AD-A252 965 ESL-TR-89-39 VOL V **FULL-SCALE INCINERATION SYSTEM DEMONSTRATION AT THE NAVAL BAT-**TALION CONSTRUCTION CENTER. **GULFPORT, MISSISSIPPI - VOL V: INCIN-ERATOR AVAILABILITY** J. A. COOK EG&G IDAHO, INC. P. O. EOX 1625 **IDAHO FALLS ID 83415 JULY 1991** FINAL REPORT SEPTEMEER 1986 - FEBRUARY 1989 APPROVED FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED 92-13812 **AIR FORCE ENGINEERING & SERVICES CENTER ENGINEERING & SERVICES LABORATORY** TYNDALL AIR FORCE BASE, FLORIDA 32403 92 7 15 008

| REPORT  | DOCUMENTATIO  | N PAGE   |  |  | Form Approved<br>OMB No. 0704-0188  |
|---|---|--|--|--|---|
| 1a. REPORT SECURITY CLASSIFICATION  |   | 1b. RESTRICTIVE  | MARKINGS   |  |   |
| SECURITY CLASSIFICATION AUTHORITY   |   | 3. DISTRIBUTION / AVAILABILITY OF REPORT   |  |  |   |
| DECLASSIFICATION / DOWNGRADING SCHI   |   | Approved for Public Release  |  |  |   |
| PEDEORMING ORGANIZATION REPORT NUL  |   | DISTID   | ORGANIZATION   | MILEO  | MBER(S)   |
|   |   | ESL-   | TR-89-39,  | Volume '   | V   |
| NAME OF PERFORMING ORGANIZATION   | 6b. OFFICE SYMBOL<br>(If applicable)  | 7a. NAME OF M  | ONITORING OR   | GANIZATION   | 1   |
| EG&G Idaho, Inc.  |   | 1  |  |  |   |
| ADDRESS (City, State, and ZIP Code)   |   | 76. ADDRESS (Ci  | ty, State, and Z   | IP Code)   |   |
| P. O. Box 1625<br>Idaho Falls, ID 83415   |   |  |  |  |   |
| , NAME OF FUNDING / SPONSORING  | 86 OFFICE SYMBOL  | 9 PROCUREMEN   | T INSTRUMENT   | IDENTIFICA   | TION NUMBER   |
| HQ AFESC  | RDVW  |  |  |  |   |
| ADDRESS (City, State, and ZIP Code)   |   | 10. SOURCE OF  | FUNDING NUME   | BERS   |   |
| HQ AFESC/RDVW<br>Typdall AFB FL 32403-6001  |   | PROGRAM<br>ELEMENT NO.   | PROJECT<br>NO.   | TASK<br>NO   | WORK UNIT<br>ACCESSION NO   |
| Gulfport, Mississippi, Volum<br>PERSONA, AUTHOR(S)<br>J. A. Cook  | e V: Incinerator  | Availabilit  | у<br>У   |  |   |
| Gulfport, Mississippi, Volum<br>2. PERSONA_AUTHOR(S)<br>J. A. Cook<br>3. TYPE OF REPORT<br>Final<br>FROM_   | e V: Incinerator<br>COVERED<br>Sep 86 TO Feb 89   | Availabilit  | CRT (Year, Mon<br>991  | °h, Day) 1   | 5. PAGE COUNT<br>212  |
| Gulfport, Mississippi, Volum<br>PERSONAL AUTHOR(S)<br>J. A. Cook<br>TYPE OF REPORT<br>Final<br>SUPPLENENTARY NOTATION   | e V: Incinerator<br>COVERED<br>Sep 86 TO Feb 89   | Availabilit  | .y<br>DRT (Year, Mon<br>991  | -h. Day) [1  | 5. PAGE COUNT<br>212  |
| Gulfport, Mississippi, Volum<br>PERSONA_AUTHOR(S)<br>J. A. Cook<br>TYPE OF REPORT<br>Final<br>SUPPLENENTARY NOTATION<br>COSATI CODES<br>FIELD CROUP SUB-GROUP   | IS SUBJECT TERMS<br>Herbicide On  | Availabilit  | SY<br>DRT (Year, Mon<br>991<br>se if necessary   | Th, Day)   | 5. PAGE COUNT<br>212<br>by block number)  |
| Gulfport, Mississippi, Volum<br>PERSONAL AUTHOR(S)<br>J. A. Cook<br>TYPE OF REPORT<br>Final<br>SUPPLENENTARY NOTATION<br>COSATI CODES<br>FIELD GROUP<br>SUB-GROUP   | ICOVERED<br>Sep 86 TO Feb 89<br>18. SUBJECT TERMS<br>Herbicide On<br>Dioxin<br>Incineration   | Availabilit  | y<br>DRT (Year, Mon<br>991<br>se if necessary  | and identify   | 5. PAGE COUNT<br>212<br>by block number)  |
| Gulfport, Mississippi, Volum<br>PERSONAL AUTHOR(S)<br>J. A. COOK<br>TYPE OF REPORT<br>Final<br>SUPPLENENTARY NOTATION<br>COSAFI CODES<br>FIELD<br>COSAFI CODES<br>FIELD<br>ABSTRACT (Continue on reverse if necessa<br>This technical report is div<br>Volume V, Incinerator Availa<br>availability data. It prese<br>items (components) that cont<br>general background section,<br>implementation used to colle<br>incinerator availability eva<br>conclusions and recommendati | 18. SUBJECT TERMS<br>Sep 86 TO Feb 89<br>18. SUBJECT TERMS<br>Herbicide On<br>Dioxin<br>Incineration<br>ability. This volution<br>ributed to the av<br>a brief descript<br>ect availability of<br>aluation, and spec- | Availabilit<br>Availabilit<br>(Continue on rever<br>Tange<br>(Continue on rever<br>(Continue on rever<br>tange<br>(Continue on rever<br>tange<br>(Continue on rever<br>tange<br>(Continue on rever<br>tange<br>)<br>(Continue on rever<br>tange<br>)<br>(Continue on rever<br>tange<br>)<br>(Continue on rever<br>tange<br>)<br>(Continue on rever<br>tange<br>)<br>)<br>)<br>)<br>)<br>)<br>)<br>)<br>)<br>)<br>)<br>)<br>) | Sy DRT (Year, Mon<br>991<br>se if necessary<br>is portion<br>es the metha<br>collected<br>of the inc<br>rocess equipperations<br>rator compo | of the<br>hods use<br>d, and d<br>inerator<br>ipment,<br>and fie<br>onent in | 5. PAGE COUNT<br>212<br>by block number)<br>report comprises<br>d to collect<br>iscusses the<br>. It provides a<br>the planning and<br>ild data, an<br>spection |

(The reverse of this page is blank.)

24.2

## EXECUTIVE SUMMARY

The Naval Construction Battalion Center Demonstration Project was conducted as part of the research test and evaluation phase of the U.S. Air Force Installation Restoration Program and was sponsored by the Air Force Engineering and Services Center. The overall goal of the project was to determine the cost and effectiveness of a 100 tons/day rotary kiln incinerator in processing soil contaminated with dioxins and other hazardous constituents of Herbicide Orange.

The demonstration program consisted of three phases. The first phase, the verification test burn, demonstrated the effectiveness of the 100 tons/day incinerator to destroy soil contaminated with constituents of Herbicide Orange, in particular 2,3,7,8-tetrachlorinateddibenzodioxin.

The second phase demonstrated the ability of the incinerator to meet the requirements of the Resource Conservation and Recovery Act (RCRA), which specifies that the incinerator must meet or exceed a Destruction and Removal Efficiency of 99.9999%.

The third phase determined the cost and reliability of using the incinerator on a long-term basis while processing more than 26,000 tons of contaminated soil between November 25, 1987, and November 19, 1988.

Maintenance information pertaining to the incineration system was collected daily from the operator's logbook, scheduled and unscheduled maintenance forms, and the Data Acquisition System Interlock Summary Sheet. The maintenance and cost data were entered into a computer data base. These data were used to calculate the availability and cost effectiveness of the incineration system.

This report is the fifth of eight volumes. It includes a general background section, a brief description of the MWP-2000 incinerator system components and operation, the planning and implementation used to collect availability data, field operations and field data, the incinerator availability evaluation, and finally a conclusion and recommendation section.

iii (The reverse of this page is blank.)

#### PREFACE

This report was prepared by EG&G Idaho, Inc., P. O. Box 1625, Idaho Falls, ID 83415, under Job Order Number (JON) 2103 9027, for the Air Force Engineering and Services Center, Engineering and Services Laboratory, Tyndall Air Force Base, Florida 32403-6001.

This report summarizes work done between September 1989 and February 1989 Major Terry Stoddart and Major Michael L. Shelley were the AFESC/RDVS Project Officers.

This report has been reviewed by the Public Affairs Office (PA) and is releasable to the general public, including foreign nationals.

This report has been reviewed and is approved for publication.

MICHAEL L SHELLEY, Maj, USAF, BSC

Chief, Environmental Actions R&D

Killy Lamb EIL J. LAMB, LE CO1, USAF, BSC

Chief, Environics Division

FRANK P. GALLAGHER III, Col, USAF Director, Engineering and Services

Laboratory

| Acces         | ston For  |       |
|---------------|-----------|-------|
| NT15          | GRAEI     |       |
| DTIC          | TAB       | ñ     |
| Unant         | nounced   | ā     |
| Just          | fication_ |       |
| Distr<br>Aval | ibution/  | Codaa |
|               | Avail and | ijor  |
| Dist          | Special   |       |
| A-1           |           |       |
|               |           |       |

(The reverse of this page is blank.)

