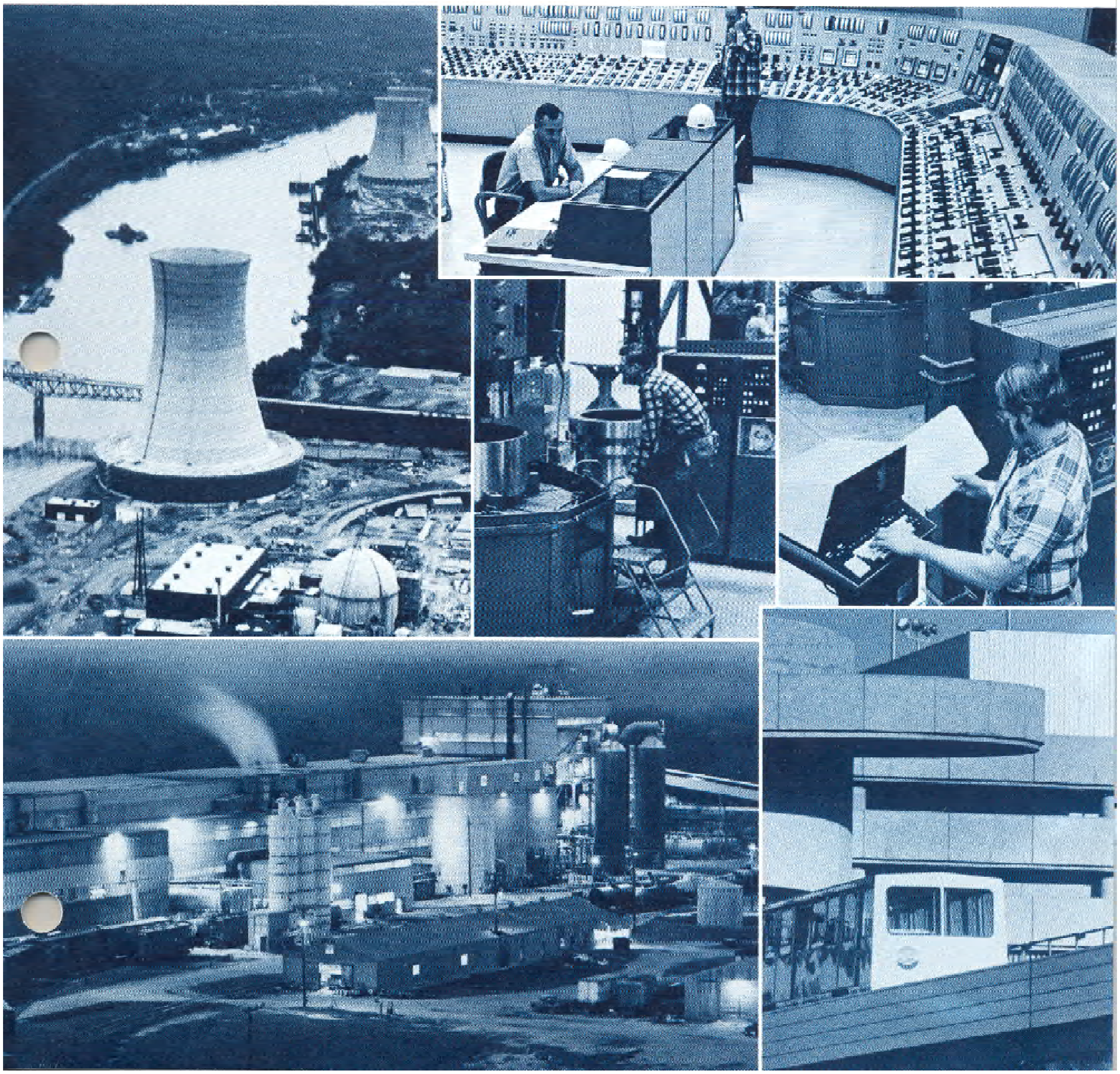
Sold to customers worldwide, more than 1000 Westinghouse process control computer systems were installed in USA, Canada, Mexico, Japan, England, France, Germany, Belgium, Italy, Spain, Switzerland, Sweden, Finland, Iran, India, Dominican Republic, Trinidad, Brazil, Columbia, Ecuador, Venezuela, Argentina, South Africa, Labrador, Taiwan, Thailand, Australia, Hong Kong, Korea, Croatia, Slovenia, and Yugoslavia,

Westinghouse Electric Corporation
Industry Systems Division
O'Hara Township, Pa., U.S.A. 15238

January, 1978
Supersedes 21-020 I WE A, pages 1-16,
dated August, 1976
Mailed to: E, C/1870/PL

Representative list of
worldwide computer
orders and installations

Installation List



Metals Industries

Since 1960 computer control of rolling mills has progressed from scheduling and roll setting calculations to adaptive control, minicomputer logic sequencers, auto matic gage control and multi-computer hierarchial systems. Many of today's mills can only be run under computer control.

	Model	Application
Companhia Acos Especiais Itabira, Belo Horieonte, Brazil	2500	Steckel Mill
Algoma Steel Corp. – Sioux Ste. Marie, Ontario, Canada	2000	Monitoring contact operations on steel mill power station
Algoma Steel Corp. – Sioux Ste. Marie, Ontario, Canada	50	Economic Gas Dispatch
Altos Hornos Del Mediterraneo S.A. – Sagunto, Spain	2500 (2)	Cold Mill
Altos Hornos Del Mediterraneo S.A. – Sagunto, Spain	2500	Temper Mills (2)
Altos Hornos Del Mediterraneo S.A. – Sagunto, Spain	2500	Pickle Line
Altos Hornos Del Mediterraneo S.A. – Sagunto, Spain	2500	Batch Annealing Furnace
Aluminum Co. of America – Warrick, Indiana	250 2000	Cold Mill
Aluminum Co. of America – Warrick, Indiana	510	Hot Strip Mill
Armco Steel Corp. – Ambridge, Pennsylvania	2500	Process Control
Armco Steel Corp. – Butler, Pennsylvania	2500 (3)	Process Control
Armco Steel Corp. – Butler, Pennsylvania	50	Electric Arc Furnaces (3)
Armco Steel Corp. – Butler, Pennsylvania	2000 (2)	Batch Annealing Control
Armco Steel Corp. – Butler, Pennsylvania	50	Digital Classifier
Armco Steel Corp. – Butler, Pennsylvania	2500	Process Control
Armco Steel Corp. – Houston, Texas	50	Blooming Mill
Armco Steel Corp. – Houston, Texas	50	Substation Switching
Armco Steel Corp. – Houston, Texas	4449	Plate Mill
Armco Steel Corp. – Houston, Texas	50	Undisclosed
Armco Steel Corp. – Houston, Texas	50	Undisclosed
Armco Steel Corp. – Houston, Texas	50	Electric Arc Furnaces (2)
Armco Steel Corp. – Middletown, Ohio	550 50 (5)	Hot Strip Mill
Armco Steel Corp. – Middletown, Ohio	250	System Laboratory
Armco Steel Corp. – Middletown, Ohio	250	Cold Mill
Armco Steel Corp. – Middletown, Ohio	500 (2)	System Laboratory
Armco Steel Corp. – Middletown, Ohio	2500	Demand Control
Armco Steel Corp. – Middletown, Ohio	2500	Recycling Plant
Armco Steel Corp. – Middletown, Ohio	2500	Batch Annealing Furnace
Armco Steel Corp. – Middletown, Ohio	2500 (5)	Process Control
Armco Steel Corp. – Middletown, Ohio	2500 (4)	Process Control
Ateliers de Construction Electriques de Charleroi – Belgium (Ferblatil)	2000	Tinning Line
Ateliers de Construction Electriques de Charleroi – Belgium	2000 (2)	Undisclosed
Babcock & Wilcox – Ambridge, Pennsylvania	2500 (4)	Seamless Tube Mill
Bethlehem Steel Corp. – Bethlehem, Pennsylvania	250	Beam Mill
Bethlehem Steel Corp. – Burns Harbor, Indiana	580	Hot Strip Mill
Bethlehem Steel Corp. – Burns Harbor, Indiana	250	Basic Oxygen Furnace
Bethlehem Steel Corp. – Burns Harbor, Indiana	2500	Sinter Plant Control
Bethlehem Steel Corp. – Burns Harbor, Indiana	2500	Raw Material Blending of Sinter Plant Feedstock
Bethlehem Steel Corp. – Lackawanna, New York	2500 (9)	Bar Mill; Scheduling, Control, Material Handling, Warehousing and Shipping

