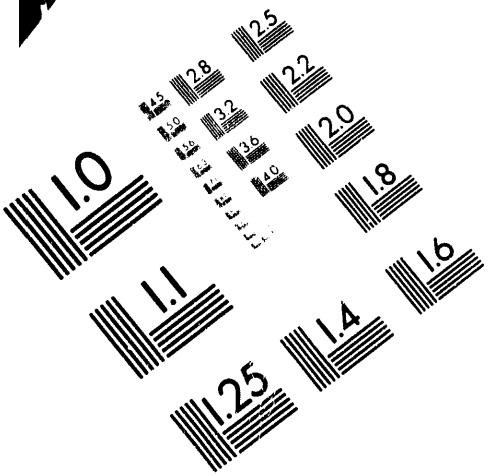

AIIM

Association for Information and Image Management

1100 Wayne Avenue, Suite 1100
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 mm

1 2 3 4 5

Inches

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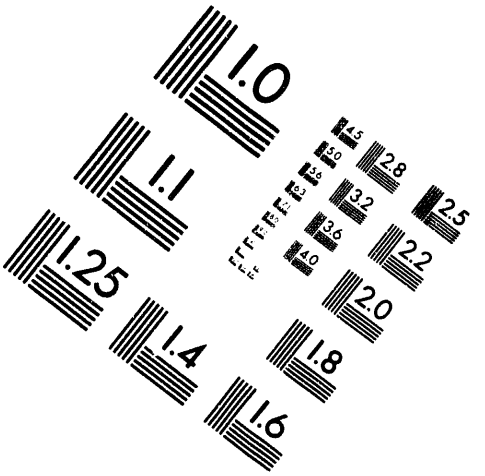
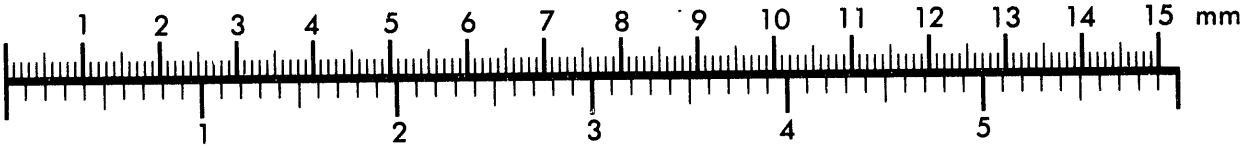
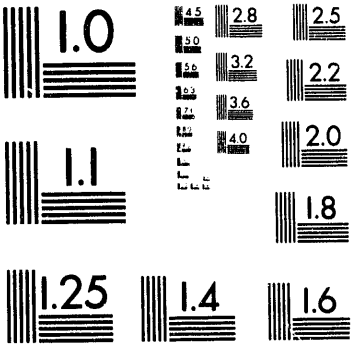
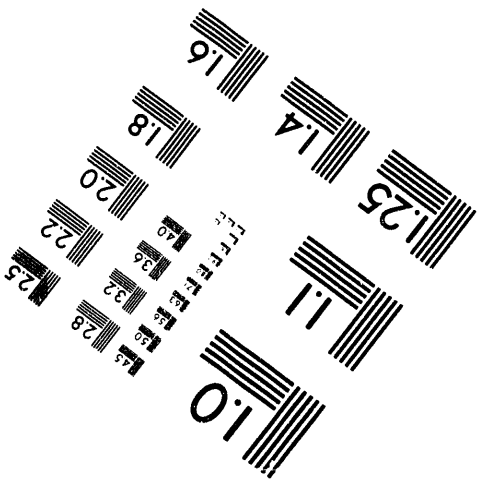
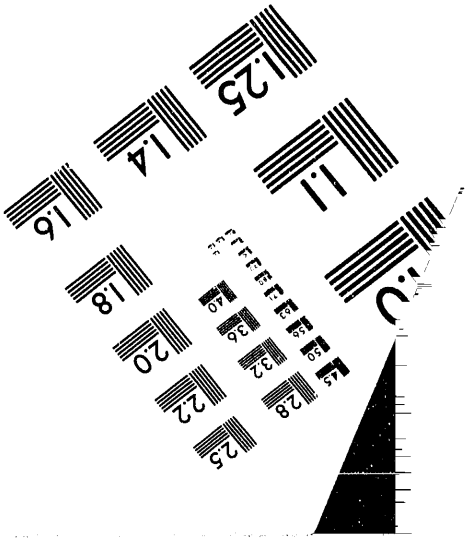
BY APPLIED IMAGE, INC.