## TABLE OF CONTENTS

ſ

| Section |                            | Title  | Page                       |
|---------|----------------------------|--|----------------------------|
| I       | INTR                       | ODUCTION   | 1                          |
|         | A.<br>B.                   | OBJECTIVE<br>BACKGROUND  | 1<br>1                     |
|         |                            | 1. Site Characterization   | 7                          |
|         | C.                         | SCOPE/APPROACH   | 7                          |
| II      | TEST                       | EQUIPMENT TECHNOLOGY   | 8                          |
|         | A.<br>B.                   | GENERAL DESCRIPTION<br>PROCESS DESCRIPTION   | 8<br>11                    |
|         |                            | <ol> <li>Contaminated Soil Feed System</li> <li>Rotary Kiln</li> <li>Secondary Combustion Chamber</li> <li>Waste Heat Boiler</li> <li>Air Pollution Control Train</li> </ol> | 11<br>11<br>14<br>17<br>17 |
|         | C.                         | GENERAL DESCRIPTION OF MANUAL DATA COLLECTION  | 21                         |
|         |                            | <ol> <li>System Component Codes</li> <li>Data Base</li> <li>Criteria for Data Collection</li> <li>Techniques of Determining Availability</li> </ol>                          | 21<br>24<br>24<br>25       |
|         | D.                         | ON-LINE MONITORING   | 25                         |
|         |                            | <ol> <li>Auger Hours</li> <li>Interlock Record</li> </ol>  | 25<br>25                   |
| III     | PLAN                       | VING AND IMPLEMENTATION  | 26                         |
|         | A.<br>B.<br>C.<br>D.<br>E. | REPORTING CRITERIA<br>INVOICES<br>INTERLOCKS<br>LOG ENTRIES<br>SPARE PARTS INVENTORY   | 26<br>26<br>26<br>26<br>27 |
|         | F.                         | INSPECTION PLAN FOR DECONTAMINATION AND<br>DEMOBILIZATION  | 27                         |
|         | G.                         | METHODS USED TO COLLECT DATA   | 27                         |
| IV      | FIEL                       | O OPERATIONS AND FIELD DATA  | 29                         |
|         | A.<br>B.<br>C.             | DAILY REPORTS<br>PRODUCTIVITY IMPROVEMENTS AND PROCESS CHANGES<br>DATA COLLECTION DURING DECONTAMINATION AND   | 29<br>29                   |
|         |                            | DEMOBILIZATION   | 30                         |

## TABLE OF CONTENIS (CONTINUED)

...!

| Section | Title   | Page   |
|---------|---|--|
| V       | INCINERATOR AVAILABILITY EVALUATION   | 31   |
|         | A. DATA EVALUATION<br>B. EVALUATION AND DISCUSSION  | 31<br>32   |
|         | <ol> <li>Overall Evaluations</li> <li>Specific Components</li> </ol>  | 33<br>102  |
| VI      | CONCLUSIONS AND RECOMMENDATIONS   | 133  |
|         | A. CONCLUSIONS<br>B. RECOMMENDATIONS  | 133<br>135   |
|         | <ol> <li>Trunnion Rollers</li> <li>Shredder</li> <li>Kiln Seals</li> <li>Weigh Hopper/Feed System</li> <li>Water Jacket on Auger Chute</li> <li>Feed Auger</li> <li>Auger Shear Bolt</li> <li>Overlay on Auger Flights</li> <li>Setting Process Equipment on Contaminated<br/>Plots</li> <li>Using Gunnite<sup>R</sup> As Replacement for Refractory<br/>Brick</li> <li>Preventive Maintenance</li> </ol> | 135<br>136<br>136<br>138<br>138<br>138<br>139<br>139<br>139<br>139<br>140<br>140 |
| VII     | REFERENCES  | 141  |

۰.

# LIST OF FIGURES

. .

Figure

 $\hat{\phantom{a}}$ 

## Title

Page

| 1      | Former HU Storage Site  | 6             |
|--------|---|---------------|
| 2      | Overall View of MWP-2000 Incinerator System   | 9             |
| 3      | System Flow Schematic   | 10            |
| 4      | View of Rotary Auger Inside the Feed Hopper   | 12            |
| 5      | View of Trailer-Mounted Rotary Kiln   | 12            |
| r<br>r | View of Evolution and Ach Quarch  | 15            |
| 0      | View of Cyclones and Ash Quench   | 12            |
| 1      | view of irailer-mounted Secondary Lombustion Champer  | 10            |
| 8      | View of Waste Heat Boiler and Steam Drum  | 18            |
| 9      | View of Effluent Neutralization Tank with Quench  |               |
|        | Elbow and Packed Tower  | 19            |
| 10     | View of Skid Mounted Packed Tower   | 20            |
| 11     | View of Trailer-Mounted Fiector Scrubber and Demister   | 22            |
| 12     | View of Incinerator Stack   | 22            |
| 12     | Companies of Augon On line and Off-line Time  | 23            |
| 13     | Comparison of Auger on-time and off-time time   | 25            |
|        | buring unscheduled maintenance  | 33            |
| 14     | Monthly Unscheduled Maintenance limes   | 36            |
| 15     | Monthly Unscheduled Maintenance Events  | - 38          |
| 16     | Component Unscheduled Maintenance Times   | 47            |
| 17     | Component Unscheduled Maintenance Events  | 48            |
| 18     | Monthly Unscheduled Maintenance Times for the   |               |
|        | Weigh Honner  | 55            |
| 10     | Monthly Unechodulad Maintananca Timos for the Chroddan  | 55            |
| 13     | Monthly Unscheduled Maintenance Times for the Shreuder  | 50            |
| 20     | Monthly Unscheduled Maintenance limes for the Kiln  | 5/            |
| 21     | monthly unscheduled Maintenance limes for the Ash Drag  | - 58          |
| 22     | Monthly Unscheduled Maintenance Times for the   |               |
| •      | Instrumentation   | 59            |
| 23     | Monthly Unscheduled Maintenance Events for the  |               |
|        | Weigh Hopper  | 60            |
| 24     | Monthly Unscheduled Maintenance Events for the Shredder   | 61            |
| 25     | Monthly Unscheduled Maintenance Events for the Kiln   | 62            |
| 26     | Monthly Unscheduled Maintenance Events for the Ash Drag   | 63            |
| 27     | Monthly Unscheduled Maintenance Events for the Ash Dray   | 03            |
| 21     | The transmission of the maintenance events for  | <i>с</i> •    |
| ~~     |   | 64            |
| 28     | Monthly Downtime from Interlocks  | 68            |
| 29     | Monthly Interlock Events  | <del>69</del> |
| 30     | Interlock Downtime  | 71            |
| 31     | Interlock Events  | 72            |
| 32     | Monthly Scheduled Maintenance Times   | 81            |
| 33     | Monthly Scheduled Maintenance Events  | 82            |
| 34     | Comparison of Scheduled and Unscheduled Maintenance   |               |
| 34     | and Interlack Contributions to System Downtime  | 02            |
| 76     | And Interioux Contributions to System Downthme  | 03            |
| 35     | Monthly System Downtime   | 85            |
| 30     | monthly Soll Processed  | 87            |
| 37     | Monthly Average Feed Rate   | 88            |
| 38     | Monthly Average Processing Rate   | 89            |
| 39     | Graph of Operations Monthly Cost  | 92            |
| 40     | Packed Tower Tellerettes Before Cleaning  | 103           |
| 41     | Parked Tower Tollerettes After Cleaning   | 104           |
| • •    | There into the concernes when the transmither the second | ***           |

## LIST OF FIGURES

# Figure

## Title

Page

| 42       | Shredder as Received                  |
|----------|---------------------------------------|
| 43       | Bent Wiper on Shredder                |
| 44       | General Wear on Shredder              |
| 45       | Missing Wiper on Shredder             |
| 46       | Shredder After Use                    |
| 47       | Drag Flight Wear One Side             |
| 48       | Drag Flight Wear Both Sides           |
| 49       | Side Arm Wear on Ash Drag Flights     |
| 50       | Side Arm Wear on Ash Drag Flights     |
| 51       | Side Arm Wear on Ash Drag Flights     |
| 52       | Grooves in Ash Drag Guide Plates      |
| 53       | Knock-off Pine on Ash Drag            |
| 54       | Conveyor Rollers                      |
| 55       | Conveyor Rollers                      |
| 56       | Conveyor Rollers                      |
| 57       | Conveyor Pollers                      |
| 50       | Effluent Neutralization Tank Lamallac |
| 50       | Effluent Noutralization Tank Lemallas |
| 55       | Effluent Noutualization Tank Lomallac |
| 60       | Demaged Demister Dad                  |
| 53       | Damaged Demister Fad                  |
| 0Z<br>53 | Damaged Demister Fau                  |
| 02       | Damayeu Demister rau                  |