Metal Industries (Cont'd)	Model	Application
Bethlehem Steel Corp. – Sparrows Point, Maryland	2500 (2)	Hot Strip Mill
Bethlehem Steel Corp. – Sparrows Point, Maryland	2500 (2)	Blast Furnace
Bethlehem Steel Corp. – Steelton, Pennsylvania	250	Electric Arc Furnace
Ceco Steel Products Corp. – Milton, Pennsylvania	50	Electric Arc Furnaces (3)
Continental Steel Corp. – Indianapolis, Indiana	50	Electric Arc Furnaces (2)
Compania Siderurgica Nacional – Brazil	2000	Hot Strip Mill
Compania Siderurgica Nacional – Brazil	50	Rolling Mill, Automatic Gage Control
C.O.P. – Belgium	50	Rolling Mill
Cosipa – Brazil	2000	Automatic Gage Control
Cosipa – Brazil	2500	Hot Strip Mill
Crucible Steel Co. – Midland, Pennsylvania	4449	Hot Strip Roughing Mill
Dominion Foundries & Steel Co., Ltd. – Hamilton, Ontario, Canada	2000	Slabbing Mill
Dominion Foundries & Steel Co., Ltd. – Hamilton, Ontario, Canada	50	Reversing Roughing Mill
Dominion Foundries & Steel Co., Ltd. – Hamilton, Ontario, Canada	50	Blast Furnace
Ensidesa – Spain	250	Basic Oxygen Furnace
Ensidesa – Spain	50	Tin Line
Ensidesa – Spain	50	Temper Mill
Esperance Longdoz – Belgium	250	Hot Strip Mill
Esperance Longdoz – Belgium	50	Roughing Mill
Esperance Longdoz – Belgium	50	Automatic Gage Control
European via Siemens (licensee, Dusseldorf, Germany)	550	Plate Mill
Florida Steel Corporation – Baldwin, Florida	2500	Bar Mill (Logic)
Forge de Clabecq – Belgium	2000	Plate Mill
Forge de Clabecq – Belgium	2000	Basic Oxygen Furnace
Granite City Steel Co. – Granite City, Illinois	50	Basic Oxygen Furnace
Great Lakes Steel Co. – Detroit, Michigan	50	Arc Furnace Demand Control
Hainaut Sambre – Belgium	2500 (4)	Hot Strip Mill
Inland Steel Co. – East Chicago, Indiana	580	Hot Strip Mill
Inland Steel Co. – East Chicago, Indiana	2500	Coke Battery
Inland Steel Co. – East Chicago, Indiana	2500 (5)	Blast Furnace
Italsider – Taranto, Italy	510	Plate Mill
Italsider – Piombino, Italy by Marelli	2500	Graphic Sequencer for Rod Mill
Jeumont-Schneider – France	2000	Hot Strip Mill Down Coiler
Jeumont-Schneider – France	2000	Pickling Line
Jeumont-Schneider – France	2000	4-high Single Stand Reversing Cold Mill
Jeumont-Schneider – France	2000	Single Stand Reversing Multiple Roll Cold Mill
Jeumont-Schneider – France	2000	Blooming Mill
Jeumont-Schneider – France	2000	Billet Mill
Jeumont-Schneider – France	2000	Rod Mill
Jeumont-Schneider – France	2000	Inspection and Reconditioning
Jeumont-Schneider – France	2500	Cold Mill
Jeumont-Schneider – France	2500	Cold Mill
Jeumont-Schneider – France	2500	Cold Mill
Jeumont-Schneider – France	2500	Cold Mill
Jeumont-Schneider – France	2500	Pickling Line
Jeumont-Schneider – France	2500	Basic Oxygen Furnace
Jones & Laughlin Steel – Aliquippa, Pennsylvania	250	Basic Oxygen Furnace Has been Resold to Kodak

Metals Industries (Cont'd)	Model	Application
Jones & Laughlin Steel – Cleveland, Ohio	50	Slabbing Mill
Jones & Laughlin Steel – Cleveland, Ohio	50	Basic Oxygen Furnace
Kaiser Aluminum & Chemical Corp. – Ravenswood, Virginia	250	Pot Line
Kaiser Steel Corp. – Fontana, California	510	Plate Mill
Kaiser Steel Corp. – Fontana, California	2500	Oxygen Furnace
Kaiser Steel Corp. – Fontana, California	2500	Continuous Caster
Kawasaki Steel Corp. – Japan	550	Plate Mill
Lake Ontario Steel – Whitby, Ontario, Canada	250	Electric Arc Furnaces
Lake Ontario Steel – Whitby, Ontario, Canada	250	Laboratory
Ercole Marelli – Italy	2500	Wire/Rod Mill
Ercole Marelli – Italy	2500	Reversing Cold Mill
Ercole Marelli – Italy	2500	2 Stand Temper Mill
Ercole Marelli – Italy	2500	4 Stand Tandem Cold Mill
Ercole Marelli – Italy	2500	5 Stand Tandem Cold Mill
Ercole Marelli – Italy	2500	Arc Furnace
Ercole Marelli – Italy	2500	Rod Mill
Metalurski Kombinat Smedereva – Yugoslavia	2000	Hot Strip Mill
National Steel, Midwest Division – Chicago, Illinois	250	Cold Mill
Nippon Iron & Steel – Japan	550	Plate Mill
Republic Steel Corp. – Canton, Ohio	50	Electric Arc Furnace
Republic Steel Corp. – Cleveland, Ohio	50	Cold Mill
Republic Steel Corp. – Gadsden, Alabama	500 50	Hot Strip Mill
Republic Steel Corp. – Niles, Ohio	50	Tinning & Side Trim Line
Santa Rosa – Argentina	2000	Demand & Generation Control
C.V.G. Siderurgica Del Orinoco, C.A. – Venezuela	2500	Temper Mill (Logic)
Sociedad Mixta Siderurgia – Argentina	50	Undisclosed
SOLLAC, Seremange – Alsace-Lorraine, France	50	Slabbing Mill
South African Iron & Steel Industrial Corp. Ltd. (ISCOR) – South Africa	250	Arc Furnace
South African Iron & Steel Industrial Corp. Ltd. (ISCOR) – South Africa	50	Slabbing Mill
South African Iron & Steel Industrial Corp. Ltd. (ISCOR) – South Africa	50	Tinning Mill
Somisa – Argentina	2000	Arc Furnace Demand Control
Somisa – Argentina	2000	Position Regulation and Automatic Gage Control
Steel Company of Canada, Ltd.	2500	Blast Furnace
Steel Company of Canada, Ltd.	50	Tinning Line #1
Steel Company of Canada, Ltd.	50	Tinning Line #3
The Timken Co. – Gambrinus Plant – Canton, Ohio	2500 (2)	#5 Seamless Tube Mill
U. S. Steel Corp. – Gary, Indiana	4449	Plate Mill
U. S. Steel Corp. – Gary, Indiana	510	Cold Mill
U. S. Steel Corp. – South Chicago, Illinois	50	Blast Furnace
U. S. Steel Corp.	2500	Thickness Gage Monitoring
U. S. Steel Corp.	2500	Alarm Indicating and Monitoring
USINOR – France	50	Hot Strip Mill
USINOR – France	2000 (3)	Hot Strip Mill
USINOR – France	2000 (2)	Cold Mill
USINOR – France	2000	Combination Temper & Double Cold Reduction Mill
USINOR – France	2000	Shear Line
Weirton Steel Division, National Steel – Weirton, West Virginia	50	Blast Furnace
Weirton Steel Division, National Steel – Weirton, West Virginia	50	Blast Furnace
Weirton Steel Division, National Steel – Weirton, West Virginia	50	Continuous Casting Plant
Wheeling Steel Co. – Wheeling, West Virginia	580	Hot Strip Mill
Youngstown Sheet & Tube – Indiana Harbor, Indiana	550 50 (2)	Hot Strip Mill