1 of 1

DOE/CE/15510--T6

TECH BRIEF REPORT

OIL WELL POWER CONTROLLER (OPC)

GENERAL EQUIPMENT INFORMATION

DOUBLE M ELECTRIC INC.,WATFORD CITY N.D. IS NEARING COMPLETION ON THE TESTING OF **OPC PROTOTYPE UNITS.**

THIS DEVICE IS AN OILWELL BEAM PUMP CONTROLLER AND DATA LOGGER. APPLICATIONS FOR THIS DEVICE HAVE BEEN FOR AN ELECTRICAL POWER SAVING DEVICE,PUMP OFF CONTROL, PARAFFFIN DETECTION,DEMAND POWER LOAD CONTROL,CHEMICAL TREATMENT DATA, DYNAMOMETER AND PUMP EFFICIENCY DATA.

PRELIMINARY RESULTS APPEAR VERY PROMICING.

IMPLEMENTATION OF PROTOTYPE TESTING

A TOTAL OF TEN OPC ROD PUMP CONTROLLERS WERE ASSEMBLED AND INSTALLED ON OILWELLS IN SEVERAL AREAS OF CENTRAL AND WESTERN UNITED STATES.

DATA WAS ANALYZED ON THESE WELLS AND FORWARDED TO THE PARTICIPATING OIL COMPANIES.

COST SAVINGS REPORT

GENERAL STATEMENT

COST SAVINGS ON EACH INDIVIDUAL OILWELL PARTICIPATING IN THE OPC TESTING VARY CONSIDERABLY.SAVINGS ON SOME SITUATIONS HAVE BEEN OUTSTANDING. IN SITUATIONS WERE THE PUMP EFFICIENCY WAS DETERMINED TO BE LOW, THE COST SAVINGS HAVE BEEN CONSIDERABLE.

COST SAVINGS DUE TO PREVENTIVE MAINTENENCE ARE ALSO PRESENT, BUT ARE DIFFICULT TO PIN POINT AN EXACT DOLLAR AMOUNT TO AT THE PRESENT TIME.

THE FOLLOWING PAGE CONTAINS A BREAK OUT OF ACTUAL COST DATA OBTAINED ON SOME OF THE OILWELLS CONTROLLED AND MONITERED WITH THE OILWELL POWER CONTROLLER (OPC).

MASTER

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

PROJECTED GOALS AND FUTURE PLANS

DOUBLE M ELECTRIC INC. PLANS TO MANUFACTURE THE OPC UNIT ON A LIMITED BASIS AT THE PRESENT TIME.

A FEW UNITS HAVE BEEN SOLD AS WELL AS UNITS ON LEASE/PURCHASE AGEEMENTS.

ALL THE ORIGINAL D.O.E. PROTOTYPES CONTINUE TO OPERATE ON THE TEST OILWELLS.

WE PLAN TO UPGRADE THE SOFTWARE AS WE SEE FIT IN THE FUTURE.

AS THE DOMESTIC OIL INDUSTRY IS IN A SEVERE DECLINE, IT BECOMES INCREASINGLY DIFFICULT TO SELL OILFIELD RELATED EQUIPMENT. OUR SUCCESSES WITH THE OPC CONTROLLER HAVE BEEN WHERE THE DEVICE HAS SIGNIFICANTLY LOWERED LIFTING COSTS BY INCREASING PUMP EFFICIENCY AND LOWERING ELECTRICITY COSTS.

ON SMALL OIL PRODUCING WELLS THE LEASE/PURCHASE OPTION SEEMS A POSSIBILTY AS THE LOWERED ELECTRICITY COSTS HAVE MORE THAN COVERED THE MONTHLY LEASE PAYMENT. THIS OPTION DOESN'T REQUIRE ANY CAPITAL INVESTMENT BY THE OIL COMPANY.

MARKETING PLAN

DOUBLE M ELECTRIC IS THE U.S. MANUFACTURER OF THE GML ELECTRONIC OIL TANK GUAGE AND THE PYRO-PLUG THERMAL HEAT FUSE.

