

INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT

Applications Inventory Control, Order Processing
Type of Industry Food Processor
Name of User Green Giant Co.
LeSueur, Minn.

Equipment Used GE 415 Computer System

Synopsis

Most of Green Giant Co.'s past computer applications have been relatively standard, such as payroll and accounting. When, due to the pressures of work volume, a GE 415 was added, the development of a common data base began to be evaluated. Working toward this goal, inventory control, order processing and a "recordless warehouse" operation have evolved. The system involves data transmission between headquarters in LeSueur, Minn., the company's distribution centers and food brokers.

The Green Giant Co., founded in 1903 as the Minnesota Valley Canning Co., encompasses plants, warehouses and offices in a dozen widely scattered states and four foreign countries. Within a recent 10-year period, the company doubled in size and expanded its product line from canned corn and peas to include other vegetables and also frozen food. The company recently acquired Clark Foods of Canada and Delaney Foods in Fruitland, Md. Annual sales exceed \$175 million.

Background to EDP

The GE 415 is the third phase in a planned program of EDP equipment evolution at Green Giant. From 1939 to 1961, punched card equipment was used. Phase two--from 1961 to 1965--centered on an IBM 1620, a scientific computer which was used for business applications about 80 percent of the time. Late in 1965, most of the punched card hardware was released and the 415 installed. Phase four, a move to a random access, is next on the schedule.

Conversion to the 415 was primarily on an "as is" basis, according to A. R. Throldahl, director of data processing. A moratorium was placed on new projects. Only those applications that were on the 1620 were moved to the 415. Project requests from company departments were changed from casual phone calls to written requests. Such project requests are assigned priorities after conference with the individuals involved.

To save time in the computer operating procedures, the dp department has programed the system to print out "notify author" whenever a program goes awry. Thus, computer operators are not occupied with attempts to trace errors.

The system

One of the new projects that the GE 415 is handling is a recordless warehouse operation. The warehouse is a Green Giant distribution center. Products are shipped to the distribution center after the food has been processed and packaged. From here, the products are shipped to customers.

Orders are forwarded to company headquarters in LeSueur, Minn., by food brokers. The orders arrive via mail, Teletype or phone. Those involving shipments from the recordless distribution center are keypunched and read into the computer. During this processing run, the quantity to be shipped is deducted from an "unallocated inventory" file kept on magnetic tape. Output from this run consists of punched cards in a format that facilitates transmission and also order picking and packing at the distribution center.

Stored in computer memory is a "picture" of the warehouse which shows where each product is stacked as well as the quantity available. The data on the punched card is in optimum picking order so that when it is printed out at the distribution center, the man who picks up the products and deposits them in a railroad freight car will be able to "pick and pack" in sequence. The data is detailed to the point of informing him how many fully loaded pallets and layers of partial pallets will be required.

Transmission of data to the distribution center is via an electronic code translator, developed by Canadian Aviation Electronics, hooked to a Teletype Model 35 ASR data communications terminal. The translator converts codes from punched card input into Teletype code. The information is received on a Model 35 which prints out a hard copy shipping notice.

After the order has been filled and the products shipped, the distribution center notifies LeSueur--transmitting verification of shipment which triggers the invoicing sequence. This verification data is keypunched and fed back into the computer at which time the "unshipped inventory" file on magnetic tape is updated and billing begins. The distribution center has no local records.

Input to Inventory

The primary business application currently operational involves order processing which, of course, reaches into other areas such as billing, inventory control and sales analyses.

GREEN GIANT COMPANY
WAREHOUSE SHIPPING ORDER

WHSE	UNIT	PAGE	WHEN SHIP	
11	12345	1	DEST	11-15-66
MIN.WEIGHT	ACT.WEIGHT	TOT.CASES	FRT. RATE	
75,000	72,976	3,041	.58	
FRT.	FRT.AMT.	S/O CHGS.	TOTAL	
FRT	423.26		423.26	

SHIP TO ROUTE

ANY PROGRESSIVE GROCERY CO.,
122 SOUTH SOME PLACE,
ANYTOWN, U.S.A.
SAL-ACL-FEC

DATE SHIPPED	CAR NUMBER	B/L NO.