Power Generation	Type of Plant	Model	Additional Functions
Alabama Power Co. – Joseph M. Farley #1 & 2	Nuclear	2500	On-line communication to remote data processing center. CRT Display System Secondary Plant Performance Calculations
Allegheny Power System – Harrison #1, 2 & 3	Fossil	2000 (2)	Data-linked CPUs Share Load; Automatic Backup Transfer Capability
Allegheny Power System – Pleasants #1 & 2	Fossil	2500	Performance Calculations, CRT consoles and displays
Arkansas Power & Light – Lake Catherine #4	Fossil	250	Turbine Startup Control
Ateliers de Construction Electriques de Charleroi – Belgium	Fossil	2500 (2)	Data Acquisition and Monitoring
Baltimore Gas & Electric – Calvert Cliff #1 & 2	Nuclear	250	Secondary Plant Performance Calculation, CRT Display System
Basin Electric Power Cooperative – Leland Olds #2	Fossil	2500	CRT Display
Boston Edison Co. – New Boston Station #1 & 2	Fossil	510	Turbine Startup Control
Calgary Power Corp. – Sundance, Alberta, Canada	Fossil	50	Turbine Startup Control – Unit #1
Calgary Power Corp. – Sundance, Alberta, Canada	Fossil	50	Data Acquisition – Unit #1
Calgary Power Corp. – Sundance, Alberta, Canada	Fossil	50	Turbine Startup Control – Unit #2
Calgary Power Corp. – Sundance, Alberta, Canada	Fossil	50	Data Acquisition – Unit #2
Calgary Power Corp. – Sundance, Alberta, Canada	Fossil	2000	Unit #3
Calgary Power Corp. – Sundance, Alberta, Canada	Fossil	2000	Unit #4
Canatom – Canada for the government of Taiwan	Nuclear	2000	Data Logging Only
Carolina Power & Light – H. B. Robinson #2	Nuclear	250	Secondary Plant Performance Calculation
Carolina Power & Light – L. V. Sutton #3	Fossil	2000	
Carolina Power & Light – Roxboro #3 & 4	Fossil	2000	
Carolina Power & Light – Shearon Harris #1, 2, 3 & 4	Nuclear	2500	Backup of the plant computer by an additional CPU/DISC. Interactive CRT Display System. Secondary Plant Performance Calculations Batch System and Mag Type
Central Louisiana Electric – Caughlin Station #7	Fossil	50	
Central Louisiana Electric – Teche #3	Fossil	250	Subloop DDC
Central Nuclear de Almaraz – Almaraz #1	Nuclear	2500	Backup of the plant computer by an additional CPU/DISC. CRT Display System. Secondary Plant Performance Calculations
Central Nuclear de Almaraz – Almaraz #2	Nuclear	2500	Backup of the plant computer by an additional CPU/DISC. CRT Display System. Secondary Plant Performance Calculations
Central Termica de Aceca – Aceca #1 & 2	Fossil	250	
Churchill Falls Power Corp. – Labrador	Hydro	2000	
Cincinnati Gas & Electric – Beckjord Station #6	Fossil	550	
Cleveland Electric Illuminating – Avon Lake #9	Fossil	50	Turbine Startup Control Only
Commonwealth Edison – Joliet Station #7 & 8	Fossil	510	
Commonwealth Edison – Zion Station #1	Nuclear	250	Secondary Plant Performance Calculation
Commonwealth Edison – Zion Station #2	Nuclear	250	Secondary Plant Performance Calculation
Commonwealth Edison – Power Station #5 & 6	Fossil	2000 (2)	CRT Display

Power Generation (Cont'd)	Type of Plant	Model	Additional Functions
Compania Sevillana de Electricidad, Spain – C. T. Bahia de Algeciras #2	Fossil	2500	CRT Display
Consolidated Edison – Indian Point #2	Nuclear	250	
Dairyland Electric Cooperative – Alma #6	Fossil	2500 (2)	PROTEUS with complete system backup, color CRT's and Calculations
Dairyland Electric Cooperative – Genoa #3	Fossil	250	
Dallas Power & Light – Lake Hubbard #1	Fossil	50	Turbine Startup Control Only
Duquesne Light – Beaver Valley Power Station #1 & 2	Nuclear	250	Secondary Performance Calculation, Turbine Acceleration Control
East Kentucky Power Cooperative – Spurlock 1	Fossil	2500 (2)	Complete backup, dial-up data link to 3 environmental stations near plant
Electric Generating Authority of Thailand, Unit 5	Fossil	2000	CRT displays and calculations
Electric Generating Authority of Thailand	Fossil	2000	CRT Display
Electricity Commission of New South Wales, Australia – Wallerwang #7	Fossil	2500	Data-linked CPU's Share Load; Automatic Backup Transfer Capability; Turbine Startup Control; CRT Display; Mag. Tape Historical Data Storage
Ente Nazionale Per L-Energia Elettrica Centrale Di La Specia (ENEL) Unit #3 – Italy	Fossil	550	Turbine Startup Control
Fuerzas Electricas de Cataluna, S. A. – Asco #1 & 2	Nuclear	2500	Secondary Plant Performance Calculations
Furnas Centrais Electricas, S. A. – Angra #1	Nuclear	2500	Secondary Plant Performance Calculations, CRT Display System
Georgia Power Corp. – Alvin W. Vogtle #1 & 2	Nuclear	2500	
Georgia Power Corp. – Harlee Branch Station #1 & 2	Fossil	510	
Georgia Power Corp. – Harlee Branch Station #3 & 4	Fossil	550	
Georgia Power Corp. – Wansley #1 & 2	Fossil	2500	Color Graphic CRT's and extensive performance calculations.
Gulf States Utilities – Lewis Greek Station	Fossil	50	Monitoring and Logging Only
Gulf States Utilities – Willow Glen #4	Fossil	250	CRT Display
Hong Kong Electric Co. – Ap Lei Chau #1, 2, 3, & 4	Fossil	2000	
Hong Kong Electric Co. – Ap Lei Chau #5, 6, 7 & 8	Fossil	2500	CRT functions and calculations for all 4 units in one computer.
Iberduero, S. A. – Lemoniz #1 & 2	Nuclear	2500	Secondary Plant Performence Calculations, CRT Display System Critical Input Monitoring between Two Computers
Indiana & Michigan Electric – Donald C. Cook #1 & 2	Nuclear	250	
Indiana Public Service – Neal #2	Fossil	50	Monitoring and Logging Only
Kansai Electric – Japan, Mihama #1 & 2	Nuclear	250	Secondary Performance Calculation, Critical Input Monitoring Between Two Computers
Kansai Electric – Japan, Nuclear Training Center	Nuclear	2000 (2) Sigma 5	Simulation for Operator Training
Korea Electric Co. – KO-RI	Nuclear	2500	Secondary Plant Performance Calculations
Louisiana Power & Light	Combined Cycle	2500	Automatic Plant Startup, Computer & Analog control integrated system

Power Generation (Cont'd)	Type of Plant	Model	Additional Functions
Minnesota Power & Light – Clay Boswell Station #3	Fossil	2500	Monitoring, Logging and Performance Logging Only
Missouri Public Service – Sibley Station #3	Fossil	250	Turbine Startup Control, Boiler and Turbine DDC
New York State Electric & Gas and Penna. Electric – Homer City #1	Fossil	50	(No Performance Calculation)
NOK – Switzerland, Beznau #1 & 2	Nuclear	250	
Northern Indiana Public Service Co. – Michigan City #12	Fossil	2000	Turbine Startup Monitoring, Operator Guides, CRT Display
Northern Indiana Public Service Co. – Rollin M. Schahfer #14	Fossil	2000	
Northern States Power – Prairie Island #1 & 2	Nuclear	250	Secondary Performance Calculation, Critical Input Monitoring Between Two Computers, CRT Display, Turbine Acceleration, Nuclear Fuel Performance Calculation, Large Motor Monitoring
Northwestern Public Service Co., Ottertail Power Co. & Montana-Dakota Utilities – Big Stone #1	Fossil	2000	Turbine Diagnostic Logging
Oklahoma Gas & Electric – Muskogee #4 & 5	Fossil	2000	CRT Display
Omaha Public Power – Fort Calhoun	Nuclear	250	Secondary Plant Performance Calculation
Orlando (Florida) Utilities Commission – Indiana River #3	Fossil	2000	Turbine Startup Monitoring, CRT Display
Pacific Gas & Electric – Contra Costa #6 & 7	Fossil	510	Secondary Performance Calculation, 3 Loops DDC
Pacific Gas & Electric – Diablo Canyon #1 & 2	Nuclear	250	Secondary Performance Calculation, CRT Display, Data Link to DEH Computer
Pacific Gas & Electric – Moss Landing #6 & 7	Fossil	550	Subloop DDC
Pacific Gas & Electric – Pittsburg Station #7	Fossil	250 2000 (2)	Boiler and Turbine DDC with DDC Backup, Subloops DDC
Pacific Power & Light – D. Johnson #4	Fossil	50	Data Logging & Monitoring
Portland General Electric – Trojan #1	Nuclear	250	Secondary Plant Performance Calculations, CRT Display
Power Authority State of New York		2500	Proteus
Power Authority State of New York – Indian Point #3	Nuclear	250	
Public Service Co. of New Mexico – San Juan #2	Fossil	2000	Pulverized Coal Burner Control
Public Service Electric & Gas of New Jersey – Hudson #1	Fossil	510	
Public Service Electric & Gas of New Jersey – Hudson #2	Fossil	550	
Public Service Electric & Gas of New Jersey – Salem #1 & 2	Nuclear	250	Secondary Performance Calculation, CRT Display
Public Service Indiana – Gibson #3	Fossil	2500 (2)	One Batch System, One Monitor System with Data Links and Mag Tape
Public Service Indiana – Gibson #4	Fossil	2500	
Rochester Gas & Electric – Robert Emmett Ginna Station	Nuclear	250	Data Link to Off-site Computer, Secondary Plant Monitoring
Savske Electrarne, Ljubljana Slovenia, Elektroprivreda, Croatia – Krsko #1	Nuclear	2500	CRT Display
Societa Electronucleare Italiana – Enrico Fermi	Nuclear	510	
South Carolina Electric & Gas – V. C. Summer	Nuclear	2500	Secondary Plant Monitoring
Southwestern Public Service – C. B. Jones #1 & 2	Fossil	2000	Data Link to DEH Computer

