

INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT

Applications Data Collection
Type of Industry Oil Refiner
Name of User Clark Oil & Refining Corp.
Milwaukee, Wis.

Equipment Used IBM System/360 Model 30G
A. O. Smith Cardcon III System
TWX Terminals
Canadian Automatic Ltd. Tape-to-Card Converter

Synopsis

Between 8 a. m. and 11 a. m. each work day at Clark Oil & Refining Corp.'s Milwaukee, Wis., headquarters, a Teletypewriter Exchange Service (TWX) machine chatters, signaling arrival of data from the company's nine terminal points in a 10-state marketing area. The information collected is funneled through Clark's EDP complex, providing reports for management and control of the multi-million dollar sales organization.

Heart of the terminal's EDP setup is an A. O. Smith Cardcon III system; at the other end in headquarters is an IBM System/360 Model 30G with six tape drives.

Clark Oil & Refining Corp.'s central data collection system is unique in the petroleum industry, according to company officials. Competitors--including some of the giants in the field--have been experimenting with similar data gathering networks, but Clark was the first to go the route successfully.

At one end, in each of nine terminals, is an A. O. Smith Cardcon III system consisting of a card reader, Cardcon console, tape puncher and TWX equipment; at the other, in Milwaukee, is the teletypewriter, a Canadian Automatic Ltd. tape-to-card converter, keypunch machines and IBM System/360 Model 30G. The latter includes the following equipment:

<u>Type</u>	<u>Model or Feature</u>	<u>Description</u>
2030	E 3237 7915	Central Processing Unit (32,768 bytes) Decimal Arithmetic 1051 Attachment
2821	2	Control Unit for Printer
1442	N2	Card Punch (91 to 270 cards per minute)
2501	B2	Card Reader (1,000 cards per minute)
2415	6	Magnetic Tape Units and Controls (6 drives)
1403	2	Printer (600 lines per minute)
1051	N1 3130	Console Control Unit CPU Attachment
1052	3	Printer-Keyboard

Clark is the largest independent marketer of gasoline in the Midwest, with over 1,000 service stations in a 10-state area. Nearly 90 percent of the stations are dealer-operated; the rest are run by Clark directly.

The company, a deficit refiner (it purchases virtually all of its crude oil requirements), was founded in 1932 with a \$14 investment and a one-pump service station, which still operates on the same site in Milwaukee. Clark's sales are close to \$200 million.

BACKGROUND TO EDP

Impetus for installation of the data collection system was provided by Adrian Ignowski, Clark's director of data processing, who manages a staff of 25, including 17 keypunch operators, three computer operators, one systems analyst and two programmers. "We already had the nucleus of the system," he says. "TWX machines were transmitting data between the terminals and the home office, except that this was primarily clerical gathered information such as gallonage on hand and dispensed. Thus, we had the necessary data communications already installed."

Management's awareness that handling of credit data needed refining and that company sales required better controls and more analytical reports heightened implementation of a data collection system.

Product security provided additional impetus. Although oil officials generally deny that a theft problem exists in the industry, A. O. Smith researchers estimate the annual loss due to pilferage to be in excess of \$5 million.

In addition, the company wanted to provide customers with 24-hour-a-day access to its terminals.

