Goldstone (GDSCC) Administrative Computing

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The GDSCC Data Processing Unit provides various administrative computing services for Goldstone. Those activities, including finance, manpower and station utilization, deep-space station scheduling and Engineering Change Order (ECO) control are discussed.

I. Introduction

Realizing the need in many administrative areas to assimilate data into useful management tools, GDSCC management initiated actions utilizing existing manpower to analyze those areas and develop the necessary software for data collection and reporting. This proved so successful that, in 1978, the GDSCC Data Processing Unit (DPU) was formed to enable full-time dedication to this program. The DP Unit presently consists of three people who perform data entry, systems analysis, software development and sustaining engineering on existing software. The DP Unit utilizes both the Information Processing Center (IPC) Univac computer via telephone lines and dumb terminals, and a Northern Telecom 410 intelligent terminal. The intelligent terminal utilizes a 10-Mbyte hard disk, 8-in. flexible diskettes, 64K memory and a bidirectional matrix printer for local data processing. It will also communicate with the IPC via telephone lines at a 1200-baud rate. Software written for the 410 is in either ANSI COBOL or TAL-II, the terminal's general application language. Software residing on the IPC is written in MBASIC.

II. Data Processing Unit Activities

A. Engineering Change Order (ECO) Management

A system was developed and a vigorous program initiated to bring the ECO's for all Goldstone stations under central control with status reporting. This system was followed later by the Engineering Change Management (ECM) system residing on the IPC computers. The DP Unit performs data input and report generation services to the ECM System. Special programs to extract selected data from the system have also been developed (Fig. 1).

B. GDSCC Deep-Space Station Schedules

Schedules are supported via computer tie-lines rather than the teletype system. Software has been developed to provide the stations and maintenance unit with preliminary schedules extracted from the DSN data base which resides on the IPC. The schedules are in a format which allows maintenance and training data to be written in by the different units. The data are then entered into the intelligent terminal off-line, formatted and transmitted to the IPC for the DSN scheduling group (Fig. 2).

Final schedules are later extracted from the DSN data base and distributed to the appropriate units. Once the scheduled week is completed, real-time changes which occurred are input to the data base and a history file is established. The weekly Station Utilization Report is computer-generated from this history data (Fig. 3).

As an adjunct to the scheduling, a preventive maintenance (PM) system was developed which was compatible with the

DSN schedule. When the preliminary schedule is extracted, a report of those PM's which are due is also generated (Fig. 4). PM's are then planned by the units, input along with the other schedule data, and made a part of the final schedule. After the history schedule is complete, the PM information is extracted by the computer and the PM data base is automatically updated to reflect those which were performed.

C. Manpower Utilization

Manpower utilization is a system by which the man-hour expenditures by station operators and maintenance personnel are recorded and reported upon. These data provide management with an insight into how personnel time is being expended in various categories (Fig. 5).

D. Financial System

A system was initiated in the mid 1970's to satisfy a need to provide expenditure information to a level of detail not provided by the JPL financial system. To accomplish this, each account was subdivided into cost centers to which expenditures could be charged. This permitted Complex management to ascertain how much each unit, such as the carpenter shop, the air-conditioning shop, etc., was spending. It also provided information when allocating budgets. Since the initial system covered only those items which were processed through the contractor purchase order system, many expenditures and charges were not reflected in the reports. This system has since been modified to accept data which are extracted from contractor data such as accounts payable, other direct charges (ODC) reports and award fees. Data are also extracted from the JPL SRM Resources Status Report detail backup reports. The system is not, however, operated on an accrual basis. Additional information is also accumulated as to projected man-hour, overtime hour and labor expenditures.

Extracted from these data are such reports as a monthly budget report (Fig. 6), a procurement accomplishment report (Fig. 7), a subcontractor utilization report, plots and reports which provide comparison data on projected versus actual expenditures in dollars, regular labor hours and overtime hours. Expenditure history reports for individual cost centers can also be extracted.

E. The Vehicle Utilization System

This system became an important function to reduce man-hours which were being required to manually extract data necessary to monitor the expenditures, gas consumption and periodic maintenance of the General Services Administration (GSA) vehicles being leased by the Complex. This is especially true with ever-increasing energy costs. Data are utilized from the daily gas log sheets from the GSA gasoline pumps and from the GSA billing sheets. Reports are generated which provide information on vehicles due for maintenance, monthly mileage and cost summaries, and data required for annual reporting to GSA (Fig. 8).