AS CONTACTS ARE BEING FOLLOWED UP WITH THESE PRODUCTS, THE OPC IS BEING INTRODUCED. ALTHOUGH THIS IS NOT A REAL STRONG MARKETING PLAN WE FEEL THAT THE BOOT-STRAP METHOD OF PULLING THE OPC PROJECT ALONG IS OUR BEST ALTERNATIVE AT THE PRESENT TIME. AS THE DEMAND FOR THE OPC INCREASES A MORE HIGH PRESSURE MARKETING PLAN WILL BE IMPLEMENTED.

CASE NO. 1

OILWELL ON 24HR. CONTINUOS RUN TIME
PUMP EFFICIENCY OF LESS THAN 30%.

FINAL RESULT AFTER OPC INSTALLATION
* PUMPING UNIT SPEED SLOWED 35%.
* 50% DECREASE IN ELECTRICAL KWH
* 50% DECREASE IN DEMAND KW USAGE
TOTAL MONTHLY POWER SAVINGS OF **$460.00 / MONTH**
ESTIMATED EGUIPMENT (OPC) PAYBACK OF 7 MONTHS

CASE NO. 2

OILWELL ON 12HR. RUN TIME/DAY
PUMP EFFICIENCY OF APROX. 60%.

NEAR FINAL RESULT AFTER OPC INSTALLATION
* 35% DECREASE IN KWH USAGE
* 20% DECREASE IN DEMAND KW USAGE
* SLIGHT INCREASE 5% IN OIL PRODUCTION
* OIL PRODUCTION STABILIZED
TOTAL MONTHLY POWER SAVINGS OF **$90.00 / MONTH**
ESTIMATED EQUIPMENT (OPC) PAYBACK OF 24 months

CASE NO. 3

OILWELL ON BOTH 24HR AND TIME CONTROL

FINAL RESULT AFTER OPC INSTALLATION AND DEMAND LOAD CONTROL VIA RADIO SIGNAL.

* 50% DECREASE IN DEMAND CHARGE
* 20-25% DECREASE IN KWH USAGE
TOTAL MONTHLY SAVINGS OF **$160.00 / MONTH**
ESTIMATED OPC EQUIPMENT PAYBACK OF 19 MONTHS

CASE NO. 4

OILWELL ON 24 HR. CONTIUOUS RUN
PUMP_ EFFICIENCY OF 17%

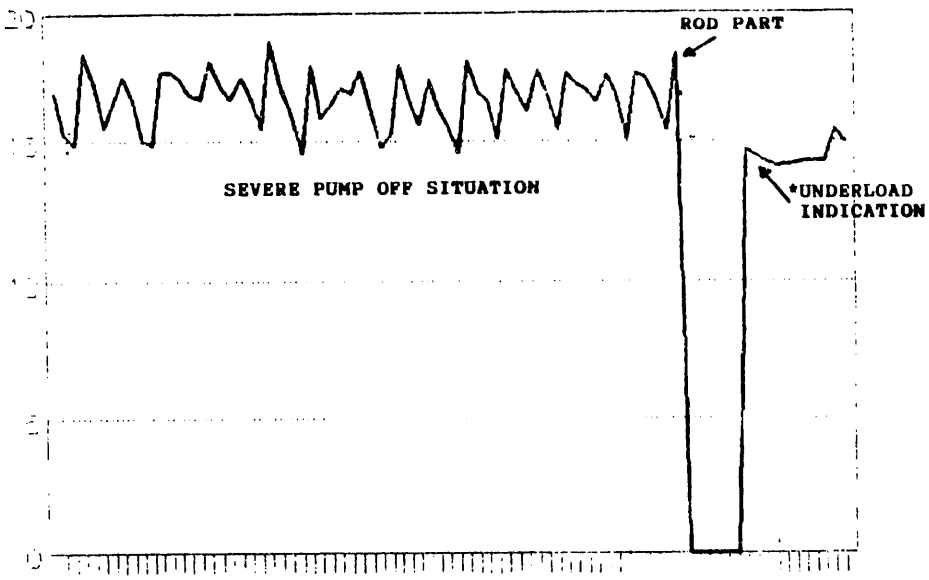
* 40% DECREASE IN KWH USAGE
* 30% DECREASE IN DEMAND
* PUMPING UNIT SPEED SLOWED 25%
MONTHLY COST SAVINGS OF APROX. **$240.00 / MONTH**
ESTIMATED OPC PAYBACK OF 13 MONTHS

SUMMARY

COST SAVINGS HAVE BEEN SIGNIFICANT ON WELLS WITH POOR PUMP EFFICIENCIES. WITHOUT INCLUDING PREVENTIVE MAINTENCE PAY BACK APPEARS TO AVERAGE APROX. 18 MONTHS OR LESS.