LIST OF TABLES

# Table

# Title

No. 19 Anna State of the State

| 1  | MONTHLY UNSCHEDULED MAINTENANCE                 | 34  |
|----|---|-----|
| 2  | MAJOR COMPONENT UNSCHEDULED MAINTENANCE         | 39  |
| 3  | MAJOR COMPONENT MEAN TIME BETWEEN FAILURE       | 40  |
| 4  | MAJOR SYSTEM COMPONENT CODES                    | 41  |
| 5  | MONTHLY WEIGH HOPPER UNSCHEDULED MAINTENANCE    | 50  |
| 6  | MONTHLY SHREDDER UNSCHEDULED MAINTENANCE        | 51  |
| 7  | MONTHLY KIIN UNSCHEDULED MAINTENANCE            | 52  |
| 8  | MONTHLY ASH DRAG UNSCHEDULED MAINTENANCE        | 53  |
| g  | MONTHLY INSTRUMENTATION UNSCHEDULED MAINTENANCE | 54  |
| 10 | AUGER INTERLOCK CODE IDENTIFICATION             | 66  |
| 11 | MONTHLY INTERIOCK EVENTS                        | 67  |
| 12 |   | 70  |
| 12 | MONTHLY HAFR INTERIOCKS                         | 74  |
| 14 | MONTHLY I KOD INTERIOCKS                        | 75  |
| 15 | MONTHLY LYOT INTEDIOCKS                         | 76  |
| 15 | MONTHLY I DT INTERLOCKS                         | 77  |
| 17 | MONTHLY SCHEDULED MAINTENANCE                   | 79  |
| 19 | MONTHLY AUGED DOWNTIME                          | 80  |
| 10 | MONTHLY SOLL PROCESSED                          | 86  |
| 20 | INCINERATOR OPERATIONS SPREAD SHEET             | 93  |
| 21 | MAJOR COMPONENT PARTS COSTS                     | 99  |
| 22 | PARTS LIST FOR FINAL FOULPMENT REPAIR           | 100 |
| 23 | SATURN 5232HT SHREDDER SPECIFICATIONS           | 137 |
|    |   |     |

xi

÷ 1

## LIST OF APPENDICES

| Appendix | Title                        | Page |
|----------|------------------------------|------|
| A        | SCHEDULED MAINTENANCE FORM   | 143  |
| В        | UNSCHEDULED MAINTENANCE FORM | 147  |
| C        | MAINTENANCE DATA BASE        | 151  |
| D        | INTERLOCK DATA BASE          | 185  |

## LIST OF ABBREVIATIONS

| AFESC | Air Force Engineering and Services Center        |
|-------|--|
| AWFSO | Automatic Waste Feed Shut Off                    |
| BTU   | British Thermal Unit                             |
| DAS   | Data Acquisition System                          |
| DOD   | Department of Defense                            |
| DOE   | Department of Energy                             |
| DRE   | Destruction and Removal Efficiency               |
| E&I   | Electrical and Instrument                        |
| ENT   | Effluent Neutralization Tank                     |
| EPA   | Environmental Protection Agency                  |
| HAFR  | High Average Feed Rate                           |
| но    | Herbicide Orange                                 |
| HSWA  | Hazardous and Solids Waste Amendments            |
| INEL  | Idaho National Engineering Laboratory            |
| I.T.  | International Technologies Corporation           |
| LKOD  | Low Kiln Outlet Draft                            |
| LKOT  | Low Kiln Outlet Temperature                      |
| LRT   | Low Retention Time                               |
| MTBF  | Mean Time Between Failure                        |
| MWP   | Mobile Waste Processor                           |
| NCBC  | Naval Construction Battalion Center              |
| OEHL  | Occupational and Environmental Health Laboratory |
| PC    | Personal Computer                                |
| POTW  | Publicly Owned Treatment Works                   |
| PPB   | Parts Per Billion                                |
| PPM   | Parts Per Million                                |
| RCRA  | Resource Conservation and Recovery Act           |
| RD&D  | Research, Development, and Demonstration         |
| RPM   | Revolutions Per Minute                           |
| SCC   | Secondary Combustion Chamber                     |
| USAF  | United States Air Force                          |
| WC    | Water Column                                     |



## SECTION I INTRODUCTION

## A. OBJECTIVE

The purpose of the Naval Construction Battalion Center (MCBC) Demonstration Project was to demonstrate the reliability and cost-effectiveness of a mobile rotary kiln incinerator in the soft the tment and site restoration of a Herbicide Orange (HO) contaminated site. The mobile waste incineration system, Model MWP-2000, manufactured and cuerated by ENSCO Environmental Services of Little Rock, Arkansas was selected for the NCBC Demonstration Project. The former HO storage site at the NCBC in Gulfport, Mississippi was the selected location for the demonstration.

The specific goal of this technology demonstration was to reduce the total isomers of tetra-, penta-, and hexachlorodibenzo-p-dioxin and respective isomers of polychlorodibenzofuran to less than one part per billion (ppb). The overall soil treatment goal was to reduce the contaminants to criteria approved by Environmental Protection Agency (EPA) Headquarters, which would facilitate the delisting of soil under the auspices of the Resource Conservation and Recovery Act (RCRA) of 1976, as amended by the Hazardous and Solid Waste Amendments (HSWA) of 1984.

The effectiveness of the demonstration was monitored in terms of cost, availability, maintainability, schedule, and the ability to satisfy the current regulations in terms of total site remediation.

### B. BACKGROUND

HO is primarily composed of two compounds, 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), and various esters of these two compounds. HO was sprayed as a defoliant in Vietnam during the 1960s. The NCBC served as an interim storage site (6 to 18 months) for drums destined for Southeast Asia until 1970.

In April 1970, the Secretaries of Agriculture, Health, Education, and Welfare, and the Interior jointly announced the suspension of certain uses of 2,4,5-T. This suspension resulted from published studies indicating that 2,4,5-T was a teratogen. Subsequent studies revealed that the teratogenic effects resulted from a toxic contaminant in the 2,4,5-T identified as tetrachlorodibenzodicxin (TCDD). Subsequently, the Department of Defense (DOD) suspended the use of HO, which contained 2,4,5-T. At the time of cuspension, the U.S. Air Force (USAF) had an inventory of 1.37 million gallons of HO in South Vietnam and 0.85 million gallons at NCEC. In September 1971, the DOD directed that the HO in South Vietnam be returned to the United States and that the entire 2.22 million gallons be disposed of in an environmentally safe and efficient manner. The 1.37 million gallons were moved to Johnston Island in the central pacific in April 1972. The average concentration of dioxin in the HO was about 2 parts per million (ppm), with the total amount of TCDD in the entire HO stock estimated at 44.1 pounds.

Various disposal techniques for HO were investigated from 1971 to 1974. Of those techniques investigated, only high-temperature incineration was sufficiently developed to warrant further investigation. Therefore, during the summer of 1977, the USAF disposed of 2.22 million gallons of HO by high-temperature incineration at sea. This operation, Project PACER HO, was accomplished under very stringent U.S. EPA ocean dumping permit requirements.

During storage and handling at the storage sites, some of the HO was spilled onto the surrounding soil. The soil was therefore contaminated with dioxin as well as the 2,4-D and 2,4,5-T components. Prior to this project, the dioxin contamination on the site ranged from nondetectable to over 640 ppb; the average concentration was estimated at 20 ppb.

The USAF plan for disposal of the bulk quantities of HO and the EPA permits for the disposal of the herbicide committed the USAF to a follow-up storage site reclamation and environmental monitoring program.

The major objectives of that required program were to:

- Determine the magnitude of herbicide, TCDD, and tetrachlorodibenzofuran (TCDF) contamination in and around the former HO storage and test sites.
- Determine the rate of natural degradation for the phenoxy herbicides (2,4-D and 2,4,5-T), their phenolic degradation products, and TCDD and TCDF in soils of the storage and test sites.
- Monitor for potential movement of residues from the storage and test sites into adjacent water, sediments, and biological organisms.
- Recommend managerial techniques for minimizing any impact of the herbicides and dioxin residues on the ecology and human populations near the storage and test sites.

Immediately following the at sea incineration in 1977, the USAF Occupational and Environmental Health Laboratory (OEHL), which is responsible for routine environmental monitoring, initiated site monitoring studies of chemical residues in soil, silt, water, and biological organisms associated with the former HO storage sites at NCBC and Johnston Island.

To accomplish the goals of returning the former HO storage site to full and beneficial use, the Air Force used the technical capabilities of the Department of Energy's (DOE) Idaho National Engineering Laboratory (INEL) and, in particular, EG&G Idaho, a DOE contractor.

In 1985, the Air Force and EG&G Idaho coordinated a site characterization study (Reference 1). The Air Force and EG&G Idaho continued the remediation investigation by coordinating two small-scale projects to demonstrate the feasibility of two different technologies for the removal of dioxin from HO contaminated soil. Although those demonstrations were successful, the technologies were not sufficiently developed to use for full-scale site remediation. When the small-scale projects were completed, the Air Force still had little data to predict the cost and feasibility of remediating large quantities of contaminated soil. The Air Force, in coordination with EG&G Idaho, proceeded to demonstrate a full-scale demonstration project in which cost and reliability data would be collected during site remediation.

a stand with the standard stands and stand

Rotary kiln incineration was chosen as the technology most likely to be cost-effective and reliable. Bids were solicited from a variety of incinerator contractors. Bid evaluation resulted in choosing Environmental Services Company, Pyrotech Division, now known as ENSCO, as the incinerator contractor. While ENSCO provided the equipment and operational personnel for the incinerator and soil excavation, EG&G Idaho provided the expertise in overall project management, EPA permitting, and regulatory compliance. Versar, Inc. provided sampling assistance. IT Analytical Services, Twin Cities Testing, and U.S. Testing provided analytical support.