*** GDSCC ECM DATA BASE EXCEPTION REPORT ***

AS OF 15 JUN 81

(ALL DATES IN YYMMDD FORMAT)

A. ECO'S SHIPPED BY THE COE BUT NOT YET RECEIVED BY THE FACILITY (30 DAYS +):

	STATION NUMBER	PROJECT	ECONBR	SUBSYS	ECO TITLE	(SF DATE) SHIP DATE
1	10	MJS	78.296	92.2	ADD 168KB TRI-CHANNELER @43 Z	790221*
2	10	'DSN	79.186	39.0	GDSCC AIRPORT RUNWAY UPGRADEF	800328*
3	10	DSN	80.055	38.14	FTS CS STD MON INTERFACE M	810301*
4	11	DSN	79.006	40.3A	SSA UPGRADE OBSOLETE PARTS T	810128*
5	11	MJS	80.123	34.91	AUTO-UPLINK TUNE BY MDA S/W$R	810227*
6	11	MJS	80.209	14.92	DYA-5081 S/W-50 PPS INTRPTS R	801230*
7	12	MUL	77.005	34.1A	MDA LOCK MONITOR MODS (MVPH)	770304*
8	12	DSN!	77.127	37.0	DISH DOCR SAFETY SWITCH-26M	800420*
9	12	DSN	80.055	38.14	FTS CS STD MON INTERFACE M	810301*
10	12	MJS	80.123	34.91	AUTO-UPLINK TUNE BY MDA S/W$R	810227*
11	12	MJS	80.209	14.92	DYA-5081 S/W-50 PPS INTRPTS R	801230*
12	12	DSN	81.046	38.0	DELETE VLF RCVR-PHAS RECRDR R	810511*
13	14	DSN	76.167	38.0	REMOVE OBSOLETE FREQ AMPS	770310*
14	14	DSN	77.015	39.5	SJ DOC FEEDCONE FIRE SENSORS	791001*
15	14	DSN	80.055	38.14	FTS CS STD MON INTERFACE M	810301*
16	14	MJS	80.123	34.91	AUTO-UPLINK TUNE BY MDA S/W$R	810227*
17	14	MJS	80.169	37.1	ADD BU HI-PERFORM MASER-64M$T	810420*
18	14	MJS	80.209	14.92	DYA-5081 S/W-50 PPS INTRPTS R	801230*
19	14	DSN	81.046	38.0	DELETE VLF RCVR-PHAS RECRDR R	810511*

B. ECO'S INDICATING A MISSED COMPLETION DATE (FS = A, B OR C):

	STATION NUMBER	PROJECT	ECONBR	SUBSYS	(SB) SUBSYSTEM TEST DATE	(SY) SYSTEM TEST DATE	PROJECT DUE DATE	(FS) FACILITY STATUS
1	10	DSN	80.075	92.2	810503	810503	810501	C
2	10	DSN	80.100	94.3	801119	NONE	810301	B
3	11	DSN	77.127	39.6	810601	810601	790101	B
4	11	DSN	79.101	39.1	810610	810610	800601	B
5	11	DSN	80.075	92.2	810610	810615	810501	B
6	12	MJS	79.145	29.0A	810601	810601	800201	B
7	12	MJS	79.145	39.6	810601	810601	800201	B
8	12	MJS	80.119	46.11B	810411	810415	800226	B
9	14	VIK	77.270	29.0D	810601	810601	790401	B
10	14	MJS	77.321	29.0	810601	810601	800101	B
11	14	DSN	78.150	35.14	810511	810610	810701	C
12	14	DSN	78.300	39.10	810429	810429	800601	B
13	14	MJS	79.012	39.6	810504	810504	800901	B
14	14	DSN	79.157	32.5	810531	810531	801101	C
15	14	DSN	79.247	31.2	810520	810520	810101	B
16	14	DSN	80.075	92.2	810610	810610	810501	B
17	14	DSN	80.164	32.8	810601	810615	810301	C
18	14	DSN	80.174	39.6	810503	810503	810601	B
19	14	DSN	80.189	39.92	810518	810630	801124	C