Power Generation (Cont'd)	Type of Plant	Model	Additional Functions
Southwestern Public Service – Nichols #1 & 2	Fossil	2500	CRT Console and Displays, Data Link to System Dispatch
Southwestern Public Service – Harrington #1 & 2	Fossil	2500	Mag Tape, Color CRT Graphics and Console
Square Butte Electric Coop. – Young #2	Fossil	2500	Color CRT
Swedish State Power Board – Ringhals #2	Nuclear	250	Secondary Plant Monitoring
Swedish State Power Board – Ringhals #3 & 4	Nuclear	2500	Secondary Plant Monitoring
Taiwan Power Co. – Talin Station #3 & 4	Fossil	2000	CRT Display
Tennessee Valley Authority – Sequoyah #1 & 2	Nuclear	250	Secondary Plant Performance Calculations
Tennessee Valley Authority – Watts Bar #1 & 2	Nuclear	2500	Secondary Plant Performance Calculations
Texas Electric Service – Graham #2	Fossil	50	
Texas Electric Service – Permian Basin #6	Fossil	2000	
Texas Electric Service – Handley Station #3	Fossil	IV	
Texas Power & Light – Valley Station #2	Fossil	50	
Union Electrica S.A. Compania Sevillana Electricidad, S.A. Hidroelectrica Espanola, S.A. – Almaraz #1 & 2	Nuclear	2500	CRT Display Backup Computer, Batch System, Secondary Performance Calculation
Union Electric – Rush Island #1 & 2	Fossil	2000	
Virginia Electric & Power – North Anna #1 & 2	Nuclear	250	CRT Displays
Virginia Electric & Power – Mt. Storm #3	Fossil	2000	CRT Display
Virginia Electric & Power – Surry #1 & 2	Nuclear	250	Secondary Performance Calculation, Turbine Acceleration, CRT Display
Wisconsin Electric Power – Oak Creek #7	Fossil	510	Turbine Startup Control
Wisconsin Electric Power – Oak Creek #8	Fossil	550	Turbine Startup Control
Wisconsin Electric Power – Point Beach #1 & 2	Nuclear	250	
Wisconsin Public Service – Kewaunee	Nuclear	250	Secondary Performance Calculation
Westinghouse & Commonwealth Edison – Zion Training Center	Nuclear	2000 (2) Sigma 5	Nuclear Simulation for Operator Training

Turbine Control – Digital Electrohydraulic Governor

Alabama Power Co. – Farley #1 & 2	2000
Bechtel Corp. – Big Stone Plant	2000
Brazos Electric Power Coop., Inc. – R. W. Miller Power Plant Unit 3	2000
Canal Electric System – Canal #2	2000
Carolina Power & Light Co. – Shearon Harris #1, 2, 3 & 4	2000 (4)
Central Illinois Public Service Co. – Meredosia Unit #4	2000
Central Nuclear de Almaraz – Units #1 & 2	2500(2)
Central Nuclear de Lemoniz – Bilbao Site	2500
Central Nuclear de Lemoniz – Unit #2	2500
Cincinnati Gas & Electric – East Bend Station – Unit #2	2500
Cincinnati Gas & Electric – W. H. Zimmer Nuclear Power Sta.	2000
Cincinnati Gas & Electric, Dayton Power & Light, and Southern Ohio Electric Co.	2000
Columbus & South Ohio Electric Co. – Conesville Station	2000 (2)
Commonwealth Edison – Collins #4 & 5	2500 (2)

Turbine Control – Digital Electrohydraulic Governor (Cont'd)

Dairyland Power Coop. – Alma Unit #6	2500
Detroit Edison – Monroe #2 & 3	2000 (2)
Duke Power Co. – Belews Creek #1 & 2	2000 (2)
Duke Power Co. – McGuire #1 & 2	2000 (2)
Florida Power & Light – Sanford #4 & 5	2000 (2)
Florida Power & Light – Hutchinson Island #1 & 2	2000 (2)
Florida Power & Light – St. Lucie #1 & 2	2000 (2)
Florida Power & Light – Manatee #2	2000
Florida Power & Light – Martin Plant #1 & 2	2000 (2)
Fuerzas Electricas de Cataluna – Fesca – ASCO #1 & 2	2500 (2)
Furnas Centrais Electricas, SA	2000
Interstate Power Company – Lancing #4	2000
Jacksonville Electric Authority – Northside #3	2000
Kansas City, Board of Public Utilities	2500
Krsko, Yugoslavia	2500
Louisianna Power & Light Co. – Waterford #3	2000
Mississippi Power Co. – Jackson County Steam Plant, Units #1 & 2	2000 (2)
Nebraska Public Power District – Cooper Nuclear Station Unit #1	2000
Niagara Mohawk – Oswega – Units #5 & 6	2000 (2)
Northern Indiana Public Service Company – Kankakee #14	2000
Northern Indiana Public Service Company – Unit #14 Generating Station	2000
Oklahoma Gas & Electric – Muskogee Gen. Sta. Unit #4 & 5	2500 (2)
Omaha Public Power District – Nebraska City Power Station	2500
Ottertail Power Co. – Big Stone #1	2000
Pacific Gas & Electric – Diablo Canyon #1 & 2	2000 (2)
Pacific Gas & Electric – Pittsburg #7	2000
Public Service of New Hampshire – Newington #1	2000 (2)
Salt River – Hayden Power Plant	2000
San Diego Gas & Electric – South Bay #4	2000
San Diego Gas & Electric – Encina #4 & 5	2000 (2)
Southwestern Public Service – C.B. Jones #1 & 2	2000 (2)
Southwestern Public Service – Harrington Station Unit #2	2500
Southwestern Public Service – 4 Corners Plant	2500
Taiwan Power Company – Chinshan #1 & 2	2000 (2)
Taiwan Power Company – Hsieh Ho #2 Steam Plant	2500
Taiwan Power Company – Kuo Sheng Nuclear Power Station– Units #1 & 2	2500 (2)
Texas Utility Services, Inc – Steam Electric Station	2500
Texas Utility Services, Inc. – Martin Lake Steam Electric Station	2500 (2)
Union Electric – Rush Island Plant	2000
Union Electric – Rush Island Plant #1 & 2	2000 (2)

Combined Cycle – PACE (Power at Combined Efficiencies)	**Model**	**Application**
Central Iowa Power Co. – Creston, Iowa	50	PACE 30
Central Iowa Power Co. – Summit Lake, Iowa	50	PACE 30
El Paso Electric Company, El Paso, Texas Newman Power Station, Unit #4	2000 (2)	PACE 260
Florida Power & Light Co. – Palatka Station, Unit #1 & 2	2000 (2)	PACE 260
Mexico Comision Federal De Electridad – Altamira, Tampico	2000 (2)	PACE 260
Mexico Comision Federal De Electridad – Dos Bocas, Vera Cruz	2000 (2)	PACE 260 (2)
Public Service Co. of Oklahoma, Lawton Comanche Unit #1	2000 (2)	PACE 260
St. Joseph Power & Light – St. Joseph, Texas	50	PACE 60
Southern California Edison Co. – Coolwater Station, Unit # 3 & 4	2000 (2)	PACE 260
Southwestern Public Service – Borger, Texas	50	PACE 30