The full-scale Research, Development, and Demonstration (RD&D) project began in September 1986, when the incinerator was assembled onsite. A verification test burn conducted in December 1986, successfully demonstrated that the incinerator produced no hazardous effluents. In May 1987, a Resource Conservation and Recovery Act (RCRA) Trial Burn successfully demonstrated that the incinerator could achieve the required 99.9999% ("six 9s") Destruction and Removal Efficiency (DRE). Operational testing and site remediation began when EPA Region IV issued the final RD&D permit on November 23, 1987. Testing and remediation continued until November 19, 1988 when the last contaminated soil was processed. The incinerator was decontaminated, disassembled, and removed from the site in February 1989.

The former HO storage site is located at the northern end of the NCBC at Gulfport, Mississippi. In the 1940s, the site was designated as a heavy

equipment storage area. To accommodate that function, the soil was tilled and mixed with portland cement. The natural precipitation and subsequent drying left a 6-10-inch hard pan layer of cement-stabilized soil.

The boundaries of the former HO storage site were determined through an extensive investigation, using aerial photographs, personal interviews, and shipping documents. Based upon those data, an extensive sampling and analysis program was developed.

Figure 1 shows the former HO storage area, which was divided into three major sections separated by railroad tracks. Each area was subdivided into 20- by 20-foot plots and sampled for 2,3,7,8-TCDD.

Area A was used for long-term storage of HO from 1970-77. Areas B and C were used in the 1960s for short-term storage of HO awaiting shipment to Southeast Asia. The average length of time that a drum of HO remained at NCBC was approximately 9 months. Contamination of Areas B and C resulted from spillage ouring handling of the stored HO drums. Because the drums remained in those areas for only a relatively short time, the spread of contamination was less significant than in Area A. The contaminant migration followed a pattern of decreasing concentration toward the drainage ditches, which lie at the center of the areas. This is because the drums were stored on the rows near Holtman and Greenwood Avenues in Area B and near Holtman Avenue in Area C. The natural gradient of the site is from those rows towards the drainage ditches.

The total area actually used for HO storage was approximately 16 acres. Because of the storage pattern, however, all of areas A, B, and C were left unusable; those areas comprise approximately 31 acres.

Because of the cement-stabilized soil, the spilled HO tended to remain close to the surface and did not penetrate deeply into the underlying soil. Additionally, the principal hazard, 2,3,7,8-TCDD, has a very low solubility in water and a very high affinity to soil particles; hence, it did not migrate to deep subsurface layers of soil.



1. Site Characterization

In the late 1970s, the Air Force Occupational and Environmental Health Laboratory (OEHL) conducted studies that determined that dioxin was migrating slowly offsite via the drainage ditches. Based upon those studies, the Air Force had sediment filters installed in the drainage ditches to reduce the contaminant migration.

Site characterization of Area A was conducted in two separate campaigns in 1977-78 and in 1980-82. Over 1,700 samples and 200 quality assurance samples were collected to characterize the 16-acre site. These sampling programs consisted of both surface and subsurface sampling. Surface soil samples were obtained at depths up to 5 feet. The sampling program for Areas B and C conducted in 1986-87 consisted of 920 surface samples with an additional 87 samples collected for quality assurance purposes.

### C. SCOPE/APPROACH

This report will describe the incinerator process and the collection and formatting of reliability/availability data. This report will also discuss the inspection of selected equipment during decontamination and demobilization and the lessons learned from this project.

## SECTION II TEST EQUIPMENT TECHNOLOGY

This section provides a brief description of the MWP-2000 incinerator system components and operation. A more detailed description can be found in Reference 2.

A. GENERAL DESCRIPTION

The ENSCO incinerator system (Mobile Waste Processor--MWP-2000) was designed and fabricated by ENSCO at the White Bluff, Tennessee, manufacturing facility. The MWP-2000 incinerator is a modular system designed to destroy and detoxify solid, semi-solid, and/or liquid wastes. Most of the components of the system are installed on flatbed trailers, platforms, or skids to facilitate the movement of the system from location to location in order to perform onsite cleanup of contaminated sites.

Figure 2 shows an overall view of the MWP-2000 incinerator system as it was installed at the NCBC site. Figure 3 is a system flow schematic. Principal components of the unit are:

- Waste feed system
- Rotary kiln with outlet cyclones
- Secondary combustion chamber (SCC)
- Air pollution control train consisting of
  - Effluent neutralization unit
  - Packed tower
  - Ejector scrubber, demister, and stack.





#### B. PROCESS DESCRIPTION

### 1. Contaminated Soil Feed System

Contaminated soil was transferred from the soil storage area to the weigh hopper using a front-end loader. After the weigh hopper was filled, the soil was weighed on digital scales and the weight recorded on a Weigh Hopper Sheet by the operator in the control room. A typical full weigh hopper weighed approximately 10,000 pounds.

After recording the weight of the contaminated soil in the weigh hopper, a slide gate (a steel plate between the weigh hopper and shredder) was opened to allow the soil to drop onto the shredder. As the soil passed through the shredder, it dropped onto a conveyor belt, which carried the material to the feed hopper/feed auger located on the front of the rotary kiln. The feed auger then pushed the material into the kiln for processing. The feed hopper/feed auger is shown in Figure 4.

### 2. Rotary Kiln

The rotary kiln is a carbon steel cylinder, lined with 6 inches of fire brick mounted horizontally on a custom semi-trailer. The rotary kiln is shown in Figure 5. The kiln has an interior diameter of 5.5 feet and an interior length of 30.0 feet. The kiln is mounted so that it is declined (front to back) 4 degrees; it is capable of being rotated from 0.5 to 4.0 revolutions per minute (rpm). The rotational speed of the kiln for this project was normally 1.5-2 rpm. The soil entered the kiln at the flame end (front) of the kiln and was subjected to temperatures of approximately 2,200°F at the burner and to a minimum temperature of 1,450°F at the putlet end of the kiln.





13

Sectors there

Because of the declination and rotation of the kiln and the continuous feed of soil, processed soil (ash) was pushed to the lower end (rear) of the kiln in approximately 20 minutes where it would fall through the kiln drop chute into the ash removal system. The kiln outlet gases and lighter particulate would exit the kiln at a minimum temperature of 1,450°F, passing through a cyclone on their way to the secondary combustion chamber (SCC). The cyclone's purpose was to remove the lighter particulates from the kiln outlet gases before they reached the SCC. The particulates removed in the cyclone would fall into the ash removal system, which consisted of a receiving tank filled with water, a conveyor (ash drag), and the ash pan. As the hot ash from the kiln and particulates from the cyclone fell into the receiving tank, the water quenched the ash temperature to approximately 200°F. The ash conveyor system dragged the ash from the receiving tank into the ash pan. The ash was removed from the ash pan and transferred to a rolloff box in the ash storage area. The ash quench and cyclone systems are shown in Figure 6.

### 3. Secondary Combustion Chamber

The SCC is a carbon steel cylinder mounted horizontally on a custom semi-trailer. It is lined with 2.25 inches of insulating brick and 4.50 inches of fire brick. It has an interior diameter of 6.6 feet and an interior length of 40.0 feet. It is designed to further burn the gases discharged from the rotary kiln. The gases were delivered to the SCC through a rectangular carbon steel duct at the burner end of the SCC. The gases were subjected to temperatures ranging from approximately 3,000°F at the burner to a minimum 2,150°F at the outlet end of the SCC. Some of the lighter particulates carried over from the rotary kiln were also deposited in the SCC. This buildup of particulates in the SCC was a major contributor to the unit shutting down for 3 to 4 days after every 50 to 60 days of operating time. The SCC is shown in Figure 7.





iq.

.



## 4. Waste Heat Boiler

The gases exited the SCC and were carried to the waste heat boiler through a carbon steel, T-section duct. The vertical outlet of this T-section duct was equipped with an access lid, which could be opened to vent hot gases away from the boiler and the downstream air pollution control train. As the gase- exited the SCC, they passed through a water spray to reduce the gas temperature from approximately 2,150°F to 1,400-1,600°F before they entered the waste heat boiler. The purpose of the water spray was to cool the particulate entrained in the gases to minimize their condensation on the boiler face and in the boiler tubes.

The waste heat boiler is a fire tube boiler. It was designed to recover heat from the process gases and produce steam at 250 psig, which was supplied to the ejector scrubber and deaerator. The waste heat boiler is shown in Figure 8.

5. Air Pollution Control Train

The air pollution control train consisted of a quench system, packed tower, ejector scrubber, stack, and effluent neutralization tank (ENT). This equipment train was designed to cool and remove acid and submicron particulate from the gases that exited the waste heat boiler and to neutralize the effluent generated in this train. The quench elbow and the ENT are shown in Figure 9.

The gases exited the waste heat boiler at a temperature of approximately 400°F where they immediately passed through the quench system (water spray) to further reduce the gas temperature to approximately 165°F before the gases entered the packed tower. The gases flowed upward through the tower and were scrubbed by a countercurrent flow of water sprayed into the top of the tower. The packed tower is shown in Figure 10.









ł



Figure 10. View of Skid Mounted Packed Tower.

The packed tower was designed to remove acid from the gases, but for this project it mainly removed submicron particulate from the gases. From the packed tower the gases flowed through the ejector scrubber to further remove submicron particulate and acid. The gases exiting the packed tower were drawn through the ejector mixing tube by the force of steam delivered through a nozzle in the mixing tube. The turbulence created by the unique nozzle and mixing tube design caused the agglomeration of submicron particulates in the water mist supplied by the steam. This particulate was removed by the removal of water mist in the demister at the downstream end of the scrubber.