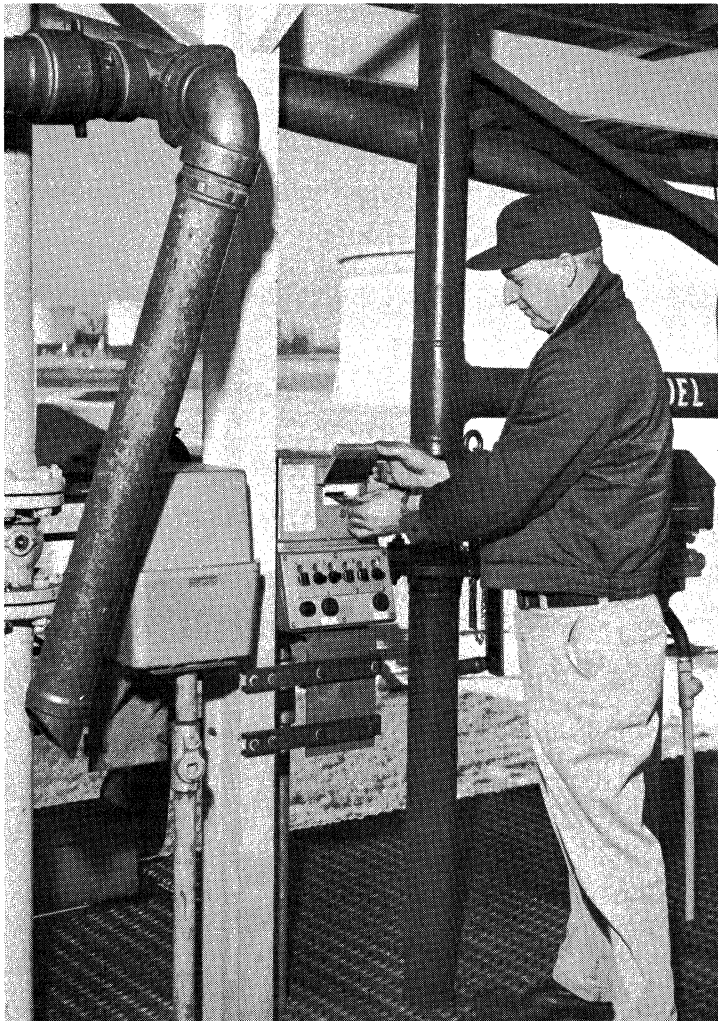
"We spent 18 months putting all our terminals (in Milwaukee; Green Bay, Wis.; Chicago; Hammond, Ind.; Marshall, Mich.; Detroit; Indianapolis, Ind.; St. Louis, Mo.; Peoria, Ill.; and St. Paul, Minn.) on the system," adds Ignowski.

THE SYSTEM

The equipment operates in this way:

Each wholesale customer authorized to draw products from a terminal is given a coded plastic card. When the card is inserted in the card reader at the loading rack, the unit identifies the customer and unlocks those products he is entitled to draw.

Certain information, such as manifest number, is dialed in manually. As the truck is filled, the product is metered by the meter counter-printer on the loading rack, and the total amount dispensed is stored in the solid state memory storage unit in the Cardcon console--located inside the terminal building.



THE CARD READER AT THE TRUCK LOADING RACK CAN BE ACTIVATED BY EITHER A CUSTOMER CARRIER CARD OR A COMBINATION OF A CARRIER CARD AND A CUSTOMER CARD. THE CUSTOMER CARRIER CARD AND THE CUSTOMER CARD ARE COLOR-CODED BY PRODUCT.

CLARK OIL & REFINING CORP.

When loading is completed, a ticket printer gives the customer a written record of the amount received. The console then prints out the information on the transaction: terminal number, carrier, customer, date, time manifest number, product drawn, gross gallons drawn, specific gravity and temperature of the product. This information is simultaneously punched into a paper tape.

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03 010 3000 095 0135 734469 03 08000 042 628
03 010 3000 095 0220 734470 03 08000 043 628
03 010 3000 095 0256 734471 03 08000 043 628
03 010 3000 095 0309 734472 03 07800 043 628
03 014 5103 095 0500 734473 04 06000 041 660
03 014 5104 095 0504 734473 04 02000 041 660
03 010 3000 095 0650 734474 03 07900 042 628
03 000 5106 095 0701 734475 02 05500 044 343
03 000 4000 095 0710 734476 02 03349 044 343
    
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CONSOLE PRINT-OUT INCLUDES: TERMINAL NUMBER, CARRIER, CUSTOMER, DATE, TIME, MANIFEST NUMBER, PRODUCT DRAWN, GROSS GALLONS DRAWN, SPECIFIC GRAVITY AND TEMPERATURE OF THE PRODUCT.