SIZE	DESCRIPTION	PRODUCT		QUANTITY	PALLET		TALLY
		CODE	LABEL		FULL	PART	
24 12	NIBLETS GOLDEN WK CORN	161-252	01	50		50	
24 7	GREEN GIANT WHITE CORN	181-082	01	300	2	40	
24 8.5	MINN VALLEY EARLY PEAS	122-096	40	260	2		
24 8.5	KOUNTY KIST EJ PEAS	123-096	30	390	3		
24 17	KK WK CORN LIQUID	162-246	30	450	5	50	
24 16	GRN GNT KS BNS/ONIONS	209-232	01	160	2		
24 17	LE SUEUR EARLY PEAS	122-242	32	480	6		
24 17	GREEN GIANT SWT PEAS	140-242	01	300	3	60	
24 17	GG PEAS W/MUSHROOMS			160	2		

SHIPPING NOTICE PRINTED OUT AT THE DISTRIBUTION CENTER ON A TELETYPE TERMINAL IS IN "PICK AND PACK" SEQUENCE WITH PALLET INFORMATION INCLUDED.

WHSE.	11	ITEM	LAB	DESCRIPTION	PLLT	LAYR	WT/CB	SLOT	MIN.BAL.	ACT.BAL.	IN-TRANS	STATUS
		203232	01	24- 16 GREENGIANT KS GR BEANS	80	16	3.20	290	5,100	3,861	3,200	
		203236	30	24- 16 KTY KIST KS GRN BEANS	80	16	3.20	280	800	1,506		
		203238	56	24- 16 TRAILER KS GRN BEANS	80	16	3.20	999	900		1,280	
		203362	01	6-103 GRN GNT KS GRN BEANS			4.50	660	200	393		
		204232	01	24- 16 GREENGIANT FS GR BEANS	80	16	3.20	300	900	595	960	
		204236	30	24- 16 KTY KIST FS GR BEANS	80	16	3.20	310	300	320		
		204362	01	6-103 GRN GNT FS GR BEANS			4.50	670	200	176		24-
		209142	01	24- 10 GRN GNT KS BNS/ONIONS	105	21	20.00	726	400	398		2-
		209232	01	24- 16 GRN GNT KS BNS/ONIONS	80	16	3.20	340	1,300	1,983		
		213232	01	24- 16 GREENGIANT KS WX BEANS	80	16	3.20	330	400	639	960	
		213236	30	24- 16 KTY KIST KS WAX BEANS	80	16	3.20	320	200	230		
		214232	01	24- 16 GREENGIANT FS WX BEANS	80	16	3.20	999	80		80	
		221621	01	24-2.5 GRN GNT LS WH MUSHROOM	176	16	12.00	730	1,300	682	1,408	
		221631	01	12-4.5 GG LS WHOLE MUSHROOMS	200	20	10.00	740	600	90	400	110-
				24-2.5 GRN GNT LS SL MUSHROOM	176	16	12.00	750	2,000	926	704	32-

THE MONTHLY INVENTORY REPORT OF THE RECORDLESS WAREHOUSE INCLUDES PRODUCT IDENTIFICATION (ITEM NUMBER, LAB NUMBER, DESCRIPTION, WEIGHT), WAREHOUSE LOCATION (PALLET AND LAYER NUMBERS) AND INVENTORY STATUS (MINIMUM BALANCE, ACTUAL BALANCE, IN-TRANSIT).

Inventory can be affected by several factors in addition to the obvious--input of new production figures and deduction of shipments. Occasionally a product will be regraded after it enters inventory. Also, products may be repacked prior to shipment. Production totals are submitted from the various processing plants throughout the country. These are listed on a form that is sent along with samples of the pack to a quality assurance laboratory. The data includes identification of the processing plant, can code (numbers embossed on the cans) and product identification data. There are blank spaces on the form to allow the lab to insert the quality grade of the product.

After the form has been completed by the testing lab, one copy is sent to inventory control and a second to the processing plant. Inventory control adds a transaction code to the data which is then keypunched for processing and entry on the magnetic tape inventory records.

Once each day a printout of the unallocated inventory file is sent to the distribution department which reviews incoming orders (except for those automatically allocated for shipment from the recordless warehouse) to ascertain which plant should make the shipment. To a certain extent, this decision is predetermined by the transportation plan, developed by the operations research group, which shows the most economical combination of shipping-receiving locations. However, deviations from the plans are sometimes required. For example, the logical shipping plant may not have a sufficient quantity on hand to fill the order, then a decision must be made as to whether an interplant shipment should be made or another plant should ship direct to the customer.

After the shipping plant has been designated, shipping notices are prepared and then mailed, transmitted via Teletype or phoned (depending on urgency) to the plant.