The ejector scrubber, also served as the prime mover for the entire system. The drawing of gases through the ejector mixing tube produces up to 25 inches water column (WC) vacuum. This was sufficient vacuum to draw gases through the kiln, SCC, waste heat boiler, and the air pollution control train. The gases exited the ejector scrubber through the demister and out the stack. The ejector scrubber and demister are shown in Figure 11. Because of the steam used in the ejector system, the gases were reheated slightly from the packed tower temperatures and actually exited the stack at approximately 185°F. The stack is shown in Figure 12.

The stack was equipped with a gas sampling system that collected, conditioned, and delivered a continuous stack sample stream to oxygen, carbon monoxide, and carbon dioxide analyzers. These analyzers continuously analyzed the sample stream and transmitted results to the data acquisition and control computer. Strip chart recorders provided redundant recordings of these parameters.

C. GENERAL DESCRIPTION OF MANUAL DATA COLLECTION

1. System Component Codes

Tracking incinerator availability was performed by assigning a sequential code number, (e.g., weigh hopper (01), weigh scales (0101),





• .-

. .

Figure 12. View of Incinerator Stack.

mechanical scales (010101), and shredder (02), for each major component and subcomponent of the MWP-2000 incinerator.

As maintenance was performed on a component or subcomponent, the shift supervisor or Electrical and Instrument (E&I) technicians completed the respective Scheduled or Unscheduled Maintenance Form, listing the component code in the appropriate space (see Appendices A and B for examples of the maintenance forms).

2. Data Base

The information obtained from the Scheduled/Unscheduled Maintenance Forms and the Operator's Log entries was collected daily and stored on a computer data base. This information included the date, type (scheduled/unscheduled) maintenance, component code, amount of time (in minutes) required for the maintenance, cost of parts (if applicable), and a brief description of the work performed. These details were also used by the ENSCO site superintendent in his monthly reports.

3. Criteria for Data Collection

Initially, the criteria for data collection was to collect only data for the maintenance items that resulted in lost production time. This was expanded to include all scheduled and unscheduled maintenance and all auger downtime, such as stopping feed to remove metal scrap from the shredder teeth. Additionally, in a joint decision between the Air Force and EG&G Idaho, a \$100 parts cost and 2-hour external (non-ENSCO) labor charge were to be the minimum factors used in collecting the cost data for maintenance. An attempt was made to adhere to these minimum standards, but it was not strictly enforced.

### 4. Techniques of Determining Availability

To determine the availability of the incinerator to process soil on a daily basis, maintenance information from the scheduled/unscheduled maintenance forms and operator's logbook were added to the auger off-time attributed to process interlocks. Interlocks occurring at the same time as scheduled/unscheduled maintenance or multiple interlocks were discounted to avoid downtime duplications.

D. ON-LINE MONITORING

### 1. Auger Hours

The EPA permit was based not only on cubic yards of soil to be processed, but also on the number of auger days to process the soil. Based on computer information, the actual number of processing hours each day was calculated using data from the Data Acquisition System (DAS). The number of daily processing hours divided by 24 (hours in a day) times 100 gives the on-line percentage for each day. The on-line percentage used as a decimal is the actual part of a day the incinerator operated. These parts of days were totaled daily giving a running total of the actual auger days used in soil processing. The Daily Report, issued by the ENSCO site superintendent, contained the previous 24 hour shift auger hours, percentage of on-line time for the shift, and the running total of auger days from start of soil processing November 25, 1987.

2. Interlock Record

Part of the DAS information generated each day, were printouts of the Automatic Waste Feed Shutoff (AWFSO) interlocks. When the unit reached a permit limit (high or low), the computer would automatically shut off the feed auger. These were called process interlocks. The feed auger would not start again until the interlock (trip values) were cleared.
### SECTION III PLANNING AND IMPLEMENTATION

#### A. REPORTING CRITERIA

The main criteria in collecting maintenance data were whether the repair resulted in auger off-time. The auger off-time was the direct link to incinerator availability. The longer or more often the auger was off, not feeding soil to the kiln, the less time the incinerator was available for processing soil. These auger off criteria were used regardless of the time duration.

#### B. INVOICES

In order to obtain cost data directly associated with an individual repair or replacement, the purchase invoices were regularly monitored. The vendor name, purchase date, end use, and cost were noted for subsequent use in the data base report.

#### C: INTERLOCKS

The daily interlock summary sheets were reviewed to determine the primary interlocks, to delete duplicate times when multiple interlocks occurred, and to justify interlocks against the logbook entries as well as scheduled/unscheduled maintenance forms. If the feed auger was off for maintenance of any type, those AWFSO interlocks occurring during that particular time frame were discounted.

#### D. LOG ENTRIES

Two logbooks were maintained on a daily basis: one by the operators in the control room and one by the shift supervisors. The entries to the operator's logbook were made at the time of an occurrence, whereas the supervisor's logbook was more general with numbered entries, not necessarily in chronological order. Copies of the operator's logbook sheets were

reviewed daily to aid in the gathering of maintenance information. Often times, especially in the early stages of the project, the scheduled/unscheduled maintenance forms were not used on a consistent basis.

#### E. SPARE PARTS INVENTORY

A spare parts inventory was not taken when the incinerator first arrived at the site. When the materials started to run out during the incinerator set-up, an after-the-fact inventory was taken to determine what would be necessary to purchase to complete the assembly. After that time, only replacement parts were purchased. A complete inventory was taken at the end of the project in an attempt to separate the ENSCO-owned property from the government-owned property.

#### F. INSPECTION PLAN FOR DECONTAMINATION AND DEMOBILIZATION

When the project was still considered to be of 150-day duration, an inspection plan was made. The inspection list included such items as kiln refractory, particulate build-up on boiler tubes, feed auger, and particulate build-up on the packed tower tellerettes. Because the project lasted for 12 months (soil processing), many of those items on the original inspection list were repaired, replaced or cleaned several times.

During the decontamination and demobilization of the unit, those items that showed unusual wear were noted. All phases of the unit/equipment decontamination and disassembly were documented with photographs.

G. METHODS USED TO COLLECT DATA

Maintenance data for this report were collected on a daily basis from scheduled maintenance forms, unscheduled maintenance forms, and the logbooks. Copies of these were kept not only as part of the daily files submitted to EG&G Idaho by ENSCO, but also in separate binders by EG&G Idaho personnel for the availability report. More often than not, the operator's

log entries proved to be more informative than the scheduled/unscheduled maintenance forms. To ensure that all the maintenance data were collected and entered into the data base, all incinerator component downtime was used whether it caused feed auger downtime or not. However, only feed auger downtime was used as the measure of incinerator availability. In those instances where time durations were not noted on the scheduled/unscheduled maintenance forms or operator's log, an average duration for the previous type of work was used.

Cost data for maintenance parts and labor were not collected on a routine basis. There was a time delay between the purchase of a part and the invoice submittal. The invoices were reviewed individually to collect cost data that were applicable.

## SECTION IV FIELD OPERATIONS AND FIELD DATA

#### A. DAILY REPORTS

The daily reports consisted of: (1) daily logbook entries, (2) inspection checklists (both operational and instrumental), (3) operator's hourly log, (4) soil weight records, (5) soil moisture analysis records, (6) daily stack gas monitor calibration records, (7) daily health and safety records, (8) strip chart records, and (9) the daily computer output that included a floppy disk, interlock summaries, and a 15-minute interval printout of the incinerator operations. This total package was collected each morning by the on-duty shift supervisor and taken to the ENSCO secretary. The secretary made copies of everything for ENSCO files and checked to be sure all the daily paperwork was there. Either the plant superintendent or a shift supervisor would prepare the Daily Report from information on the computer printouts. Once this was accomplished, ENSCO would transfer the originals of the daily records to EG&G Idaho personnel who would then review the package for completeness and any abnormalities of the previous day's operations.

B. PRODUCTIVITY IMPROVEMENTS AND PROCESS CHANGES

As the initial planning for the project and the project itself progressed, numerous changes were made that resulted in more efficient and cost-effective operations.

Some of the more significant changes were:

- Installed continuous reading ultraviolet flame monitors on both the kiln and secondary burners
- 2. Installed redundant stack analyzers to operate while the on-line analyzers were being calibrated

- Changed from originally proposed diesel fuel to natural gas to fuel the kiln and secondary burners
- 4. Revised the ambient air sampling program to eliminate one of the sample stations and to sample only during the hours of excavation
- Replaced the original, hollow, welded trunnion rollers on the kiln with solid trunnion rollers
- 6. Slowed the rotational speed of the kiln and lowered the draft across the incinerator system to minimize particulate carryover into the secondary combustion chamber.

#### C. DATA COLLECTION DURING DECONTAMINATION AND DEMOBILIZATION

Routine daily operational information was collected during the decontamination of the equipment until the burners in both the kiln and SCC were shut off in mid January, 1989. This information consisted of gas usage and some interlocks during the burning of the decontamination water. However, the information collected after November 19, 1988, was not used in the data analysis for the incinerator availability. November 19, 1988, was used as the end date for pertinent incinerator availability data as that was the final day of soil processing.

As each piece of equipment was decontaminated, it was swipe tested. The swipes were analyzed for 2,3,7,8-TCDD. A data sheet was developed that described the following: (1) the equipment to be swiped tested, (2) the areas on the equipment to be swiped, and (3) the size of the surface area to be swiped. After assigning a unique number to each sample, the swipe samples were sent to the laboratory for analysis. Upon receipt of the analytical results, the results were entered on the data sheet which was filed in the applicable daily file.

Only data pertaining to possible maintenance was noted during the dismantling of the incinerator.