743 REV 6-65

PLEASE REMIT TO:

ORIGINAL INVOICE
CLARK OIL & REFINING
 CORPORATION
 P. O. BOX 51256 MILWAUKEE, WISCONSIN 53201

LOADED AT: PEORIA

INVOICE DATE: 05-21-66

INVOICE NO.: 0521001

SOLD TO: EAST CUPCAKE OIL CO
 4193 NO MAIN STREET
 EA CUPCAKE ILL 62407

SHIP TO: 483 SAME

MANIFEST NO.	P.C.	PRODUCT	CAPACITY GALLONS	TEMP.	NET GALLONS	UNIT PRICE	AMOUNT
567890	05	RANGE OIL GTY 62.6	4,000			.105000	420.00
567890	06	#2 FUEL OIL GTY 62.6	4,000			.097500	390.00
567891	01	SUPER PREMIUM GTY 62.6	6,000			.132500	795.00
567891	03	SUPER REGULAR GTY 62.6	6,000			.112500	675.00
						FEDERAL TAX	480.00
						STATE TAX	600.00
						INSPECTION FEE	4.80
						FREIGHT	136.40

SOURCE: TERR. NO. STATE CUST. CARRIER

AT MILWAUKEE HEADQUARTERS, A SYSTEM/360 MODEL 30G AUTOMATICALLY OUTPUTS CUSTOMER INVOICES.

The terminal manager retains the typewriter output for local recaps of shipments made during the day, and he uses this information to prepare terminal reports such as inventory control balances. This data is mailed daily to Milwaukee headquarters for determination of terminal replenishment. This phase of the operation is not computerized, but plans call for its addition to the EDP workload sometime in the future.

When computerized, data such as barge and pipeline deliveries to each terminal will be cranked into the central processor. Product usage data will be input through the TWX terminals, and the typewriter output at each terminal will then be used solely as a visual check against what has been loaded.

Meanwhile, at a specified time each day, the punched tape is fed into the TWX transmitter for relay to Milwaukee.



DATA FROM TRUCK LOADING STATION IS RECORDED IN CARDCON CONSOLE WHICH PRINTS OUT COPY FOR TERMINAL USE AND PUNCHES TAPE, USED TO SEND DATA TO HEADQUARTERS.

The card reader at the truck loading rack can be activated by either a customer carrier card or a combination of a carrier card (notched on the upper left-hand corner) and a customer card (notched on the upper right-hand corner). The customer carrier card and the customer card are color-coded by product--green for range oil, blue for No. 2 fuel oil, red for premium and yellow for regular, which is sold by dealers unaffiliated with any of the major oil companies or independents.

"Generally, we have encountered few problems in implementing this system," explained Ignowski. One uncertainty, quickly solved, was getting customers acclimated to the system. For example, at each terminal site some truckers were confused regarding proper use of the plastic card reader. A "Truck Loading Manual" was prepared and issued by Clark, and personal assistance was provided by the terminal managers.

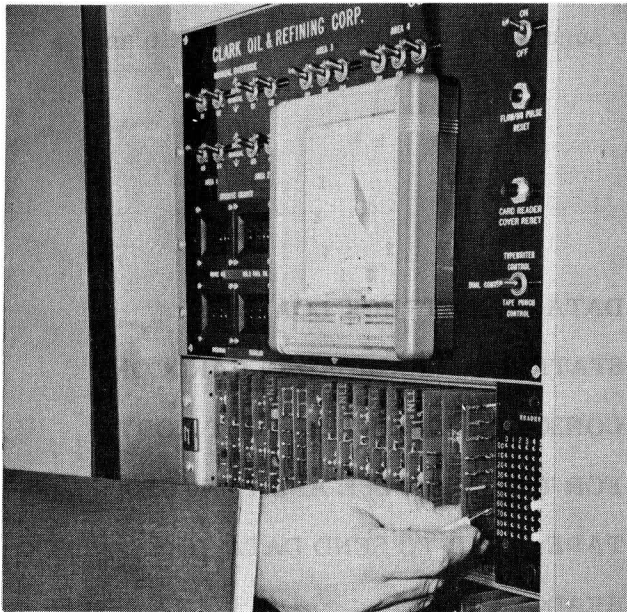
One drawback to the system, according to Fred Gust, superintendent of terminals, has been the inability to load two products at the same time in one truck. "The plastic identity card must remain in the card reader until the load is completely delivered," he explained, "and only then can the trucker insert a second card for another product load."