After shipment, the notices are returned to LeSueur, edited, batched, keypunched and fed into the computer. Several processing runs follow before final invoices are printed out. First a "facsimile" invoice is prepared and sent to the billing department which verifies prices and other information. Any corrections are entered via punched cards.

During the billing run, data culled from the billing information is routed to a magnetic tape containing sales analysis data used in the compilation of monthly reports. (One of the reports shows product sales by customer, by broker, by product. Others may track the sales of a special product for the marketing group, or provide product-by-product comparisons.)

One of the applications in the company's computing repertoire involves an inadequate supply situation. The computer program ascertains what is available, then determines what percentage of the product total each customer has purchased in the previous two years and allocates the "short supply" item accordingly.

Other research

The company is engaged in research designed to develop better products and higher yields. Data on the factors that can be varied in producing a crop--types of seed, placement of plants, type of soil, time of harvesting--is recorded on punched cards along with statistics on rainfall and temperature. All of these factors can be broken out, correlated and analyzed in various ways to show which "mix" produces the best results.

Historical data is available on nearly all of the production sites showing the yield per acre, rainfall for each year, rotation of crops on each plot for the previous two years, type of topography, how the land was prepared, maturity at which the crop was harvested. Also available are weather reports dating back 40 years for some areas. During the year, weather bulletins from 25 states are fed into the system via punched card; from these reports and from the history of the area, an effort is made to determine probabilities of rainfall and temperature by particular days and the effect these will have on the yield.

GREEN GIANT CO.

C040 DAILY TEMPERATURE/PRECIPITATION PROBABILITIES PAGE 1

TEMP. EQUAL TO OR > 85.00

LOCATION 4561 NO. YEARS 21

DAY	FREQ 1	PROBABILITY(%)			
		3	5	7	
123	95.0	19.7	11.1	11.2	
124	75.2	11.1	15.3	4.7	
125	85.9	13.6	24.5	0.0	
126	77.6	33.3	21.2	21.9	
127	65.0	11.4	4.9	0.0	
128	95.2	21.5	0.0	4.5	
129	83.7	0.0	21.4	22.6	
130	77.6	0.0	12.5	0.0	
131	97.5	3.9	0.0	0.0	
132	52.6	24.7	4.7	0.0	
133	47.8	27.3	20.5	0.0	
134	65.9	22.4	12.7	0.0	
135	78.3	0.0	8.6	0.0	
136	83.9	9.7	0.0	0.0	

C034 WEEKLY PRECIPITATION DEVIATION PROBABILITIES PAGE 1

PROBABILITIES FOR GIVEN DEVIATION FROM AVG RANGES (INCHES)

LOCATION 4823

WK DAY	AVG PREC	NO. YRS USED	PROBABILITIES FOR GIVEN DEVIATION FROM AVG RANGES (INCHES)							
			DOWN	-.50	-.25	.01	.26	.51	1.01	4.00 & UP
17	0.85	16	56.3	6.3	6.3	6.3	0.0	12.5	6.3	6.3
4	1.71	16	37.5	6.3	25.0	6.3	6.3	6.3	6.3	6.3
	1.00	16	31.3	12.5	18.8	0.0	25.0	0.0	12.5	6.3
	0.7	16	18.8	18.8	18.8	12.5	12.5	12.5	12.5	6.3

THE TEMPERATURE AND RAINFALL STATISTICS ARE CORRELATED AND ANALYZED TO DETERMINE OPTIMUM PLANTING AND HARVESTING TIMES.

The move toward scientific applications

About 80 percent of the applications now being run at the Green Giant's data processing center are business applications, but this percentage is expected to decrease in the future as more scientific-type work is added.

Interrelationships of business and scientific applications become obvious when the various aspects of food processing are examined. For example, accumulation and analysis of rainfall and temperature data provides tighter control over planting and harvesting. After harvesting, the product must be processed and with scientific techniques, optimum processing schedules can be derived. Transportation must be considered: the most economical means to get products from the processing and packaging plants to the distribution centers and from the distribution centers to the customers can be ascertained.

Future plans

The course which EDP operations will take at Green Giant is clear. There are now three dp-oriented departments which report to the assistant controller: data processing, data collection and data interpretation.