## SECTION V INCINERATOR AVAILABILITY EVALUATION

#### A. DATA EVALUATION

Data provided for the availability evaluation of the incinerator consisted of two personal computer (PC) data base files and daily and weekly operator logs. The PC data base files consisted of: (1) a daily log of scheduled and unscheduled maintenance events that involved system component downtime and (2) a daily log of system downtime attributed to instrumentation interlocks (system shutdowns that resulted when system monitoring instrumentation set points were reached). The operator log data included system on-line time, amount of soil processed, and notes concerning system problems and repairs.

The availability evaluation was focused on the incineration of contaminated soils. Data associated with the initial system shakedown and testing period and the period at the end of the program when program-generated waste was burned were excluded. Only those data associated with the period from November 25, 1987 through November 19, 1988 were retained. During this period, a total of 26,058.4 tons of soil were processed.

The data base for maintenance activities required modification to facilitate data searches and sorts. The remarks field was deleted because the data could not be easily electronically searched. Deletion of the remarks field made the data base more manageable and efficient. Valuable information from the remarks field was retained in three new fields: (1) major component - to identify those major components that were most prone to failure, (2) failure mode - to categorize the failure events, and (3) auger status - to identify the probable state of system operation (i.e., whether it was or was not processing soil). The only modification made to the system interlock data base was the deletion of data outside the November 25, 1987 through November 19, 1988 time frame. The data bases, as modified, are included as Appendix C (maintenance data) and Appendix D

(interlock data). Codes used in the data bases are defined on the first page of each listing.

The maintenance data base, as modified, contained 1,223 records. These records are comprised of 358 scheduled maintenance events that account for 166 downtimes (1,521.6 hours of component or system downtime), and 865 unscheduled maintenance events (899.1 hours of component or system downtime); a combined total of 2,421.7 hours or 100.9 days. Not all events resulted in actual system shutdown. For example, although it may have been required to shutdown the system auger for a given event, it did not necessarily result in a system shutdown. If the incinerator had nearly a full charge of feed material at the time of the event, and feeding of material could again be started within approximately 20 minutes of the event, the system could continue soil processing. Thus, for this evaluation, if a record did not explicitly indicate whether or not the feed auger was on (operating), it was assumed to be on during those maintenance activities that involved 20 minutes or less time.

The interlock data base, as modified, contained 1,081 records. These records show that over the approximate 12-month period, a total of 14,461 interlock events were reported. System downtime associated with these events amounted to 393.37 hours.

#### B. EVALUATION AND DISCUSSION

1. Overall Evaluations

The data were categorized according to downtime (Section V.B.1), amount of soil processed (Section V.B.2), and cost (Section V.B.3). The data were then sorted by cause, month, component, interlock, etc. Outliers in the data, such as large downtime per month, number of downtime events per month, or costs were noted and their causes investigated.

a. Downtime

System downtime and that of specific components of the system are discussed in the following four subsections. In the first subsection, V.B.1.a, unscheduled maintenance of system components is tabulated. Most of the maintenance activities performed required that the feed auger be shut down. However, some maintenance was performed without the need to shut off the auger. Also, as explained in Section V.A (Data Evaluation), unless explicitly stated otherwise, the feed auger was assumed to remain on if the maintenance was completed within 20 minutes. System or component downtime is specified in two ways: (1) total maintenance time involved and (2) only that time where maintenance required shutdown of the feed auger. System instrumentation also contributed to shutdown of the feed auger, thus potentially the shutdown of the system. The computerized interlock system monitored the critical system operating parameters. Downtime caused by the interlock system is discussed in more detail in Section V.B.1.b. Scheduled maintenance data are discussed in Section V.B.1.c and total system downtime (i.e., feed auger off) is discussed in the Section V.B.1.d.

(1) Unscheduled Maintenance

A total of 899.06 hours of unscheduled maintenance time was experienced between November 25, 1987 and November 19, 1988. Table 1 is a monthly summary of the total unscheduled maintenance time, the number of events involved, and the average maintenance time per event. Table 1 also includes a list of the times during which the feed auger was off. Review of the data shows that the feed auger was off approximately 86% of the unscheduled maintenance time. A comparison of the unscheduled maintenance events that required the auger to be off with those with the auger on is shown in Figure 13.

The unscheduled maintenance time (hours) for each month of operation is displayed in Figure 14. These monthly totals include both

|              | Total<br>Maintenance | Number of<br>Events | Average<br>Maintenance | Auger<br>Downtime   | Number of<br>Events | Average<br>Auger |
|--------------|----------------------|---------------------|------------------------|---------------------|---------------------|------------------|
| <u>Month</u> | (h)                  | (IOTAI)<br>         | (h)                    | (Auger Off)<br>(h)  | Downtime            | <u>(h)</u>       |
| 11/87        | 54.47                | 15                  | 3.63                   | 54.23               | 11                  | 4.93             |
| 12/87        | 42.70                | 70                  | 0.61                   | 40.15               | 55                  | 0.73             |
| 1/88         | 89.00                | 95                  | 0.94                   | 80.63               | 59                  | 1.37             |
| 2/88         | 68.70                | 115                 | 0.60                   | 56.78               | 59                  | 0.96             |
| 3/88         | 95.58                | 108                 | 0.89                   | 87.75               | 53                  | 1.66             |
| 4/88         | 29.05                | 80                  | 0.36                   | 25.42               | 50                  | 0.51             |
| 5/88         | 58.15                | 89                  | 0.65                   | 38.85               | 32                  | 1.21             |
| 6/88         | 63.85                | 86                  | 0.74                   | 35.72               | 31                  | 1.15             |
| 7/88         | 32.22                | 45                  | 0.72                   | 21.47               | 21                  | 1.02             |
| 8/88         | 106.15 <sup>a</sup>  | 36                  | 2.95                   | 89.97 <sup>a</sup>  | 19                  | 4.74             |
| 9/88         | 166.57 <sup>b</sup>  | 54                  | 3.08                   | 159.98 <sup>b</sup> | 46                  | 3.48             |
| 10/88        | 63.07                | 44                  | 1.43                   | 51.57               | 31                  | 1.66             |
| 11/88        | 30.17                | _21                 | 1.44                   | 27.33               | 15                  | 1.82             |
| Total        | 899.06               | 858                 | 1.05                   | 769.85              | 482                 | 1.60             |
|              |                      |                     |                        |                     |                     |                  |

## TABLE 1. MONTHLY UNSCHEDULED MAINTENANCE.

.

...

a. 2.4 h downtime from power losses not included.b. 64.5 h downtime from power losses and a hurricane alert not included.

, . . . . .





the auger off-line time and the total maintenance time (auger on-line plus off-line time). Most of the maintenance was performed with the auger off except in May and June 1988. Unscheduled maintenance required considerable time in August and September 1988. During these months, the soil being fed to the incinerator contained more than the usual amount of metal and large rocks. This resulted in more frequent repair of the shredder and conveyor. (Also, area power failures and a hurricane alert contributed 2.4 hours of downtime in August and 64.5 hours in September. Downtime from these sources is not included in Table 1 or Figure 13).

The total number of unscheduled maintenance events for each month is displayed in Figure 15. The total number of events include both those events that require the auger to be shutdown plus those that did not require the auger to be shutdown. During the months of February through June of 1988, about one-half of the maintenance events did not cause the auger to be shut down.

Unscheduled maintenance events are listed by major component in Table 2. The data include the total unscheduled maintenance time attributed to each of the major components, the number of events, and the average time per event. Table 3 is a list of the mean time between failure for each of the major components. Also listed are the corresponding standard deviations and ranges. The system major component codes are defined in Table 4.

The total component unscheduled maintenance time (including both auger on-line and auger off-line hours) and the number of events listed in Table 2 are displayed in Figures 16 and 17, respectively. Several of the components did not require lengthy or frequent maintenance. For example, the boiler outlet (component 12) required no maintenance. The following components required maintenance eight or fewer times over the 12-month period of operation: the cyclones (07), divert tee (09), deaerator (11), quench elbow (i3), ENT/quench tank (14), cross-over duct (15), scrubber jet (17), demister (19), stack (20), settling tank (22), raw water system (23), publicly owned treatment work (POTW) (24), cameras (25), treated water (26), and desilicizer (27).

-37



Figure 15. Monthly Unscheduled Maintenance Events.

MAJOR COMPONENT UNSCHEDULED MAINTENANCE.

TABLE 2.

