Customer Accounting on a Datatron

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In order to give you a perspective on our customer accounting and billing system, I think first I'll talk briefly about Pacific Power & Light Company itself and about the history which preceded our decision to purchase a Datatron computer.

Pacific serves about 300,000 customers, with 90% of them electric customers and the balance divided among steam, water and telephone. We serve large segments of Oregon, Washington and Wyoming, and smaller areas in Montana and Idaho, an interconnected service territory covering 1,000 miles east and west and 500 miles north and south. We have 23 districts within this area, broken down into 52 offices. Our billing has been centralized on National Cash Register equipment since 1948, with the exception of the Wyoming, Idaho and Montana districts, which became part of Pacific at the time of our merger with the Mountain States Power Company.

We also have some rather unusual operating problems, most of them arising from the large area we serve. We have five state commissions to deal with. We are competitive with another private utility in the city of Portland and with a few public utility districts and municipal power systems elsewhere. We have 188 rate schedules and a high incidence of exceptions to regular billing.

We have, I think, a very progressive, forward-looking management, and in order to solve some of our problems and to counteract the continuous increase in paper work and clerical cost, management decided as early as 1951 to make a study of the electronic computer field. We retained the Stanford Research Institute to work with our key accounting people, and by mid-1954, when medium-sized computer systems first became commercially available, the basic information for a comprehensive feasibility study had been developed. From this study a report setting forth our data processing requirements was prepared and sent to interested computer manufacturers as a basis for submission of bids. The bids, which we received from these manufacturers, along with management's recommendations, were submitted to the board of directors and the decision was made to purchase the Datatron in March of 1956. Our order was placed at that time.

Next, we selected a team of ten men from Company personnel, later expanded to twelve, who were given intensive training in the concept of EDP systems and in flow charting and programming. Actual programming began in April of 1956: six men went to work on customers accounting and the others on general accounting, construction accounting and what we sometimes call blue-sky projects.

Our computer was delivered in May of this year and was accepted, after a series of tests, in July, about six weeks later. We had sent the six customer accounting programmers to the ElectroData plant in Pasadena several times for debugging their program, and sustained debugging began as soon as we had our own computer. Our first bills were produced for the Rainier district in July and large scale billing commenced in the following month with the conversion of our Portland office, involving some 60,000 accounts. We are now in our third month of billing, and the schedule for conversion of the remaining offices calls for complete conversion to the computer system in about one more year.

Our computer installation consists of one Datatron central computer, one Cardatron with two output units and one input unit, four magnetic tape units, a Flexowriter, paper tape optical reader and high speed punch. We read data into the computer via an IBM 089 collator and our card output is a 523 card punch. Our customer accounting computer operation is all-inclusive —we not only bill our customers but we update their records by processing connect orders, disconnect orders, local bills, adjustments, cash payments, and changes in data—all this in one pass through the computer. When we prepare to do a day's billing, or cycle, we merge all the cards for each customer involved in that day's work into an input deck, in account number sequence, and load the deck into the collator. A short program is fed into the computer which starts the billing operation by reading in the contents of the first card in the input deck. This is a control card containing the beginning accounts receivable balance. It also contains a code which causes the computer to select from a reel of magnetic tape the proper program for this particular office. Our computer program is divided into two sections: one might be called the fast side and the other the low side. 80% of our accounts—the simpler ones, that is—are processed on the fast side and the other 20%, along with infrequently used subroutines, on the slow side. We use two magnetic tape units for customer records. One contains the records as they stood when last processed. After we process each account, its new updated record is written onto the second tape. The record on tape contains everything we need to know in order to bill the customer: his accounts receivable balance, the rate schedule on which he is billed, his meter number and multiplier, and various codes which are used to identify exceptions to normal billing and to determine revenue distributions. This record also in-

cludes his credit rating and a twelve-month history of his KWH consumption.

Let's return to the point where we had read in the first card, the control card which started things going. Our program is operating and the first customer's card is read into main memory, along with the first record on magnetic tape. Account numbers are compared to make sure they are for the same customer. A code in the card tells the computer which type of card it is dealing with: a connect order, reading card, payment card, and so forth. The record is updated, the account is billed, a high-low check performed, a test made to see if the customer should receive a reminder notice, and revenue is distributed. A billing card is punched on the 523 card-punch and a line printed for the account on the 407 printer. The billing card holds all the billing information required for the customer's bill and the line of print shows the current accounts receivable status of the account, including readings, balance, credit code, and two previous consumptions. This list we call the Accounts Receivable List.

When all accounts for the office have been processed, the revenue distribution, which has been made on the Datatron's magnetic drum during the run, is summarized and written onto the revenue distribution tape —the fourth magnetic tape unit of our system. This tape will be used at the end of the revenue month for preparing the monthly report of Operating Revenue and Statistical Data. The revenue distribution, as summarized on magnetic tape, is listed at the end of the Accounts Receivable List, to provide a daily cumulative record of revenue, KWH sales and customers.

In addition, we punch a card summarizing delinquent accounts receivable statistics which will be used at the end of the month for preparing a Delinquent Accounts Receivable Report and an accounts receivable control card containing the starting balance, totals for payments, adjustments and local billings, total billings by the computer and the ending balance.