With this system, the customer can serve himself while the terminal is unattended. He always has in his possession the customer carrier card, which will be accepted at a particular terminal. He has one of these cards for each of the different kinds of products he loads.

The customer's authorized truck carrier maintains the carrier card. This is his authorization to draw products from a particular terminal, after he has combined this card with the customer card. The latter is kept on file at the terminal loading rack, and each authorized carrier is assigned a particular drawer in the rack.

Theoretically, customer security is protected since only the carrier has keys to the assigned drawer.

Product security ensures Clark that no one may draw products unless he is first identified by the card reader as the holder of a legitimate card. By inserting a pin in a patchboard on the Cardcon console, the oil company can lock out any card that it decides has become invalid, such as a poor credit risk.



PATCHBOARD OF CARDCON
CONSOLE CAN BE PROGRAMED TO
LOCK OUT INVALID CARDS.

At Clark's Milwaukee headquarters, the data received in punched paper tape is converted to punched card form by an in-line Canadian Automatic Ltd. tape-to-card converter.

At one time, the cards were fed into an IBM 1401 and customer invoices were prepared automatically the same day for mailing. However, a System/360 Model 30G has replaced the 1401, providing greater processing speed and changing the whole system of operation. "Customer information such as name, address, pricing considerations, etc., previously stored on punched cards are now on magnetic tape," according to Ignowski. "The cards now used in the system to prepare invoices are also used to update the mag tapes at the same time."

The automatic invoicing feature of the system originally on the 1401 replaced an entirely manual operation which previously required terminal clerks to mail hard copies of the invoices daily to Milwaukee. Time lag in getting bills to customers was four to five days.

Implementation of the computer system necessitated the relocation of about five clerical level individuals to other positions in the company. "No one lost his job when the data collection network was installed," says Ignowski. "Since most of the terminals, except for Chicago, double as district offices for the company, some of the clerks had been handling the manual chores related to transmitting data to Milwaukee in addition to other duties."

Other advantages of the system include credit control and sales analysis. At Clark, daily transaction information is matched by the computer against a programed credit register. When a customer approaches the limit of his credit with the oil company, the computer flags his file, and Clark is able to contact the individual and work out payment arrangements. If necessary, as indicated previously, the customer can be locked out at the terminal.

Reports of each day's sales are prepared by the computer and forwarded to the sales department. On the basis of this up-to-the-minute information, the sales unit is able to plan and direct the entire marketing effort with sure facts at its disposal.

CLARK OIL & REFINING CORP.

FORM 11-640	WHOLESALE SALES - CUSTOMER PRICE DATA - NUMBER & NAME LISTING - REPORT THREE																03 20 67									
TERMINAL	CODE	01 RANGE	02 NO. 2 OIL	03 S PREM	04 S REG	05 DIESEL	06 NO. 6 OIL	08 ASPH	09 PROP																	
BLUE ISLAND 01		102500	095000	137500	120000	095000	077500	007200	047500																	
TR	CAR	C/L NO.	NAME/PRODUCT	CPC	FRT	AL	SHRK	FED TX	STA TX	CTY TX	SAL TX	INSP	F	FRT	RT	WT	TCP	SP	ALL	C	LIM	LO	MI-GAL	NET BK	DIFF	DEL
010005560			MANNELS OIL & SUPPLY CO SUPER PREMIUM SUPER REGULAR	10 03 04				040000 040000	050000 050000					000300 000300			1G 1G						0100046 0100046	137500 120000		
010215560			MANNELS OIL & SUPPLY CO RANGE OIL #2 FUEL OIL	10 01 02										000300 005250			1G 1G						0100046 0100046	100000 092500		
010045561			MCCREDIE OIL COMPANY RANGE OIL #2 FUEL OIL SUPER PREMIUM SUPER REGULAR #2 DIESEL	10 01001400 02001400 03001400 04001400 05001400										008100 008100 006800 006800 008100			1G 1G 1G 1G 1G					1000047 1000047 1000047 1000047 1000047	098600 091100 133600 116100 091100			
010175561			MCCREDIE OIL COMPANY RANGE OIL #2 FUEL OIL SUPER PREMIUM SUPER REGULAR #2 DIESEL	10 01001400 02001400 03001400 04001400 05001400										008100 008100 006800 006800 008100			1G 1G 1G 1G 1G					1000047 1000047 1000047 1000047 1000047	098600 091100 133600 116100 091100			
010045562			MCCREDIE OIL COMPANY RANGE OIL #2 FUEL OIL SUPER PREMIUM SUPER REGULAR #2 DIESEL	10 01001400 02001400 03001400 04001400 05001400										008100 008100 006800 006800 008100			1G 1G 1G 1G 1G					1000047 1000047 1000047 1000047 1000047	098600 091100 133600 116100 091100			