Average 1 ime 0.62 2.18 2.06 1.16 1.48 6.71 1.95 1.68 0.17 2.38 0.33 5.79 0.25 1.46 0.25 0.58 0.56 2.00 ::|1 ł ļ ÷ ; ; (inder off) Number of Events 57 88 16 5 **44** 69 23 0 0 189 45 S C 40 58 00 4 **~ 0** Auger Downtime (1) 5.62 27.21 150.08 84.58 66.13 130.62 107.33 9.76 2.00 0.92 0.00 <u>0.00</u> <u>836.75</u> 38.73 0.50 65.90 0.25 0.00 0.17 2.13 0.00 19.00 0.65 23.17 0.00 2.30 32.68 0.00 0.00 Average 1 ime 0.51 0.37 1.26 1.42 1.27 5.23 1.37 1.62 0.50 1.41 0.25 0.17 1.30 0.33 0.50 0.34 0.75 2.10 1.05 2.67 0.46 0.52 1.83 1.12 Number of Events (total) 11 105 126 62 5 179 21 08 9 9 865 0 9 24 ۳ G 27 2 18 ø 111 5.62 38.42 158.64 87.95 68.25 137.23 109.75 12.35 1.50 74.62 0.25 8.00 4.13 2.62 5.50 965.93 lota) lime 38.91 0.00 0.17 7.80 0.17 28.48 0.65 31.66 0.17 2.48 60.35 0.75 12.58 Major (00) (02) (03) (02) (08) (60) (01) (13) (10) [23] [23] [23] 228 Secondary combustion Instrumentation Settling tank Raw water system Boiler outlet Quench elbow ENI/Quench tank Cross-over duct Packed tower Scrubber jet Scrubber pump Demister Cameras Treated water Desilicizer Weigh hupper Shredder feed Nopper Divert tee Deaeratur Kiln Ash drag Cyclones chamber Conveyor Builer Stack [ota] POTU

39

"Not attributed to a specific component

|   | Time Between Interruptions in<br>Component Operation (Days)                  |   |  |  |
|---|--|---|--|--|
|   | Major<br><u>Component</u>  | Mean  | Standard<br>Deviation  | Range  |
| Weigh hopper<br>Shredder<br>Conveyor<br>Feed hopper<br>Kiln<br>Ash drag<br>Cyclones<br>Secondary combustion   | *00<br>(01)<br>(02)<br>(03)<br>(04)<br>(05)<br>(06)<br>(07)<br>(08)          | 21.8<br>3.2<br>2.8<br>5.7<br>4.8<br>3.1<br>16.2<br>32.9<br>14.4 | 25.5<br>6.9<br>4.5<br>7.5<br>10.0<br>4.9<br>22.1<br>28.5<br>16.7 | [0,91]<br>[0,52]<br>[0,26]<br>[0,32]<br>[0,56]<br>[0,37]<br>[0,67]<br>[0,69] |
| Divert tee<br>Boiler<br>Deaerator<br>Boiler outlet<br>Quench elbow<br>ENT/quench tank<br>Cross-over duct<br>Packed tower<br>Scrubber jet<br>Scrubber pump | (09)<br>(10)<br>(11)<br>(12)<br>(13)<br>(14)<br>(15)<br>(16)<br>(17)<br>(18) | 139.0<br>6.1<br><br>18.4<br>12.8<br>33.0<br>16.0                | 130.1<br>6.7<br><br>22.3<br>18.7<br>18.8                         | [47,231]<br>[0,33]<br>[2,50]<br>[0,62]<br>[0,63]                             |
| Demister<br>Stack<br>Instrumentation<br>Settling tank<br>Raw water system<br>POTW<br>eras<br>Ireated water<br>Desilicize.                                 | (19)<br>(20)<br>(21)<br>(22)<br>(23)<br>(24)<br>(25)<br>(26)<br>(27)         | 43.5<br>2.1<br>23.0<br>75.0<br>26.8<br>61.5<br><u>28.5</u>      | 38.4<br>4.5<br>28.0<br>76.4<br>25.2<br>95.4<br><u>36.1</u>       | [0,92]<br>[0,32]<br>[0,55]<br>[21,129]<br>[0,77]<br>[11,204]<br>[3,54]       |
|   | Total  | 0.7   | 1.2  | [0,91]   |

## TABLE 3. MAJOR COMPONENT MEAN TIME BETWEEN FAILURE.

\*Not attributed to a specific component

TABLE 4. MAJOR SYSTEM COMPONENT CODES.

.

| 01 | - | Weig<br>0101   | h  <br>-           | Hopper<br>Scales<br>010101 - Mechanical<br>010102 - Digital  |
|----|---|--|--------------------|--|
| 02 | - | Shree<br>0201<br>0202<br>0203<br>0203  | dd(<br>-<br>-<br>- | Slide Gate<br>Teeth<br>Hydraulics<br>020301 - Pump<br>020302 - Hydraulic Motor<br>020303 - Electrical Drive Motors<br>020304 - Directional Scienoid<br>020305 - Hoses<br>020306 - Pressure Gauge<br>Electrical Box   |
| 03 | - | Conve<br>0301<br>0302<br>0303<br>0304<br>0305<br>0306<br>0307<br>0308                        | e y(               | or<br>Belt<br>030101 - Belt Wiper<br>Rollers<br>Idlers (Guides)<br>Housing<br>Actuators<br>Electric Motor and Gear Box<br>Drive Belt<br>Drive Chain  |
| 04 | - | Feed<br>0401<br>0402<br>0403<br>0404<br>0405<br>0406<br>0407<br>0408<br>0409<br>0410<br>0411 |                    | Auger<br>Auger<br>040101 - Bolts<br>040102 - Water Jacket<br>Vibrator<br>Hydraulics (Auger Drive)<br>040301 - Pump<br>040302 - Hydraulic Motor<br>040303 - Electrical Drive Motor<br>040303 - Electrical Drive Motor<br>040305 - Hoses<br>Gear Box<br>Sleeve<br>RPM Indicator (Magnetic Pick-up)<br>Bearing Block<br>040701 - Bearings<br>Adductor (Speed Control)<br>Shaft<br>Chute Water Jacket<br>Electrical Components |

and the second se

TABLE 4. MAJOR SYSTEM COMPONENT CODES (CONTINUED).

05 - Kiln 0501 - Webbco Seals 0502 - Refractory 0503 - Burners and Blowers 050301 - Maxon Valve 050302 - Burner Control 050303 - Electric Motor 050304 - Butterfly Valve 050305 - Transmitter 050306 - Blower Filters 050307 - Bauman Valve 050308 - Flame Eye (Purple Peeper) 050309 - Draft Snubber 050310 - Natural Gas High Relief Valve 0504 - Trunnions 050401 - Bearings 0505 - Thrust Bearings 0506 - Hydraulics 050601 - Pump 050602 - Hydraulic Motor 050603 - Electric Drive Motor 050604 - Directional Solenoid 050605 - Drive Sprocket 05060501 - Chain 050606 - Pinion Gear 050607 - Adductor 050608 - Pressure Filter System 0507 - Outlet Gas Release 0508 - Ash Outlet Duct 050801 - Refractory 0509 - Outlet 02 06 - Ash drag 0601 - Hydraulics 060101 - Drive Motor 060102 - Pump 060103 - Electric Drive Motor 060104 - Direc onal Solenoid 060105 - Sprockets 06010501 - Drive Chain 0602 - Drag Chain 060201 - Bearings 0603 - Flights 0604 - Pan 07 - Cyclones 0701 - Drop Legs 0702 - Vibrators 0703 - Vortex Tube (Finder) 0704 - Refractory 0705 - Cross-Over Duct 070501 - Slide Gates

TABLE 4. MAJOR SYSTEM COMPONENT CODES (CONTINUED).

| 08 | - | Second<br>0801 -<br>0802 -   | ary Combustion Chamber<br>Refractory<br>Burners and Blowers<br>080201 - Maxon Valve<br>080202 - Burner Control<br>080203 - Electric Motor<br>080204 - Butterfly Valve<br>080205 - Transmitter<br>080206 - Blower Filter<br>080207 - Bauman Valve<br>080208 - Flame Eye (Purple Peeper) |
|----|---|--|--|
| 09 | - | Divert<br>0901 -<br>0902 -<br>0903 -<br>0904 -<br>0905 -   | Tee<br>Refractory<br>Pneumatic Adductor<br>Spray Nozzles<br>Quench Pump<br>Steam Nozzles   |
| 10 | - | Boiler<br>1001 -<br>1002 -<br>1003 -<br>1004 -<br>1005 -<br>1005 -<br>1006 -<br>1007 -<br>1008 - | Tubers<br>Boiler Face<br>Inspection Hatches<br>Level Indicator<br>Steam Drum<br>100501 - Blowdown Drum<br>10050101 - Blowdown Lines and Valves<br>Safety Valves<br>Muffler<br>Boiler Feed Water Pumps<br>100801 - Electric Motors<br>100802 - Automatic Valve<br>100803 - Strainers    |
| 11 | - | Deaerat<br>1101 -<br>1102 -<br>1103 -<br>1104 -<br>1105 -  | tor<br>Regulators<br>Pumps<br>110201 - Seals<br>Motors<br>Treated Water Tank<br>Deaerator Drum   |
| 12 | - | Boiler<br>1201 -<br>1202 -   | Outlet<br>Refractory<br>Inspection Cover   |
| 13 | - | Quench<br>1301 -   | Elbow<br>Spray Nozzles   |



TABLE 4. MAJOR SYSTEM COMPONENT CODES (CONTINUED). 14 - ENT/Quench Tank 1401 - Mixer 1402 - Quency Pumps 140201 - Motors 140202 - Seals 140203 - Strainers 1403 - Transfer Pumps 140301 - Motors 140302 - Seals 1404 - Mud Transfer Pump 140401 - Motors 140402 - Seals 1405 - Lines and Valves 15 - Cross-Over Duct 1501 - Slide Gate 16 - Packer Tower 1601 - Pumps 160101 - Motors 160102 - Seals 160103 - Block Valves 160104 - Check Valves 160105 - Strainers 1602 - Demister Pad 1603 - Tellerettes 1604 - Grating 1605 - Fiber Glass Tower 17 - Scrubber Jet (Hydrosonic Jet) 1701 - Spray Nozzles 18 - Scrubber Pump 1801 - Pumps 180101 - Motors 180102 - Seals 180103 - Steam Valves and Piping 180104 - Water Valves and Piping 180105 - Strainers 1802 - Sump 180201 - Line: AND Valves 19 - Demister 1901 - Demister Pads 1902 - Tank 190201 - Lines and Valves 20 - Stack 2001 - Stack Sampling System (CO, CO<sub>2</sub>, O<sub>2</sub>)