The billing card goes to the Tab Section, where it is used to prepare the bill itself. The first step is to reproduce the account number and amount into the stub portion of the bill (we have an IBM card bill with a prepunched stub). Then we print the billing side and address side in separate runs on a 403 tabulator with bill-feed. The bills, along with the accounts receivable list, are forwarded to the district office, where the bills are mailed and the list filed for customer look-ups.

Now we have covered what happens at billing time. Let's take a look, then, at past due time. Our customers are asked to pay their bills within fourteen days of the date the meter was read, so we process the cycle through the computer again about 17 days after the reading date, allowing time for payments made on the past due date to be included. Again, we process all changes, payments and adjustments against these accounts, and again we print out an Accounts Receivable list—showing this time only those accounts which are unpaid. Our collection follow-up system is designed so that all suspension notices are issued at past due date, so the computer program looks at arrears and credit code and, for the accounts which require it, punches a card which is used in an off-line operation to prepare a suspension notice for the Customers' Office to issue to the customer.

So far, I have covered only the central billing operation; however, to give a complete picture of our customer accounting system, we should start at the beginning, with the customer, look at the district office operation and finally return to the customer with his bill.

Perhaps the best way to illustrate this sequence is to take a brand new customer who has just built a house and describe how we set up his account and render his bill. When the meter is installed, our service department sends the Customers' Office the information required for establishing the account: Meter number, number of dials, multiplier, and so on. The Customers' Office enters this information on what we call a customer order card, an IBM-sized card which is forwarded to the EDP Center just before the next billing date or past due processing date, whichever comes first. In order to establish the account in the EDP Center we must do three things: First, prepare a card which will go into the input deck to establish the customer's record on magnetic tape; secondly, prepare a name and address card for addressing the bill; and, thirdly, we must give the Customer's Office a set of records for their customer files. These last records consist of a mark-sense reading card and two IBM cards prepunched with all the fixed data pertaining to the location and with certain variable data such as credit code and date connected. Most of the data is interpreted, and the customer's name and address are printed on the cards. One of these cards is filed by account number and the other by name, in two of the basic files maintained by our Customers' Offices. The third basic file is a Remington Rand Linedex file of service addresses, from which we can obtain the customer's account number for referring to his card record.

When the original order is sent to the EDP Center, it contains the number of days on which the opening bill should be prorated, as well as the starting reading on the meter, so that when the meter is next read, the computer will have everything it needs to prepare the opening bill. The card which was prepared from the original customer order card for input into the computer and the reading card become part of the input deck and are read into the computer at cycle time and the account is established on magnetic tape and billed.

Let's assume that sometime later our new customer adds an electric water heater and we must change his rate schedule. We do this by entering the new rate schedule on the prepunched name card, which is forwarded to the EDP Center. This is called a "data

change" and causes new office records to be prepared, as well as an input card to change the record on magnetic tape. Meter changes are handled in the same way, along with most other types of change.

Now let's take a look at what happens several months later when this customer moves out of the house. Upon receipt of his request for his final bill, his prepunched IBM card is pulled from the name file and the number of days on which the final bill is to be prorated and the date of disconnection are entered on the card. At past-due time or billing time, whichever comes next, the card is forwarded to the EDP Center, where the prorate days are punched in the card and it becomes part of the input deck for the computer run. The computer estimates a final reading, punches a billing card and prints a line on the Accounts Receivable List. The billing card is used to prepare the final bill in the same manner as the regular bills. They are forwarded to the district office for mailing along with the regular bills.

Thus, we have taken care of the customer moving out. When the next customer moves in, we remove the prepunched IBM card from the *other* district office file, called the connect order file, enter the connect date, prorate days, credit code, mailing address if it is different from the service address, and a mail code which we use to prevent duplicate mailings. Again, the card goes to the EDP Center at the next past due or billing cycle time. Just as we did for the brand new customer, we prepare a new name and address card for the EDP Center, and a new mark sense reading and two new prepunched IBM order cards for the district office. The prepunched connect order card on which we made the original entries in the district office becomes the input card for the computer run, to update the record on magnetic tape with the new customers' data and to generate his opening bill.

That, rather briefly, is our customer accounting system on the Datatron. We feel that our approach to the problem of EDP was sound; we have used our own personnel to the very maximum extent possible, we have kept all personnel constantly informed about the project and have encountered none of the morale problems which might otherwise arise. Our president announced, when the decision was made to go full steam ahead in March of last year, that *no one* would lose his job because of the computer. We have had the advantage of being able to build our system from the ground up; not having had a punched card billing operation, we had no fixed ideas or biases to hinder us. This, of courses, has its disadvantages as well. Since we had no previous IBM experience, we were required to build a completely new data processing system rather than just adding a computer to an existing system.

It would be wrong to imply that we have not had our share of problems. We have encountered the normal resistance to change. After conversion began, we found that the single greatest problem is human accuracy—the computer does not tolerate transpositions, incorrect coding, or any of the things which a human biller might detect. It does not tolerate them in the sense that it accepts them as if they were correct. And when this happens, revenue may be incorrectly distributed or we may get an unscheduled computer stop—either of which is costly.

However, most of these problems were expected and certainly we feel that our venture into EDP will be fruitful—both from the dollars and cents point of view and because it is our conviction that the computer will open up entirely new sources of information for management and get that information to them faster.