DAILY WHOLESALE SALES REPORTS, SUCH AS THIS ONE FROM BLUE ISLAND (CHICAGO) TERMINAL, PROVIDE UP-TO-THE-MINUTE PRICING INFORMATION FOR CLARK SALESMEN.

When the data collection system was initially implemented, Ignowski relates, company salesmen had to realign pricing policy. Previous pricing arrangements sometimes caused confusion in accounting, and company sales policy was at times contradictory.

In addition to its use in the data collection network, the System/360 Mod 30G is also being employed for general company accounting and for billing Clark's 200,000 credit card holders.

One application includes preparation of about half a dozen different summaries of wholesale analysis reports by territory (company jargon for individual salesmen) and by terminal. The TWX input forms the basis for the documentation.

Credit reports are also prepared from the same data. Customers who are delinquent in payment or who are nearing arrears are flagged.

The payroll for the approximately 150 company-operated service stations is also computer prepared. The raw input data is transmitted via TWX in the terminals; the information originally arrived there from the service stations by mail or by salesmen. Approximately 300 to 400 checks are prepared weekly. Interestingly, the 125 people on the headquarters payroll have their checks prepared manually. "In the future," Ignowski adds, "we hope to add home office checks to the computer system, combining it with our general benefit program."

In the credit card application, daily consignment reports are received by mail in Milwaukee from all company and dealer operated service stations. The information includes the amount of product sold in the previous 24-hour period, listing cash purchases and credit card purchases separately. Charge tickets for the credit card sales are attached to the report, and the credit tickets become the input source. The amount of sale and customer number for each

ticket are transcribed into punched card form and fed into the computer, which automatically outputs statements for the customers.

Any credit card holder 60 days in arrears in payment is documented on a delinquent tape, which is used for preparation of credit letters. The computer "ages" each account to determine the ones that are delinquent and automatically provides the credit follow-up letter.

RESULTS AND FUTURE PLANS

Because of the 24-hour operation of the terminals afforded by the data collection system in use, Clark's business has increased. Wholesale sales of petroleum products have been upped because of this continuous availability. One reason is that truckers, with heavy investment in rolling stock, like to keep operating for more than one shift a day, so they offer lower freight rates to customers for hauling around the clock. Independent fuel oil jobbers like the idea, according to Ignowski, of loading up at any time.

Clark contracts to private carriers for delivery to all Clark service stations, and the 24-hour-a-day operation has added up to nearly 10 percent in delivery savings for the company because of lower freight rates.

Perhaps the biggest advantage to Clark, however, has been the management control aspect of its data collection system. The daily inventory and sales reports available from each terminal will, in the future, strengthen the company's inventory control and affect its pricing, production and purchasing decisions.

"One adjunct to our present system that we plan to investigate," adds Ignowski, "is addition of random access equipment. We want to get into a more sophisticated operating system." The company is thinking of the IBM 1311 disc file.