Fig. 1. ECM data base exception report example

06/12/81 SCHEDULE FOR DSS-11

WEEK 25

FINAL STATION COPY

DSN SCHED----------LAST UPDATE----------STA SCHED

06/10/81 @091550 06/12/81

DOY	START-END	USER	ACTIVITY	PASS	CALIB	EQUIPM	CAT	CONF	F
166	0015-1000	PN-11	TKG PASS	3000	A -A	000063	1A1	A000	
166	1000-1555	DSS-11	MAINTENANCE		-		2A1	A700	
166	1000-1030	DSS-11	PM 02.00-1-0.01	NIB	-	JERSCH	2A1	A700	
166	1030-1530	DSS-11	PM 29.00-1-0.01	NIB	-	JERSCH	2A1	A700	
166	1555-1920	HEL-01	TKG PASS	2380	B - 3	200063	1A1	A000	
166	1920-0025	PN-12	TKG PASS	1123	A - 3	800063	1A1	A000	
167	0025-0955	PN-11	TKG PASS	3001	A -A	000063	1A1	A000	
167	0955-1240	DSN	AGC WEEKLY		-		1A3	A700	
167	1240-1545	DSS-11	TRAINING		-		2B1	A700	

Fig. 2. Deep Space Station schedule example

DSS-11 STATION UTILIZATION REPORT
FOR
WEEK 23, 1981

	SOH	EUH	PER
I. DSN USER SUPPORT			
A. 1. SPACECRAFT TRACKING			
PIONEER-11	50.92	45.50	31.82%
PIONEER-12	27.17	22.92	16.98%
HELIOS-1	20.58	15.50	12.86%
VOYAGER-1	12.33	11.33	7.71%
2. PROJECT RELATED SUPPORT			
3. DSN PROJECT PREPARATION			
DSN	10.08	10.08	6.30%
B. RADIO SCIENCE			
DSS	3.75	3.00	2.34%
C. ADVANCED SYSTEMS			
D. SPECIAL			
SUB-TOTAL	124.83	108.34	78.02%
II. FACILITY ACTIVITIES			
A. MAINTENANCE			
1. PREVENTIVE	31.33		19.58%
2. CORRECTIVE(DOWNTIME)	0.00		0.00%
3. CORRECTIVE(NO DOWNTIME)	0.00		0.00%
B. PERSONNEL TRAINING	3.83		2.40%
C. DSN ENGINEERING			
1. ENGINEERING SUPPORT	0.00		0.00%
2. DEVELOPMENT OR TESTING	0.00		0.00%
3. MINOR MODS	0.00		0.00%
III. OTHER ACTIVITIES			
A. MAJOR MODIFICATIONS	0.00		0.00%
B. HOST COUNTRY RADIO SCIENCE	0.00		0.00%
C. MISCELLANEOUS	0.00		0.00%
TOTAL HOURS	160.00	108.34	100.00%