Gas Turbine Control	Model	Application
Alabama Power Co. – Demopolis Station	50 (2)	Dual Turbine Control
Alabama Power Co. – Barry Combustion Turbine Plt.	50 (2)	Dual Turbine Control
Anchorage, Alaska, City of – Municipal Light & Power Co.	50 (2)	Single Turbine Control
Aramco	50 (4)	Single Turbine Control
Aramco – Shedgum (CGTG 1, 2, 3, 4, 5, 6, 7, 8)	50 (8)	Single Turbine Control
Aramco – Safaniya (CGTG 3, 4)	50 (2)	Single Turbine Control
Aramco – Uthmaniyah (CGTG 9)	50 (1)	Single Turbine Control
Aramco – Berri Generator (#1, 2, 3)	50 (3)	Single Turbine Control
Arizona Electric Power Coop., Inc. – Apache Electric Station	50 (1)	Single Turbine Control
Arizona Public Service Co. – Ocotillo Plant	50 (1)	Dual Turbine Control
Arizona Public Service Co. – West Phoenix	50 (1)	Single Turbine Control
Arizona Public Service Co. – Sagualo	50 (1)	Single Turbine Control
Atlantic City Electric Co.	50 (1)	Single Turbine Control
Baltimore Gas & Electric	50 (1)	Dual Turbine Control
Baltimore Gas & Electric – Perryman Station	50 (4)	Dual Turbine Control
Baltimore Gas & Electric – Riverside Power Plant	50 (1)	Dual Turbine Control
Brazil – Centrais Electricas Brasileiras, S.A. Electrobras, Rio De Janiero, Brasil	50 (2)	Dual Turbine Control
	50 (1)	Single Turbine Control
C. F. Electricidad, Mexico – Valle De Mexico Station	50 (2)	Single Turbine Control
Carolina Power & Light – Darlington County Electric Plant	50 (9)	Single Turbine Control
Carolina Power & Light – H. F. Lee Steam Electric Plant	50 (1)	Single Turbine Control
	50 (1)	Dual Turbine Control
Central Iowa Power Coop. – Creston Summit Lake Generating Stations	50 (2)	Single Turbine Control
Cincinnati Gas & Electric Co.	50 (1)	Single Turbine Control
Cincinnati Gas & Electric Co. – Miami Fort Power Station	50 (2)	Single Turbine Control
Cincinnati Gas & Electric Co. – Miami Fort Power Station	50 (1)	Single Turbine Control
Cleveland Electric Illuminating Co. – Eastlake Generating Station	50 (1)	Single Turbine Control
Cleveland Electric Illuminating Co. – Avon Lake Station	50 (1)	Single Turbine Control
Consolidated Edison Co. of N. Y., Inc.	50 (1)	Dual Turbine Control
Consolidated Edison Co. of N. Y., Inc. – Buchanan Substation	50 (1)	Dual Turbine Control
Consolidated Edison Co. of N. Y., Inc. – Astoria Plant	50 (2)	Dual Turbine Control
Delmarva Power & Light Co. of Maryland – Tasley Gas Turbine Plant	50 (1)	Single Turbine Control
Delmarva Power & Light	50 (4)	Dual Turbine Control
Detroit – Mistersky Generating Station	50 (1)	Single Turbine Control
Dominican Republic – Corporacion Dominicana De Electricidad	50 (3)	Single Turbine Control
Duke Power Company	50 (1)	Dual Turbine Control
Duke Power Company – Buzzard Roost Station	50 (1)	Single Turbine Control
Duke Power Company – Buzzard Roost Station	50 (3)	Dual Turbine Control
Equador (Quito) – Empressa Electrica Quito, S.A.	50 (1)	Single Turbine Control
Electrificadora Del Atlantico Columbia, South America – Electranta III	50 (1)	Single Turbine Control
Empire District Electric Co.	50 (1)	Single Turbine Control
Florida Power Corp. – Turner Plant (Units 3 & 4)	50 (2)	Single Turbine Control
Georgia Power Co.	50 (3)	Dual Turbine Control
Illinois Power Co. – Stalling Station	50 (2)	Dual Turbine Control
Iowa Power & Light Co. – Sycamore Station	50 (2)	Single Turbine Control
Jacksonville Electric Authority	50 (4)	Single Turbine Control
Jacksonville Electric Authority – J. D. Kennedy Generating Station	50 (2)	Single Turbine Control
Jersey Central Power & Light Co. – Gilbert Generating Station	50 (2)	Dual Turbine Control
Jersey Central Power & Light Co. – Sayreville Generating Station	50 (1)	Single Turbine Control
Jersey Central Power & Light Co. – Sayreville Generating Station	50 (3)	Dual Turbine Control
Jersey Central Power & Light Co. – E. H. Werner Generating Station	50 (2)	Dual Turbine Control

Gas Turbine Control (Cont'd)	Model	Application
Kaiser Aluminum & Chemical Corp. – Chalmette Plt.	50 (4)	Dual Turbine Control
Kansai Electric Power	50 (1)	Single Turbine Control
Kansai Electric Power – Miyazu (Unit 1)	50 (1)	Single Turbine Control
Kansai Electric Power – Austin Plant	50 (1)	Single Turbine Control
Kansas Power and Light	50 (1)	Single Turbine Control
Kansas Power and Light – Hutchison Power Plant	50 (1)	Single Turbine Control
Lakeworth Utility Authority – T. G. Smith Municipal Power Plant	50 (2)	Single Turbine Control
Lincoln, Nebraska, City of	50 (1)	Single Turbine Control
	50(1)	Dual Turbine Control
Mexico, Comision Federal De Electricidad – Valle De Mexico Power Plant	50 (1)	Single Turbine Control
Nevada Power Co. – Sunrise Station	50 (2)	Single Turbine Control
New Jersey Power & Light – National Energy Leasing	50 (1)	Single Turbine Control
New Jersey Power & Light – Reigal Paper	50 (1)	Single Turbine Control
Northern States Power Co. – French Island Generating Plant	50 (2)	Single Turbine Control
Northern States Power Co. – Wheaton Generating Plant	50 (1)	Single Turbine Control
Ohio Edison – Niles Plant	50 (1)	Single Turbine Control
Ohio Edison – Mad River Plant	50 (1)	Dual Turbine Control
Pennsylvania Electric – Wayne Combustion Turbine Gen. Sta.	50 (2)	Single Turbine Control
Philadelphia Electric Co.	50 (2)	Dual Turbine Control
Philadelphia Electric Co. – Richmond Generating Station	50 (4)	Dual Turbine Control
Public Service Co. of Oklahoma	50 (3)	Dual Turbine Control
Public Service Electric & Gas of New Jersey – Essex Generating Station	50 (1)	Single Turbine Control
Public Service Electric & Gas of New Jersey – Linden Generating Station	50 (2)	Dual Turbine Control
Rochester	50 (1)	Single Turbine Control
Salt River	50 (1)	Single Turbine Control
Salt River – Aqua Fria Steam Plant	50 (3)	Single Turbine Control
Salt River – Kyrene Steam Plant (Unit #4)	50 (1)	Single Turbine Control
Saudi, Kingdom of – Ministry of Industry & Electricity	50 (3)	Single Turbine Control
South Carolina Electric & Gas – Bushy Park Station	50 (1)	Dual Turbine Control
South Carolina Electric & Gas – Arthur M. William Station	50 (1)	Dual Turbine Control
South Carolina Public Service Authority – Myrtle Beach Gas Turbine	50 (1)	Single Turbine Control
Southern Indiana Gas & Electric – Ohio River Station	50 (1)	Single Turbine Control
Southwestern Public Service	50 (1)	Single Turbine Control
St. Joseph Light & Power Co. – Lake Road Power Station	50 (1)	Single Turbine Control
Taiwan Power Co. – Linkou	50 (4)	Single Turbine Control
Tallahassee, Florida, City of – A. B. Hopkins Generating Station	50 (1)	Single Turbine Control
Tampa – Big Bend Station	50 (1)	Single Turbine Control
Tennessee Valley Authority – Gallatin Steam Plant (Units 1, 2, 3, 4)	50 (4)	Single Turbine Control
Tobago Electricity Commission, Trinidad	50 (1)	Single Turbine Control
Tri-State Generation & Transmission Ass'n., Inc. – Wray Substation	50 (3)	Single Turbine Control
Tuscon Gas & Electric – Irvington Station	50 (1)	Single Turbine Control
Tuscon Gas & Electric – Irvington Station	50 (1)	Dual Turbine Control
Tuscon Gas & Electric – North Loop Station	50 (2)	Single Turbine Control
Tuscon Gas & Electric – North Loop Station	50 (1)	Dual Turbine Control
Vineland Electric	50 (1)	Single Turbine Control
Virginia Electric Power Co. – Kitty Hawk	50 (2)	Single Turbine Control
Virginia Electric Power Co. – Surry Station	50 (2)	Single Turbine Control
Virginia Electric Power Co. – Portsmouth Station	50 (2)	Dual Turbine Control
Western Power Division of Central Telephone & Utilities Corp. – Clifton Generation Station	50 (1)	Single Turbine Control