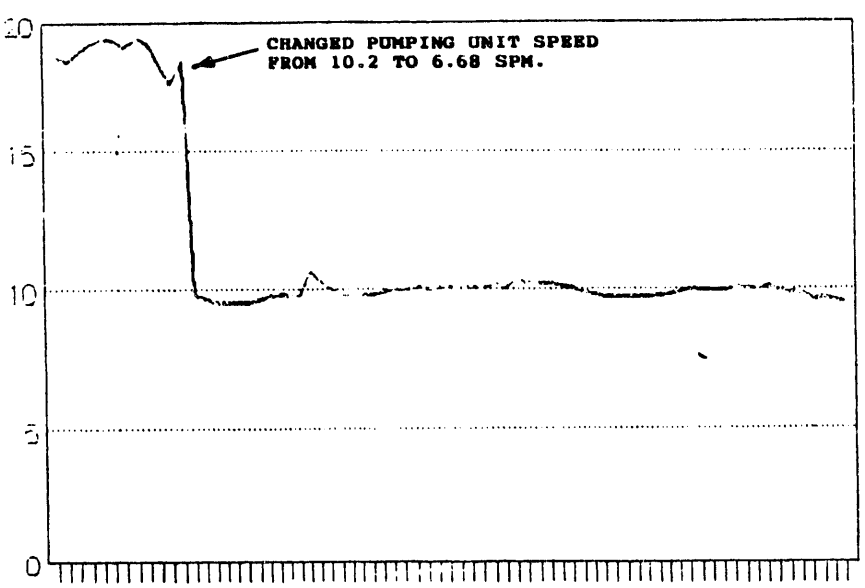
DEMAND KW AND PUMP OFF INDICATION
THE IMPORTANCE OF PROPER PUMPING SPEED

EXAMPLE A
CASE NO.1



EXAMPLE A SHOWS HOURLY DEMAND KW ON A OILWELL THAT IS INDICATING A SEVERE PUMP OFF. THE HOURLY KW SHOULD BE FAIRLY STEADY.
AS A RESULT OF THE IMPROPER PUMPING THE RODS PARTED. UPON RESTART THE OPC THEN INDICATED A UNDERLOAD FOR PUMP FAILURE TO THE PERSONNEL.

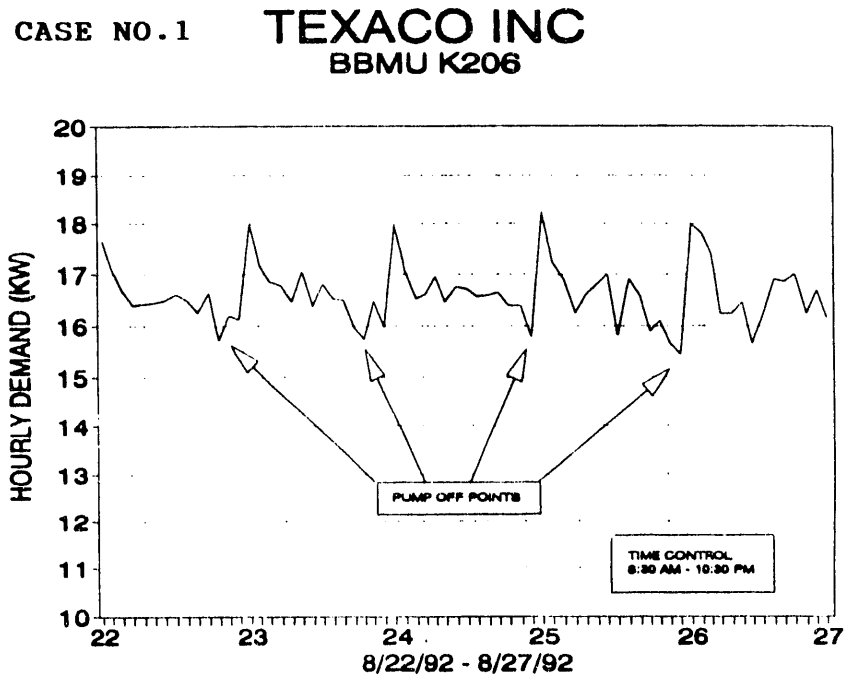
EXAMPLE B
CASE NO.1



AFTER REVIEW OF GRAPH (A) DATA THE PUMPING UNIT SPEED WAS SLOWED SIGNIFICANTLY. THIS HAS ELIMINATED THE PUMP OFF SITUATION.
NOTE THE 45% DECREASE IN ELECTRICAL KW.
THE OIL PRODUCTION REMAINED THE SAME AS AT PRIOR SPEED.