Fig. 3. Deep Space Station utilization report example

PREVENTIVE MAINTENANCE REPORT

DSS-11 WEEK 26
PM'S DUE FOR PERIOD 173/81 TO 179/81
AS OF 06/12/81

PM NUMBER	HRS RQD	DUE	LAST DONE	LAST SCHED	OD	DESCRIPTION
01.03-2-1.03	4.0	81162	81132	81132		SDA PHASE & GAIN ALIGNMENTS
01.03-2-2.01	2.0	81175	81085	79136		POWER SUPPLY CHECKS
02.00-1-0.01	0.5	81159	81152	81166		10/20 KW TXR CHECKLIST
02.00-2-2.01	4.0	81179	81089	81089		H.E. INSPECTION
05.02-1-0.02	1.0	81161	81154	81168		HODTR
06.00-2-1.21	12.0	80347	80317	81128	6	ANT HYDROMECHANICAL INSPECTION
06.01-2-3.40	4.0	80156	79341	79341	2	OUT OF BALANCE FORCE
06.01-2-3.41	3.0	76181	76001		10	FOUNDATION LEVEL CHECK
06.01-2-3.42	0.0	76181	76001		10	OPTICAL TRACKING ALIGNMENT CKS
06.01-2-3.43	0.0	76181	76001		10	ACQUISITION AID ALIGNMENT CKS
06.01-2-4.53	0.0	77001	76001		4	ORTHOGONALITY CHECK
06.01-2-4.54	24.0	78277	77277		2	POLAR SHAFT ALIGNMENT
06.01-2-5.60	72.0	78001	76001		1	DIS CURVATURE OPTICAL CKS
06.02-2-1.18	1.0	81049	81019	81019	4	LEVEL VIALS CK
06.02-2-4.34	02.0	80001	79001		1	LUBE PRESSURE SWITCH CHECKS
06.03-2-0.01	01.0	81147	81140	81140		SERVICE BULL AND PINION GEARS
06.03-2-0.02	00.5	81144	81137	81137	1	SERVICE MAIN DRIVE BRAKES
06.03-2-0.03	02.0	81159	81152	81152		SERVICE LOW SPEED CLUTCH
06.03-2-1.05	02.0	81136	81106	81106	1	MAIN DRIVE GEAR REDUCER CK
06.03-2-1.06	01.0	81154	81124	81124		LOW SPEED GEAR REDUCER CK
06.03-2-1.07	00.5	81150	81120	81120		TACH DRIVE BELT CK
06.03-2-1.08	00.5	81171	81141	81141		LIMIT SW DRIVE CHAIN CK
06.03-2-1.09	06.0	80255	80225	80225	9	LIMIT SWITCH CHECK
06.03-2-1.10	01.0	81170	81140	81140		GEAR REDUCER BOX CK
06.03-2-1.11	01.5	81103	81073	81073	2	BULL-PINION GEAR BACKLASH (EAST)
06.03-2-1.12	01.5	81103	81073	81073	2	BULL-PINION GEAR BACKLASH(WEST)
06.03-2-1.13	01.0	81103	81073	81073	2	BULL-PINION GEAR BACKLASH(NORTH)
06.03-2-1.14	01.0	81103	81073	81073	2	BULL-PINION BEAR BACKLASH(SOUTH)
06.03-2-1.17	01.0	80321	80291	80291	7	DECLINATION SHIFT
06.03-2-3.32	04.5	79289	79109	79109	3	LOW SPEED CLUTCH CHECK
06.03-2-3.33	01.0	81154	80339	81163		LUBE PINION SHAFT CARRIER BEARINGS
06.03-2-3.34	01.0	81110	80295	81163		LUBE DEC SHAFT BEARINGS
06.03-2-3.39	01.0	81007	80192	80192		LOW SPEED REDUCER DRAIN
06.03-2-4.51D	24.0	80067	79067	79067	1	MAIN DRIVE BRAKE MAINT
06.03-2-4.51H	24.0	80067	79067	79067	1	MAIN DRIVE BRAKE MAINT
06.03-2-4.55	10.0	81053	80053	80053		PINION CARRIER BEARINGS
06.03-2-6.70D	10.0	79001	76001			CLEAN MAIN DRIVE GEAR REDUCER
06.05-2-1.19	03.0	81159	81129	81162		HYPERBOLA DRIVE MECHANISM
29.00-1-0.01	06.0	81159	81152	81166		SUBSYSTEM HOUSEKEEPING
29.00-1-1.15	4.0	81152	81122	81162		MANUAL MODE TESTS
29.00-1-1.19	4.0	81165	81135	81163		AUTOMATIC TEST
29.00-1-1.20	1.0	81165	81135	81163		RELIABILITY TEST
35.04-1-0.04	1.0	81161	81154	81168		LINE PRINTER
37.02-1-1.08	00.5	81171	81141	81171		S-BAND MASER GAIN AND B/W MEASUREMENTS
37.02-2-1.01	3.0	81150	81120	81120		TWM/CCR MONTHLY INSPECTION
91.06-1-0.02	00.3	81162	81155	81169		OPERATOR MAINTENANCE

* NBR IN OD COLUMN - OVERDUE PERIODS SINCE DUE DATE...