Power System Dispatch and Control	Model	Application
Arizona Public Service Co.	580	Complete Automatic Dispatch Hybrid System
Baltimore Gas & Electric Co.	2500 (2)	One Master, One Remote; Data Acquisition, Supervisory Control, Sequence of Events to 1 Millisecond Resolution, Post-disturbance Analysis, CRT Displays (alphanumeric and one-line diagrams), PJM Binary Synchronous Data Link
Central Maine Power Co.	250	Digital Dispatch, Pool Satellite
City of Burbank, California	2000	Supervisory Control; REDAC 70
City of Gainesville, Florida	2500 (2)	Dual Combined Automatic Generation Control and SCADA (Supervisory Control and Data Acquisition), Colorgraphic CRT Consoles; REDAC 70
City of Tallahassee, Florida	2000 (2)	Data Acquisition and Supervisory Control for 3 Bulk Transmission Substation and 2 Generating Stations; Load Frequency Control; Economic Dispatch; REDAC 70
City of Rochester, Minnesota	2000	Supervisory Control; REDAC 5
Cleveland Electric Illuminating Co.	2000 (4)	Plant Operation Computers Data-Linked to Large Dispatch Computer
Compania Sevillana de Electricidad (Spain)	Xerox 550 (2) 2500 (2)	Energy Management System; REDAC 70; SCADA
Electricity Commission of New South Wales (Australia)	2500 (2)	Supervisory Control; REDAC 70
Electrical Generating Authority of Thailand (EGAT)	2500	Supervisory Control; REDAC 70
FMC Corp. Green River, Wyo.	2500 (2)	Energy Management System with Automatic Generation Control, Supervisory Control; REDAC 70
Furnas Centrais Electricas, Brazil	2500 (2)	Supervisory Control and Data Acquisition with Sequence of Events; REDAC 70
Hong Kong Gas & Electric Co.	2500 (2)	System Operation Center, Dual Redundant Main Frames; Data Acquisition, Supervisory Control and Automatic Generation Control; Color CRTs and Dynamic Mapboard; REDAC 70
Iowa-Illinois Gas & Electric Co.	Prodac System with Sigma 5 CPU (2)	System Operation Center – Transfer Switching to Backup Line Buffers; Data Acquisition and Control; Load Frequency Control; Economic Dispatch Calculation; On-Line Digital Load Flow; CRT Display Software (vector displays); REDAC 70
Kentucky Utilities Co.	510	Digital Dispatch and Operations
Middle South System	50	Computer Control System Pool Dispatch

Power System Dispatch and Control (Cont'd)	Model	Application
Montana Power Co.	2000	Automatic Dispatch
New England Power Exchange	250 (2)	Master Computer System for Satellite Control (Pool dispatch); Hybrid Load Flow Analyzer
Pacific Gas & Electric Co.	2000 (2)	Substation Control (500 KV)
Pacific Gas & Electric Co.	250 (2)	Economic Dispatch – Integrated with Substation Computers; Hydro-Thermal Optimization
Pacific Gas & Electric Co.	50 (8)	Substation Control (500 KV)
Pacific Gas & Electric Co.	50	Economic Dispatch – Backup System
Philadelphia Electric Co.	50	Hydro-station Control
Potomac Electric Power Co. (PEPCO)	2000 (2)	Supervisory Control and Data Acquisition; REDAC 70
Potomac Edison Co.	2500 (2)	Supervisory Control and Data Acquisition; REDAC 70
Public Service Co. of Indiana	510	System Operation
Public Service Co. of New Hampshire	250	Control Computer System Pool Satellite; REDAC 5C
Public Service Co. of Oklahoma	50	Dispatching
Public Utility District #1 of Chelan County – Washington	510	Automatic Control of 2 Hydro Plants
State Electricity Commission of Victoria (Australia)	2500	Supervisory Control and Data Acquisition; REDAC 70
State Electricity Commission of Western Australia	2500	Supervisory Control; REDAC 70
Tata Power Co. – India	50	Digital Dispatch System
Union Electric Corp.	510	Pumped Hydro Optimization
Utah Power & Light Co.	510	All Digital Control High Speed Telemetry
West Penn Power Company	2500 (2)	Supervisory Control and Data Acquisition; REDAC 70

Process Industries	Model	Application
American Cyanamid – Bound Brook, New Jersey	2500	Undisclosed
British Petroleum, Ontario, Canada	2500 (2)	Truck terminal control
Chemical (00104)	250	Chemical Plant DDC
Chemical (00114)	250	Chemical Plant DDC
Chemical (00154)	250	Chemical Plant DDC
Chemical (00155)	250	Chemical Plant DDC
Columbia Gas of Ohio-Union Switch & Signal, Division of WABCO	50	Gas Dispatch
Dow Corning Co. – Hemlock, Michigan	2000 (2)	Polycrystalline Silicon Manufacturing
Ercole Marelli & C. S.p.A. – Italy	2500 (2)	Process Control
Ercole Marelli & C. S.p.A. – Italy	2500 (8)	Process Control
Gulf States Paper Co. – Demopolis, Alabama	580	Control for Kamyr Digester, Bleach Plant and Paper Machine
Jeumont-Schneider – France	2500 (2)	Process Control
Kaiser Sand & Gravel Co. – Radum California	50	Batch Process
Marin County – Marin County, California	2500	Process Control, Water System
Monsanto Company – Chocolate Bayou, Texas	50 (2)	Detergent Raw Materials
National Iranian Oil	2500 (2)	Pipeline Supervisory Control, REDAC 70
OlinKraft, Inc. – West Monroe, Louisiana	250	Kamyr Digesters (2)
San Jose Water Works, California	50	Water Dispatch System
Spring Mills – Lancaster, South Carolina	2500	Material Dyeing
System-Pan Electric – Italy	2500 (2)	Process Control

Process Industries (Cont'd)	Model	Application
Union Carbide – Brazil	50 (3)	Undisclosed Process
United Gas Improvement Corp., Dresser Controls – Reading, Pa.	50	Gas Dispatch
United States Steel Corp. – Keystone	50 (5)	Gas Processing Plant
White Pine Copper Co. – White Pine, Michigan	50	Copper Concentrating Mill
William Brothers Pipeline – Tulsa, Oklahoma	50 (27)	Pipeline Terminal Control and Data Logging
Westinghouse – Columbia, SC Nuclear Fuel Division	2500	Process Control
Westinghouse Electric Corp. – East Pittsburgh, Pennsylvania	580	Hybrid Simulation Facility
Westinghouse Semiconductor Div. – Youngwood, Pennsylvania	2500	Process Control

Data Management

ACT Systems – Orlando, Florida	2500	Data Management
Barber Coleman – Loves Park, Illinois	2500	Data Management
Columbia Showcase – Los Angeles, California	2500	Data Management
Computer Firmware Systems, Inc. – San Francisco, California	2500	Data Management
Dasy Corp. – Santa Ana, California	2550 (2)	Data Management
Digital Resources Corp. – Houston, Texas	2500	Data Management
Dynacom – Reston, Virginia	2500 (5)	Data Management
Ford Motor Co. – Detroit, Michigan	2500	Data Management
Ford Motor Co. – Detroit, Michigan	2500 (9)	Data Management
Mitre – McLean, Virginia	2500 (2)	Data Management
National Association of Letter Carriers – Washington, D.C.	2500	Data Management
Offtrack Betting – London, England	2500 (2)	Electronic Data Processing
Westinghouse Gas Turbine Division – Round Rock, Texas	2550	Data Management
Westinghouse Industrial Equipment Division – Sykesville, Maryland	2500	Data Management
Westinghouse Pension – Pittsburgh, Pennsylvania	2500	Data Management