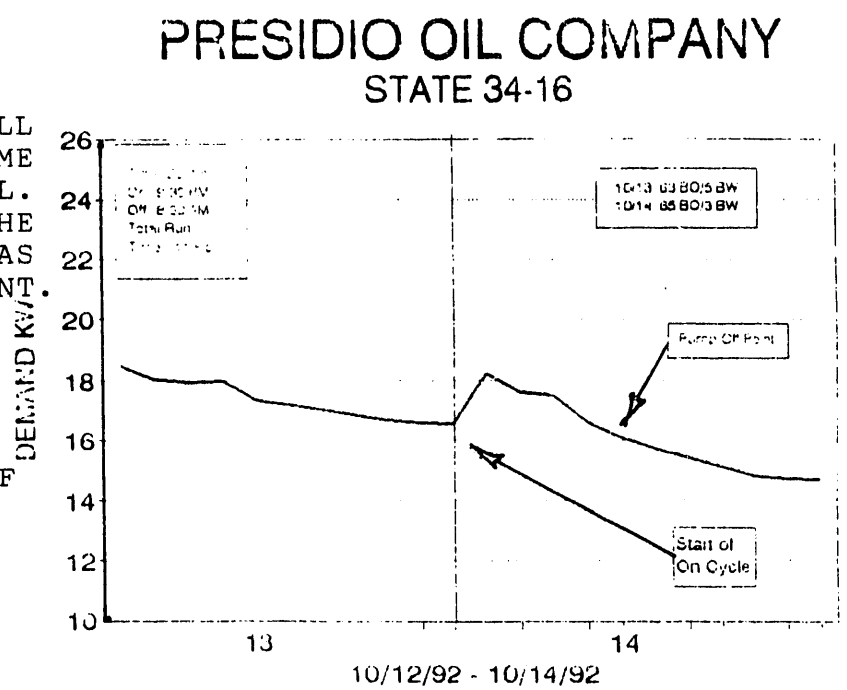
DEMAND POWER AND RUN TIME DATA

CASE NO.1



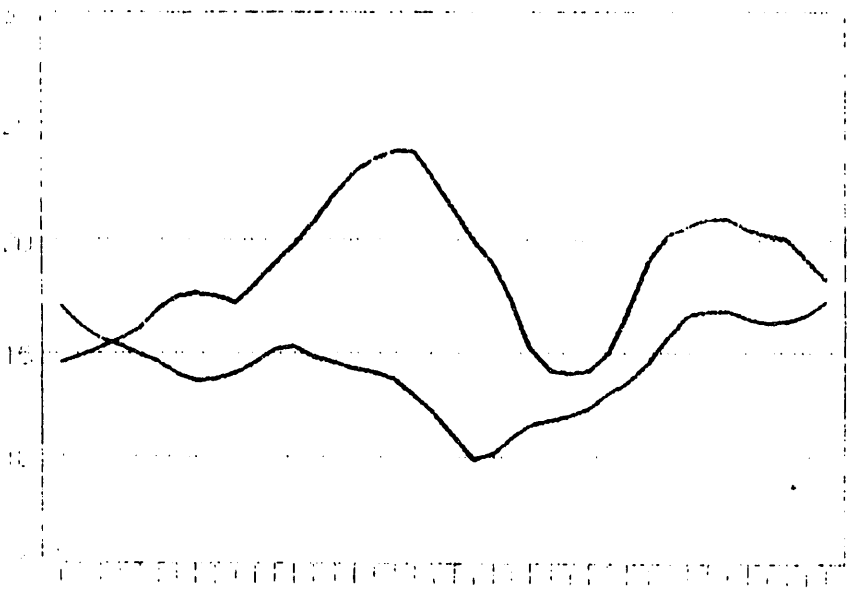
USE OF DEMAND KW TO DETERMINE MAX. PUMP RUN TIME

IN THIS SITUATION THE OILWELL WAS ORIGINALLY ON A 24HR. CONT. RUN CYCLE. THE PUMP EFF. WAS DETERMINED TO BE VERY LOW SO THE WELL WAS PUT ON A 14HR. CONTINUOS RUN, 10HR.OFF THIS HELPED TO DECIDE THE MAX PUMP TIME AS THE WELL SHOWS SIGNS OF PUMP OFF IN LESS THAN 10 HRS.