END OF REPORT

Fig. 4. Preventive maintenance report example

WEEKLY MANPOWER UTILIZATION REPORT

GDSCC MAINTENANCE AND INTEGRATION UNIT

WEEK ENDING 10 MAY 81

NUMBER OF PERSONNEL=53 TOTAL M&I MANHOURS THIS WEEK= 2112.0, YTD= 40,514.9

		M&I MANHOURS AT DSS-11			M&I MANHOURS AT DSS-12			M&I MANHOURS AT DSS-14			OTHER M&I MANHOURS		
PROJ OR TASK	WORK CODE	MAN HOURS THIS WEEK	% TOTAL MAN HRS THIS WEEK	% TOTAL MAN HRS YEAR TO DATE	MAN HOURS THIS WEEK	% TOTAL MAN HRS THIS WEEK	% TOTAL MAN HRS YEAR TO DATE	MAN HOURS THIS WEEK	% TOTAL MAN HRS THIS WEEK	% TOTAL MAN HRS YEAR TO DATE	MAN HOURS THIS WEEK	% TOTAL MAN HRS THIS WEEK	% TOTAL MAN HRS YEAR TO DATE
PROJ REL SUPP	1A2						< .1%						
DSN PROJ PREP	1A3			< .1%									
PREVENT MAINT	2A1	116.0	5.5%	4.7%	130.0	6.2%	5.4%	393.0	18.6%	20.3%			.6%
CORR MAINT	2A2			.7%			.9%	80.0	3.8%	4.3%			
CORR MAINT	2A3	128.0	6.1%	5.1%	190.5	9.0%	9.0%	380.0	18.0%	18.0%			.8%
PERS TRAINING	2B1	8.0	.4%	.3%	16.0	.8%	.6%	8.0	.4%	.8%	332.5	15.7%	9.6%
ENG SUPPORT	2C1			.2%	4.0	.2%	1.3%	8.0	.4%	.5%			
ENG SUPPORT	2C2			.2%	8.0	.4%	.3%	16.0	.8%	.5%			
MINOR MOD	2C3	21.0	1.0%	.5%	23.0	1.1%	1.7%	38.5	1.8%	2.5%			.2%
MAJOR MOD	3A1						.8%			.1%			
MISC	3C1			< .1%			.1%			< .1%			.5%
ADMIN											46.0	2.2%	1.9%
ABSENCE											148.0	7.0%	5.5%
FIRST AID TNG													1.3%
EYE EXAMS													.1%
OTHER PROJ													
SAFETY											11.5	.5%	.2%
FORD LPO TNG													.3%
DSN MASTR CLK											6.0	.3%	.1%
M&I TOTALS		273.0	12.9%	11.8%	371.5	17.6%	20.0%	923.5	43.7%	47.1%	544.0	25.8%	21.0%

M&I MANHOURS AT DSS-11 | M&I MANHOURS AT DSS-12 | M&I MANHOURS AT DSS-14 | OTHER M&I MANHOURS

Fig. 5. Manpower utilization report example

BUDGET REPORT FOR ACCOUNT 38126

FISCAL YEAR 81 THRU APR. 81
22 MAY 81

COST CENTER				DISBURSEMENTS										
CODE	TITLE	MONITOR	FY BUDGET	SIS	JPL	MATL	LABOR	ODC	ACTUAL BALANCE	OBLIG $	PROJ BALANCE	COMM $	EST BALANCE	EXPENDED TIME	EXPENDED AMT
405B	IPC UTILIZATION(BPU)	EVERETT	21561	0	13299	0	0	0	8262	0	8262	0	8262	58%	62%
405C	IPC UTILIZATION(MR)	TODD	1310	0	359	0	0	0	951	0	951	0	951	58%	27%
405D	SMART TERMINAL MAINT	EVERETT	2000	0	0	0	0	0	2000	0	2000	0	2000	58%	0%
500A	WATER TESTING	ALDERSON	1273	0	0	544	0	0	729	0	729	0	729	58%	43%
500B	GDSCC TELEPHONE	POTTER	11249	0	7485	0	0	0	3764	0	3764	0	3764	58%	67%
500C	GDSCC WATER SUPPLY	POTTER	14447	0	10755	0	0	0	3692	0	3692	0	3692	58%	74%
500D	TELEPHONE - BARSTOW	MARTIN	5599	0	1327	0	0	0	4272	0	4272	0	4272	58%	24%
500F	RODENT & PEST CONTROL	ALDERSON	3342	0	0	1553	0	0	1789	0	1789	0	1789	58%	46%
500G	GDSCC GRNDS KEEPING	ALDERSON	12365	0	0	7142	0	0	5223	0	5223	0	5223	58%	58%
500H	ELECTRICAL CONTRACT	ALDERSON	2000	0	0	0	0	0	2000	0	2000	0	2000	58%	0%
500J	WELDING CONTRACT	ALDERSON	2000	0	0	0	0	0	2000	0	2000	0	2000	58%	0%
922L	PLANT MAINT MISC	ALDERSON	18172	0	13060	13943	0	6488	-15319	0	-15319	0	-15319	58%	184%
	ACCOUNT TOTALS		95318	0	46285	23182	0	6488	19363	0	19363	0	19363	58%	80%