Manufacturing	Model	Application
American Bosch – Springfield, Massachusetts	2500	
Babcock & Wilcox – Barberton, Ohio	2500 (2)	N/C
Bult Fabrik – Sweden	50 (2)	Automatic Warehouse
Butler Machine Tool Co. – Milethorn, Halifax, England	2560 (2)	CNC
Carborundum – Niagara Falls, New York	50	Transfer Line
Carborundum Co. – Wheatfield, New York	P-50	Wide Abrasive Belt Manufacturing
CIC Computer Systems, Subsidiary of Cross Co. – Fraser, Michigan	2000	Multi-station Machining Line
ECI – Fraser, Michigan	2000 (3)	Transfer Lines
ECI – Fraser, Michigan	2000 (16)	Undisclosed
ECI – Fraser, Michigan	2500 (3)	Undisclosed
Farrel Company – Rochester, New York	2000	Numerical Control
General Motors – Chevrolet Division	2000	Cross Co. Automatic Assembly Line
General Motors – Chevrolet Division	2000	Transfer Line
General Motors, Fisher Body – Euclid, Ohio	50	Automatic Warehouse
Giddings & Lewis – Fond Du Lac, Wisconsin	2000	Numerical Control
Henkkija – Finland	2500	Automatic Warehouse
Hillyer Corporation – Mountain Side, New Jersey	2000	Numerical Control
Ingersoll	2000	Numerical Control
International Harvester – E. Moline, Ill.	2500	Automatic Warehouse
Jeumont-Schneider – France	2000	Automatic Warehouse
Jeumont-Schneider – France	2500	Warehouse
North American Rockwell – Detroit, Michigan	2000	Numerical Control
Northrop Aircraft – Hawthorne, Calif.	2500	DNC
Rockwell International – Marysville, Ohio	2000	Automatic Warehouse
Scania-Vabis – Sweden	50	Automatic Warehouse
Springs Mills – Lancaster, SC	2500	Textile Coating
W. A. Whitney – Rockford, IL	2560 (25)	CNC
XLO Parker Co. – Howell, MI	2560 (9)	CNC

Manufacturing (Cont'd)

Westinghouse	Model	Application
Annapolis, MD, Underseas	2000	N/C
Baltimore, MD, PSED	2000	LSI Testing and RMR Operation
	2500	Testing
	2000 (2)	Automatic Testing
ESSD	2500	Tape Preparations
Bloomington, IN, DAD	2000 (2)	N/C
	50	Capacitor Testing
Buffalo, NY, Large Motor	2000 (2)	N/C
Buffalo, NY, Medium Motor	2000	N/C
Buffalo, NY, ISD	2500	Systems Lab and Test
Buffalo, NY, IED	2000	Lab
Cheswick, PA, Atomic Fuel	50	Pump Test Facility
	2000 (15)	DNC System
Columbus, OH, Appliance	2000	Test Cell Monitor
	50	Automatic Warehouse
E. Pittsburgh, PA, Switchgear	2000	
Hunt Valley, MD, ESSD	2500	Product Testing
Jefferson City, MO, Transformer	2000	Warehouse Control
Lester, PA, Turbine	2000	Air Conditioning/Systems Lab
	2500	Test Stand
	2500	Systems Lab
	2000 (2)	N/C Machine Tool
Lima, OH, AirAr	2000 (2)	Automatic Testing
Mansfield, OH, Appliance	2500	Range Testing
	2500 (2)	Appliance Testing
	2500 (2)	Appliance Product Testing
Minneapolis, MN, Thermo-King	2500	Management
	2000	Systems Lab
Newark, NJ, RID	2000	Manufacturing Test
Norman, OK, Air Conditioner	2500	Automatic Warehouse
Orrville, OH, C & ID	2000	Printed Circuit Card Testing
Pensacola, FL, Turbine	2500	N/C
Pittsburgh, PA, Mfg. Dev.	2000	Manufacturing Studies
	2000	Simulation
	2000	Direct Numerical Control
	2000	Transformer Testing
	2000 (4)	
	2500	CNC
Pittsburgh, PA, ISD	50	Quality Control System
Round Rock, TX, HIMD	2000 (22)	N/C
	2500 (2)	DNC
	2500	Testing
Staunton, VA, Air Conditioner	2000 (2)	
Sunnyvale, CA	2000	N/C
Winston-Salem, NC, Turbine	2550	Communications
	2500 (4)	N/C
	2000 (2)	N/C
Youngwood, PA	50	Transistor Testing
Youngwood, PA, Semiconductor	2500	Process Control

Automatic Warehousing	Model	Application
Bult Fabriks, Hallstahammer, Sweden	P-50 (2)	Finished Goods
General Motors, Euclid, Ohio	P-50	Parts Distribution
Hankkija, Helsinki, Finland	W-2500	Distribution
International Harvester, E. Moline, Illinois	W-2500 (2)	Assembly Plant and work-in-process

Automatic Warehousing (Cont'd)	**Model**	**Application**
Jeumont Schneider, France	P-2000	Finished Goods
Pitney Bowes, Stamford, Connecticut	W-2500	Assembly Plant and work-in-process
Rockwell International, Marysville, Ohio	P-2000	Axle Assembly Plant
Scania Vabis, Södfrtälje, Sweden	P-50	Assembly Plant
Westinghouse, Columbus, Ohio	P-50	Finished Goods
Westinghouse, Jefferson City, Missouri	P-2000	Transformer Assembly
Westinghouse, Norman, Oklahoma	P-2000	Air Cond. Assembly Plant
Westinghouse, Round Rock, Texas	W-2500	Motor Assembly Plant

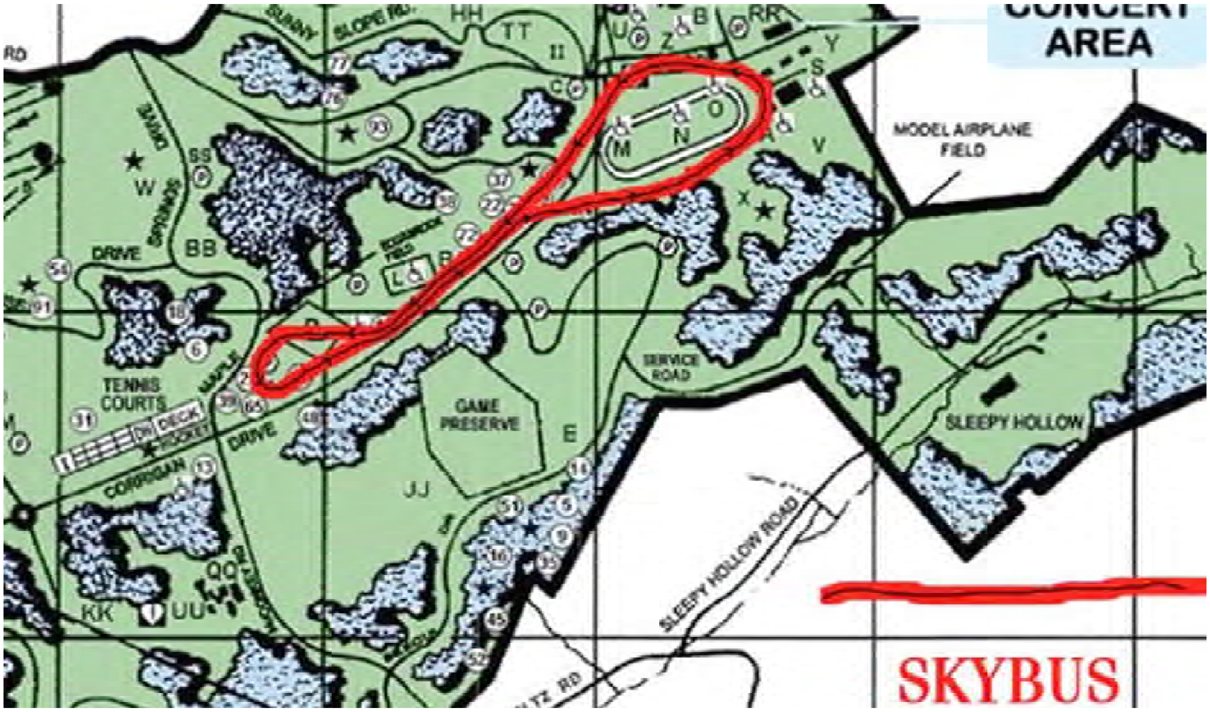
Industrial Energy Management	**Model**	**Application**
FMC – Green River WY	2500 (2)	Total Energy Management Redac 70 Supervisor
American Cyanamid	2500 (2)	Total Energy Management Redac 70 Superviser
Sicartsa – (Mexico)	2500 (2)	Automatic Generation Redac 70 Total Energy Management
Airco Alloys and Carbide – Calvert City, KY	2515	Energy Management
Owen Electric Steel Cor – Cayce, SC	2515	Energy Management
Teledyne Corp. – Muskegan, MI	2515	Energy Management
Westinghouse – East Pittsburgh, PA, Large Rotating Apparatus	2515	Energy Management
Westinghouse – Pittsburgh, PA, Research and Development	2515	Energy Management
Whiting Corporation – Harvey, IL	2515	Energy Management