IN THIS CASE THE OILWELL WAS ORIGINALLY ON A TIME CYCLE OF 12 HOURS TOTAL. UPON INSTALLATION OF THE **OPC** UNIT THE KW DATA WAS GATHERED ON A 11HR. CONT. ON & 13HR. OFF CYCLE. THE INITIAL PERCENTAGE TIME WAS THEN SET INTO THE **OPC** TIME CONTROL. THE WELL IS PRESENTLY ON A 13MIN.ON-26MIN OFF TIME CYCLE.(DOWN 35%)

DYNAMOMETER DATA

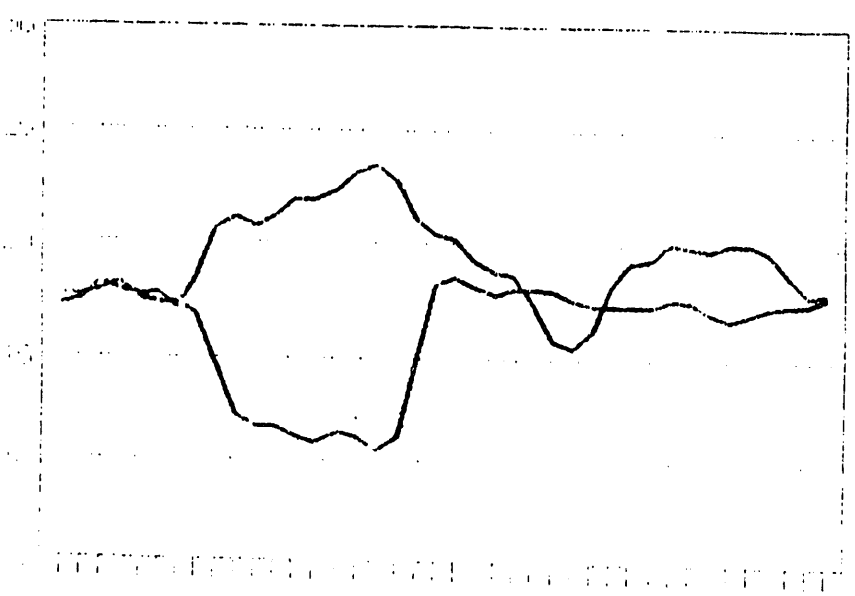


DATE: 5/25/93
TIME*: 1:10PM.
RUN CYCLE:13on-26off
UNIT SPEED: 8.16spm

*ONE MINUTE AFTER START OF ON CYCLE

PRESIDIO OIL

STATE 34-16



DATE: 5/25/93
TIME*: 1:21PM.
RUN CYCLE:13on-26off
UNIT SPEED: 8.23spm*

*ONE MINUTE PRIOR TO THE OFF CYCLE

THE ABOVE (2) SURFACE DYNAMOMETER CARDS SHOW THE EFFECT OF THE ROD WEIGHT FROM PUMPING FLUID IN THE TOP CARD TO A PUMP OFF SITUATION IN THE BOTTOM CARD. THE BOTTOM CARD SHOWS THE COMPRESSION ON THE DOWNSTROKE. NOTE THE SLIGHT INCREASE IN UNIT SPEED (spm).