Fig. 6. Budget report example

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                                  GDSCC
                    PROCUREMENT ACCOMPLISHMENT REPORT
                                  FOR
                                JUNE, 1981
                                 06/15/81
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PART 1: SUMMARY OF ACTIVITIES
   A. FOR THE MONTH OF JUNE:

      PURCHASE REQUISITIONS RECEIVED:  18    TOTAL VALUE  $    6850.85
      PURCHASE ORDERS RELEASED      :  24    TOTAL VALUE  $  228408.07


   B. TOTALS:

       PURCHASE REQUISITIONS OUTSTANDING:    0    TOTAL VALUE $       0.00
       PURCHASE ORDERS NOT RECEIVED     :   36    TOTAL VALUE $   45512.09
       PURCHASE ORDERS NOT PAID         :  106    TOTAL VALUE $   26610.61
       PURCHASE ORDERS RELEASED THIS FY :  536    TOTAL VALUE $  733586.20

   C. 1. AVERAGE DAYS FROM TIME OF PR INITIATION TO PROCUREMENT RECEIPT:
         FOR ROUTINE ACTION :     8.5
         FOR PRIORITY ACTION:     5.2
         FOR SUBCONTRACTS   :     5.7


      2. AVERAGE DAYS FROM TIME PR IS RECEIVED BY PROCUREMENT TO PO RELEASE:

         FOR ROUTINE ACTION :     8.7
         FOR PRIORITY ACTION:     2.4
         FOR SUBCONTRACTS   :    20.3


      3. AVERAGE DAYS FROM TIME PO IS RELEASED UNTIL RECEIVED FROM VENDOR:

         FOR ROUTINE ACTION :    22.8
         FOR PRIORITY ACTION:    14.8
         FOR SUBCONTRACTS   :    14.7



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Fig. 7. Procurement accomplishment report example

GDSCC VEHICLE USE REPORT

PERIOD FROM 04/21/81 TO 05/20/81

PAGE 5 VANS

VEHICLE CL TAG	ODOMETER BEGIN	ODOMETER END	TOTAL MILES		GAL-OF-GASOLINE GSAPUMP	GAL-OF-GASOLINE CR-CARD	AVG MPG	NOTES	REMARKS
G42-30946	078402	079391	01489	*	116.6		12.8		TRM 05/15/81
G42-30947	072825	073282	00457	*	35.0		13.1		TRM 05/12/81
G42-30949	080966	082694	01728	*	100.1		17.3		TRM 05/14/81
G42-32376	064293	065216	00923	*	72.5		12.7		
G42-32377	086141	087234	01093	*	108.7		10.1		TRM 05/18/81
G42-32378	089040	089958	00918	*	91.5		10.0		TRM 05/20/81
G42-32380	069742	071210	01468	*	142.5		10.3		
G42-33277	054003	057327	03324	*	258.7		12.8		
G42-33288	069947	071420	01473	*	117.5		12.5		
G42-33290	056096	058509	02413	*	166.6		14.5		
G42-33291	040916	042204	01288	*	112.6		11.4		
G42-33292	050654	053011	02357	*	147.4		16.0		
G42-3329[illegible]	01[illegible]	048392	[illegible]627	*	[illegible]		11.9		
G4[illegible] 28150	011726	014066	02340	*	162.9		14.4		
G43-29532	028646	029989	01343	*	106.3		12.6		
SUBTOTAL			45,935		3,590.6		12.8		
TOTAL 47 VANS			87,943		6,733.3				
GRAND-TOT 112 VEHICLES			200,786		13,608.8		51.6		

NOTES

NOTE(1) ODOMETER READING OF TOTAL MILES IS NEGATIVE
NOTE(2) TOTAL MILES EXCEEDS 4000
NOTE(3) THE END ODOMETER READING IS ZEROES
NOTE(4) THE AVG-MPG EXCEEDS 30.0
NOTE(5) NO GSA PUMP TRANSACTIONS THIS PERIOD

END OF REPORT

Fig. 8. Vehicle use report example