Miscellaneous		
Ateliers de Construction Electriques de Charleroi – Belgium	2500 (12)	Undisclosed
Ateliers de Construction Electriques de Charleroi – Belgium	2500 (9)	Undisclosed
Barber Coleman – Loves Park, Illinois	2500	General Scientific
BART – San Francisco, California	250 (2) 2000	Mass Transit System Central Supervisory Control
Canadian Westinghouse – Ontario, Canada	2000	Systems Lab
Canadian Westinghouse – Ontario, Canada	2000	
Canadian Westinghouse – Ontario, Canada	2000	Process Information System
Canadian Westinghouse – Ontario, Canada	2500	
F & M Automation	50	U.S. Post Office Sorting
Harry Diamond Labs – Washington, D.C.	2500	
International Monetary Fund Building – Washington, D.C.	50	Environmental Control
Jeumont-Schneider – France	2500	Systems Lab
Kaiser Steel – Fontana, CA	2500	Systems Lab
Maritime Administration, 2 Class I Oceanographic Survey Ships	1500 (2)	Shipboard Control and Scientific Work
Mitre – McLean, Virginia	2500	Simulation
Montgomery Industries – Jacksonville, FL	2500	Environmental Control
Montreal Urban Community Metropolitan Transit (Montreal Metro), Montreal, Canada	2500 (9)	Mass Transit System Central Supervisory Control
Owens-Illinois – Perrysburg, Ohio	2000	Bottle Filling Monitor
Philadelphia Water Works	50	Data Logger
Port Authority of Allegheny County – Pittsburgh, Pennsylvania	510	Experimental Transit Expressway
Robertshaw for Burlington Industries – Greensboro, North Carolina	2000	Environmental Control
Robertshaw – Greensboro, North Carolina	2000	Environmental Control
Robertshaw – Greensboro, North Carolina	2500	Environmental Control
Robertshaw – Richmond, Virginia	2500 (11)	Environmental Control

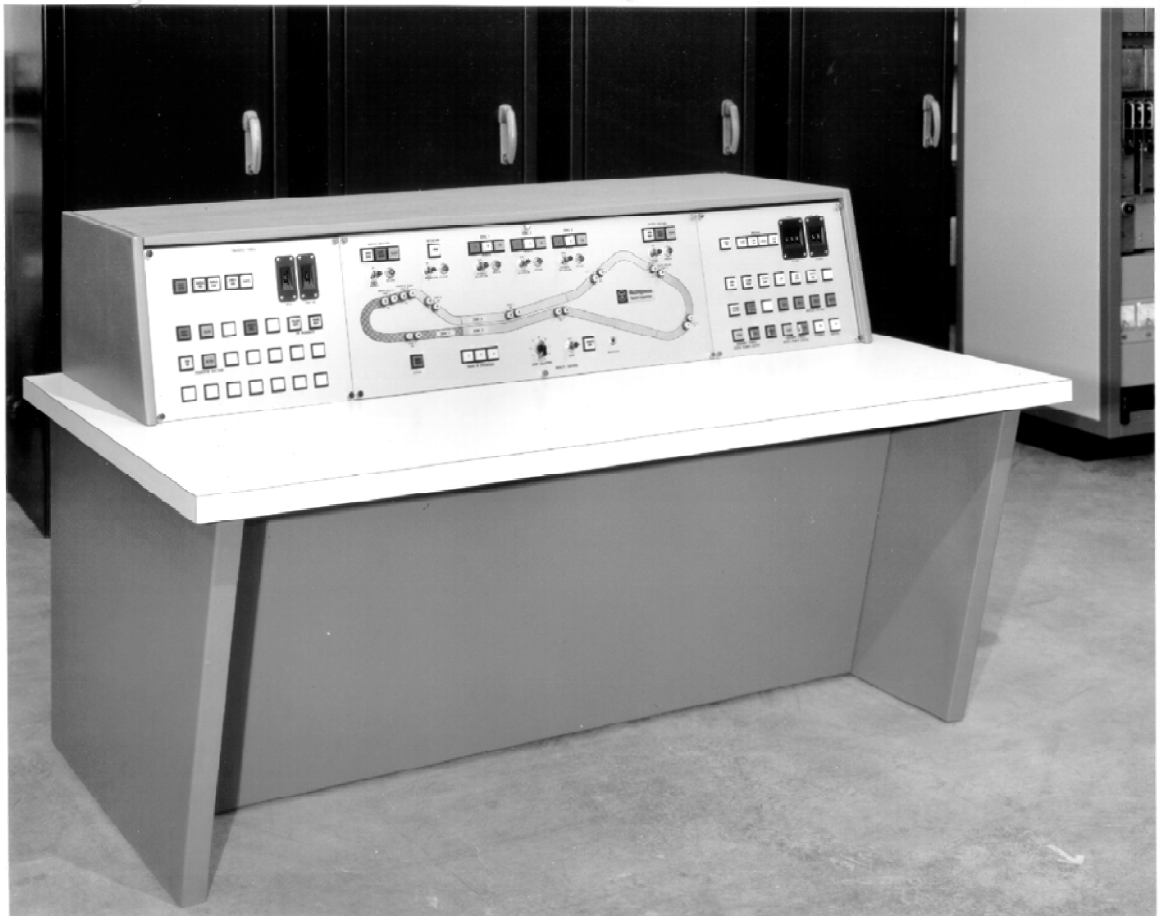
Miscellaneous (Cont'd)	Model	Application
Saginaw Control & Engineering	2000	Undisclosed
Sao Paulo Metro – Brazil	250 (3)	Mass Transit System Central Supervisory Control
Sao Paulo Metro – Brazil	2500	Yard Control
SEATAC – Seattle/Tacoma, Washington	2000	Airport Passenger Shuttle System
Stanford University – California	50	Education Research
Westinghouse		
Baltimore, MD, PSED	2000	Systems Laboratory
Cheswick, PA, Atomic Fuel	2500	
Cleveland, OH	50	Electric Sign
East Pittsburgh, PA	2515	Power Demand Control
Lester, PA	2500	
Newark, NJ, RID	2000	Systems Laboratory
	2000	Simulation Facility
Pittsburgh, PA, Atomic Power	250	Systems Lab and Hybrid Design
Pittsburgh, PA, Gateway	50	Electric Sign
Pittsburgh, PA, Industry Systems	250 (2)	Systems Laboratory
	2000	
	2500 (3)	
	50	Training and Demonstration
Pittsburgh, PA, Research & Development	2500 (3)	
	2000	Engineering Testing
	2000 (2)	Engineering Verification
	2500	Engineering Testing
Pittsburgh, PA, Specialty Electronics	2500	
Pittsburgh, PA, Transportation Div.	2000	Airport Control
Raleigh, NC, Meter	2500 (50)	Tape Translators for Environmental Telemetry

Above - The ADDAPS Programmer's Desk after installation. Notice that P-580 "Elephant Foot" design has been changed to an all-steel design.

Right - Arizona Public Service and Salt River Project dispatchers at the ADDAPS console in Phoenix. The Prodac-580 performed economic calculations and controlled all the electricity generated in the state of Arizona.



For several years in the late 1960's , the Westinghouse Skybus demonstration loop at Pittsburgh's South Park Fairgrounds was an attraction. Thousands of families rode the Skybus around the loop several times. It was fun and reliable, but it became a political football when one of the county commissioners decided that any mass-transit system for Pittsburgh must have steel wheels on steel rails. In 2010, the last surviving car of the original fleet was discovered in Ellwood City, PA and restored to running condition. It is now on display at Bombardier, in West Mifflin, PA.



The Westinghouse Transit-Expressway's automated control desk, which was located at the North Station near the Prodac-510 computer, was designed and built by the Westinghouse Power Control Division (W)PCD) at the (W)R&D Center. The desk that was designed for ADDAPS was adopted as the standard desk design used on all (W)PCD projects, including the Skybus system.

A patent disclosure was filed on the design, but the Westinghouse patent committee did not act on it to obtain a patent. Their design was unique in that it provided a reversible top turret that could arranged to give clear visibility of the instruments which were typically mounted on a wall in front of the desk. It was novel, but not novel enough for a patent.

There were many other design features in the (W)PCD systems that were patentable, however.

The Westinghouse sign at 209 West General Robinson Street in the North Shore section of Pittsburgh was world-famous because it never showed the name “Westinghouse.” This was the site of the Westinghouse factory where, in 1893, 250,000 electric light bulbs were made for the Chicago World’s Fair.

When it was first tested in 1967, the P-50 prototype at R&D was selected to be the “brains” behind it’s seemingly endless sequence of “Circle W” patterns. A later model P-50 powered the sign until the display was removed and demolished in the autumn of 1998. The Wesco Building was razed to make way for PNC Park, which succeeded Three Rivers as the home of the Pittsburgh Pirates.

The George Westinghouse Museum wanted to display one of the circles, but they were too big and too corroded to be used.