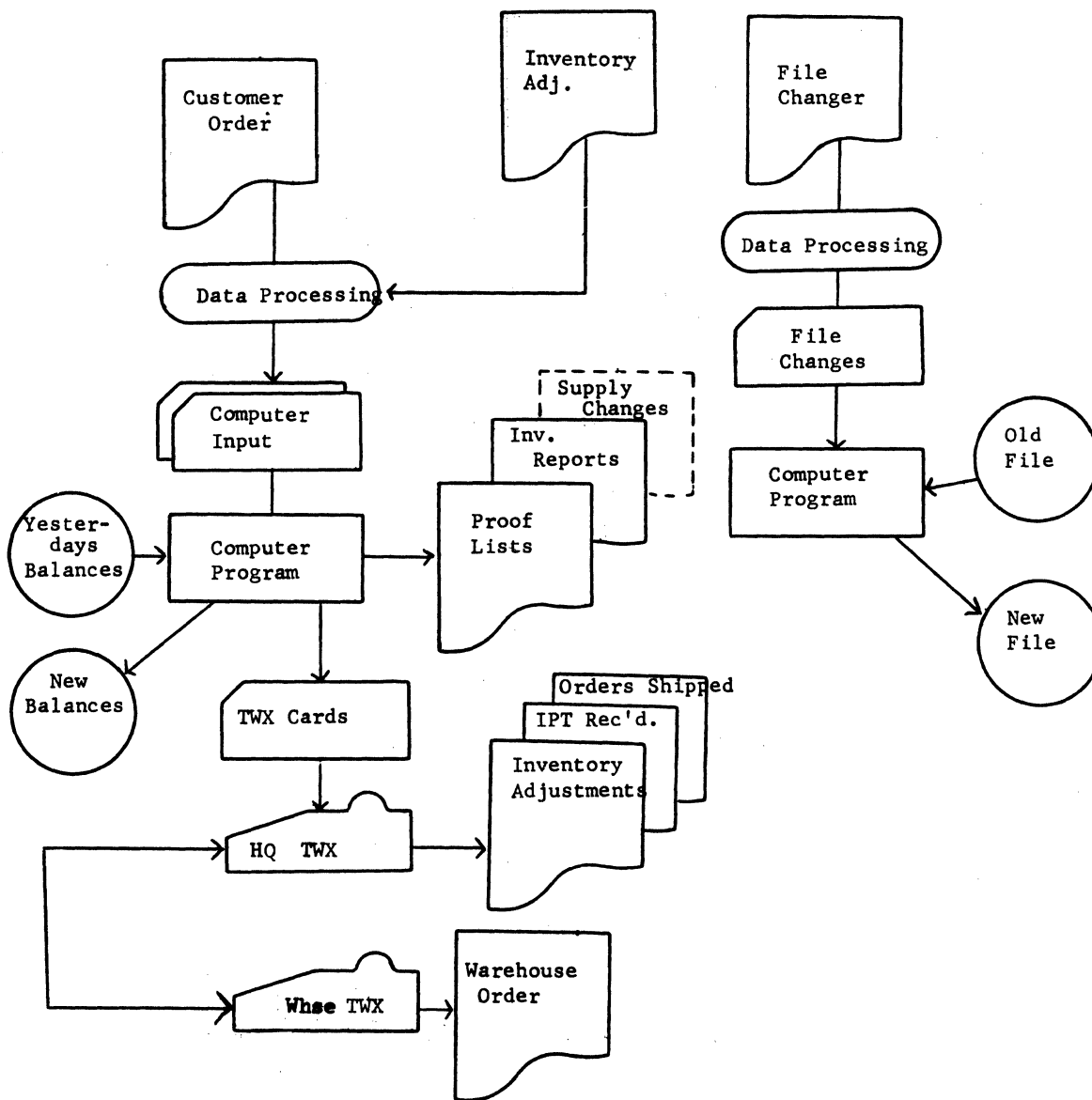
The director of data collection is, in effect, responsible for the administration and control of 30 local plant offices throughout the country. The director of data interpretation is the interface with the users of data processing output; he also is responsible for forecasting

and estimating requirements for the company and for the profit plan--a yearly plan of operation. These three groups also participate in four planning groups.

There is general agreement among those participating in long-range planning that the build-up of a corporate data bank is a necessary step toward exploiting the computer power at their disposal.

The data bank is envisioned as the lower layer of a three layer pyramid. Above it would be a systems bank comprising computer programs accessible (through the top layer) by a directory. The user would communicate with the directory which would call out the program required and the program would utilize the appropriate data base to pull together and process whatever data is required.

SHIPPING ORDER PROGRAM



FLOWCHART OF GREEN GIANT'S SHIPPING ORDER PROGRAM