REAL TIME DATA STORAGE

EGGT
Page No. 6 04-26-1992

* * OPC RUNNING HISTORY * *

Date	Time	UL	OL	Stemp	Ftemp	Fpres	Apres	HLPWR	HLTIME	OPWR	RTIME
32792	1315	40	30	65	63	23	235	0	0	6.55	623.1
32792	1915	40	30	64	64	22	249	0	0	6.598	623.6
32792	2015	40	30	63	61	24	243	0	0	6.536	624.1
32792	2205	40	30	51	52	21	251	0	0	6.781	625.1
32792	2305	40	30	49	56	22	303	0	0	6.807	626.6
32892	5	40	30	47	52	21	271	0	0	6.696	626.2
32892	105	40	30	46	59	26	279	0	0	6.849	626.7
32892	205	40	30	46	50	20	259	0	0	6.627	627.1
32892	305	40	30	46	46	22	230	0	0	6.848	627.6
32892	405	40	30	43	48	21	303	0	0	6.723	628.1
32892	605	40	30	41	58	26	303	0	0	6.83	628.6
32892	605	40	30	40	44	21	293	0	0	6.66	629.1
32892	705	40	30	40	41	20	238	0	0	6.87	629.6
32892	805	40	30	40	46	21	230	0	0	6.7	630.2
32892	905	40	30	42	46	20	233	0	0	6.824	630.7
32892	1005	40	30	46	57	20	262	0	0	6.929	631.1
32892	1105	40	30	53	64	20	233	0	0	6.85	631.6
32892	1205	40	30	58	70	19	306	0	0	6.661	632.1
32892	1305	40	30	59	72	21	263	0	0	6.702	632.6
32892	1405	40	30	63	73	21	302	0	0	6.617	633.1
32892	1505	40	30	64	75	20	290	0	0	6.659	633.6
32892	1605	40	30	65	74	20	269	0	0	6.468	634.2
32892	1705	40	30	65	70	20	266	0	0	6.579	634.7
32892	1805	40	30	64	69	19	296	0	0	6.511	635.1
32892	1905	40	30	63	62	22	248	0	0	6.616	635.6
32892	2005	40	30	59	60	20	257	0	0	6.564	636.1
32892	2105	40	30	55	55	21	300	0	0	6.593	636.6
32892	2206	40	30	50	56	23	270	0	0	6.547	637.1
32892	2305	40	30	48	49	21	307	0	0	6.571	637.6
32992	5	40	30	46	53	21	238	0	0	6.565	638.2
32992	105	40	30	45	47	19	303	0	0	6.662	638.7
32992	205	40	30	40	55	22	298	0	0	6.784	639.1
32992	305	40	30	38	42	19	289	0	0	6.702	639.6
32992	405	40	30	37	52	20	286	0	0	6.764	640.1
32992	505	40	30	37	38	21	306	0	0	6.694	640.6
32992	605	40	30	38	54	23	264	0	0	6.817	641.1
32992	705	40	30	38	39	21	262	0	0	6.686	641.6
32992	805	40	30	38	59	27	288	0	0	6.815	642.2
32992	905	40	30	42	45	19	306	0	0	6.723	642.7
32992	1005	40	30	50	60	26	302	0	0	6.765	643.1
32992	1105	40	30	51	53	19	241	0	0	6.706	643.6
32992	1205	40	30	54	58	22	272	0	0	6.731	644.1
32992	1305	40	30	59	61	21	301	0	0	6.675	644.6
32992	1405	40	30	63	63	22	247	0	0	6.67	645.1
32992	1505	40	30	64	64	21	295	0	0	6.521	645.6
32992	1605	40	30	67	65	21	231	0	0	6.75	646.2
32992	1705	40	30	61	60	20	287	0	0	6.496	646.7
32992	1805	40	30	62	62	20	257	0	0	6.655	647.1
32992	1905	40	30	59	58	20	306	0	0	6.472	647.6
32992	2005	40	30	56	60	24	265	0	0	6.609	648.1
32992	2105	40	30	50	50	20	233	0	0	6.411	648.6

SHOWN ABOVE IS A SAMPLE PRINTOUT OF REAL TIME DATA AVAILIABLE FROM THE **OPC** UNIT. THE **OPC** WILL STORE HOURLY **TIME,DATE,REAL TIME, OVERLOAD & UNDERLOAD PERCENTAGE SETTINGS,SITE TEMPERATURE, FLUID TEMPERATURE, FLUID PRESSURE,CASING OR AIR PRESSURE, OVERLOAD OR UNDERLOAD FAULT TIME OF OCCURRANCE,DEMAND KW, AND ACTUAL UNIT RUN TIME.**
THE OPC IS CAPABLE OF UP TO 60 DAYS STORAGE AND CAN BE DOWN-LOADED VIA ANY IBM COMPATIBLE LAPTOP COMPUTER. THE DATA CAN THEN BE PRINTED,VIEWED,OR GRAPHED BY VARIOUS PROGRAMS AVAILIABLE.

DATE
FILMED
9/21/93

END