TABLE 4. MAJOR SYSTEM COMPONENT CODES (CONTINUED).

| 21 | - | Inst<br>2101<br>2102 | ru<br>-<br>- | mentation<br>Panel Instruments<br>Computer<br>210201 - Disk Drives<br>210202 - Monitor<br>210203 - Printer<br>210204 - Keyboard<br>210205 - Software |
|----|---|----------------------|--------------|--|
|    |   | 2103                 | -            | Stack Analyzers<br>210301 - 02 Analyzer<br>210302 - CO Analyzer<br>210303 - CO Analyzer  |
|    |   | 2104                 |              | Strip Chart Becondone  |
|    |   | 2105                 | _            | Motor Controle   |
|    |   | 2105                 | -            | Instrument Controls  |
|    |   | 2107                 | -            | Power Convertance  |
|    |   | 2109                 | -            | Values   |
|    |   | 2100                 |              | Processo Transmittana  |
|    |   | 2110                 | -            | Flow Transmitters  |
|    |   | 2111                 |              | Nolta Pressure Transducer  |
|    |   | 2112                 | -            | Thermocouples  |
|    |   | 2113                 |              | Gauges   |
|    |   | 2114                 |              | oH Prohes  |
|    |   | 2115                 | -            | Instrument Air Compressor  |
|    |   | 2116                 | -            | System Air Compressor  |
|    |   |                      |              |  |
| 22 | - | Settl                | lii          | ng Tank  |
|    |   | 2201                 | •            | Pump   |
|    |   |                      |              | 220101 - Seals   |
|    |   |                      |              | 220102 - Electric Motor  |
|    |   |                      |              | 220103 - Lines and Valves  |
|    |   | <b>.</b> .           |              |  |
| 23 | - | Raw W                | lat          | er System  |
|    |   | 2301                 | •            | lank   |
|    |   | 2302                 | -            | Pumps  |
|    |   |                      |              | 230201 - Electric Motors   |
|    |   |                      |              | 230202 - Seals   |
|    |   |                      |              | 230203 - Lines and Valves  |
|    |   |                      |              | 230204 - Strainers   |
| 24 | _ | POTU                 |              |  |
| 67 |   | 2401                 | _            | Carbon Rod   |
|    |   | 2402                 | _            | Storago Tanko  |
|    |   | 2402                 | -            | Dumpe  |
|    |   | 2703                 | -            | 240301 - Floctuic Motors   |
|    |   |                      |              | 240302 - CIECUTIC MOLOPS   |
|    |   |                      |              | 240302 - Jears   |
|    |   |                      |              | FIANA - FINES WIN AVIA62   |

TABLE 4. MAJOR SYSTEM COMPONENT CODES (CONCLUDED).

25 - Cameras

2501 - Weigh Hopper
2502 - Conveyor
2503 - Feed Hopper
2504 - Ash Drag
2505 - Steam Drum Level

26 - Treated Water

2601 - Tank
2602 - Level Switches
2603 - Pump

260301 - Electric Motor
260302 - Seals
260303 - Lines and Valves
260304 - Strainers

27 - Desilicizer

2701 - Caustic Pump
2702 - Tank

2703 - Lines and Valves

۰.





However, the shredder (02), kiln (05), and ash drag (06) caused the auger to be shut down more than 100 hours (158.97 hours, 137.25 hours, and 109.75 hours, respectively). Four components - the hopper, shredder, kiln, and instrumentation (components 01, 02, 05, and 21, respectively) - were the main contributors to the number of unscheduled maintenance events with more than 100 events each. Monthly data for the five components (weigh hopper, shredder, kiln, ash drag, and instrumentation) are listed in Tables 5 through 9. These data are displayed in Figures 18 through 27.

The monthly unscheduled maintenance hours for the shredder are displayed in Figure 19. The largest monthly maintenance time (77.6 hours, 49% of total) was reported in August 1988. This is a factor of five larger than the maintenance time for the shredder during all other months except September 1988. On August 27 and 28, the auger was shut down to remove metal from the shredder teeth. On August 29, the shredder overheated and stopped working several times. No reason for overheating was given. Later that day, the shredder hydraulic system gear box broke. At this time, a new shredder was ordered. The installation of the new shreider was not completed until September 2, 1988. A total of about 94 hours was credited to unscheduled maintenance in August and September that was attributed to shredder problems.

Figure 27 is a plot of the monthly number of maintenance events for the system instrumentation. Many events were reported between February and July of 1988. The average event time was only about 20 minutes and, during nearly 70% of the events, the auger was not shutdown. 「「「「「「「「「」」」」

The average times between interruptions [mean time between failure (MTBF)] in component operation, whether the auger was on- or off-line, are listed in Table 3. Also shown in Table 3 are corresponding values for the standard deviation and range. Seven of the components [weigh hopper (OI), shredder (O2), conveyor (O3), feed hopper (O4), kiln (O5), boiler (10), and instrumentation (21)] required maintenance more than 50 times during the

| <u>Month</u> | Total<br>Maintenance<br>Time<br>(h) | Number<br>Events<br><u>(total)</u> | Auger<br>Downtime<br>(h) | Number of<br>Events<br><u>(auger off)</u> |
|--------------|-------------------------------------|------------------------------------|--------------------------|---|
| 11/87        | 0.80                                | 3                                  | 0.72                     | 2   |
| 12/87        | 4.98                                | 15                                 | 4.25                     | 8   |
| 1/88         | 8.50                                | 28                                 | 7.08                     | 15  |
| 2/88         | 5.53                                | 26                                 | 3.20                     | 4   |
| 3/88         | 2.43                                | 10                                 | 0.90                     | 3   |
| 4/88         | 1.78                                | 6                                  | 0.67                     | 4   |
| 5/88         | 4.05                                | 7                                  | 0.58                     | 2   |
| 6/88         | 0.57                                | 2                                  | 0.53                     | 1   |
| 7/88         | 0.25                                | ž                                  | 0.00                     | Ō   |
| 8/88         | 0.00                                | ō                                  | 0.00                     | Ō   |
| 9/88         | 3.30                                | 3                                  | 3.05                     | 2   |
| 10/88        | 6.23                                | 3                                  | 6.23                     | 3   |
| 11/88        | 0.00                                | 0                                  | 0.00                     | Ō   |
| Total        | 38.42                               | 105                                | 27.21                    | 44  |

TABLE 5. MONTHLY WEIGH HOPPER UNSCHEDULED MAINTENANCE.

| Month                                  | Total<br>Maintenance<br>Time<br>(h)    | Number<br>Events<br><u>(total)</u> | Auger<br>Downtime<br>(h)               | Number of<br>Events<br>(auger off) |
|--|--|------------------------------------|--|------------------------------------|
| 11/87<br>12/87<br>1/88<br>2/88         | 0.05<br>5.97<br>14.92<br>6.48          | 1<br>7<br>15<br>24                 | 0.00<br>5.83<br>14.23<br>3.85          | 0<br>6<br>8<br>6                   |
| 3/88<br>4/88<br>5/88<br>6/88           | 5.40<br>1.63<br>1.90<br>4.42           | 23<br>8<br>7<br>8                  | 3.08<br>1.42<br>1.65<br>3.17           | 6<br>5<br>4<br>5                   |
| 7/88<br>8/88<br>9/88<br>10/88<br>11/88 | 2.72<br>77.63<br>33.43<br>1.23<br>3.18 | 7<br>13<br>8<br>2<br>4             | 1.80<br>77.53<br>33.43<br>1.23<br>3.18 | 5<br>11<br>8<br>2                  |
| Total                                  | 158.96                                 | 127                                | 150.40                                 | 70                                 |

# TABLE 6. MONTHLY SHREDDER UNSCHEDULED MAINTENANCE.

| <u>Month</u> | Total<br>Maintenance<br>Time<br>(h) | Number<br>Events<br><u>(total)</u> | Auger<br>Downtime<br>(h) | Number of<br>Events<br><u>(auger off)</u> |
|--------------|-------------------------------------|------------------------------------|--------------------------|---|
| 11/87        | 19.48                               | 4                                  | 19.48                    | 4   |
| 12/87        | 15.67                               | 31                                 | 15.67                    | 31  |
| 1/88         | 3.23                                | 7                                  | 3.23                     | 7   |
| 2/88         | 12.03                               | 6                                  | 12.03                    | 6   |
| 3/88         | 28.23                               | 19                                 | 27.87                    | 16  |
| 4/88         | 6.73                                | 12                                 | 6.73                     | 15  |
| 5/88         | 1.93                                | 4                                  | 1.93                     | 4   |
| 6/88         | 2.55                                | 9                                  | 0.05                     | 1   |
| 7/88         | 2.                                  | 5                                  | 0.00                     | 0   |
| 8/88         | 0.50                                | 1                                  | 0.00                     | 0   |
| 9/88         | 43.45                               | 7                                  | 43.20                    | 6   |
| 10/88        | 0.93                                | 3                                  | 0.43                     | 2   |
| 11/88        | 0.00                                | 0                                  | 0.00                     | _0  |
| Total        | 137.23                              | 108                                | 130.62                   | 88  |

## TABLE 7. MONTHLY KILN UNSCHEDULED MAINTENANCE.

| <u>Month</u>                           | Total<br>Maintenance<br>Time<br>(h)           | Number<br>Events<br><u>(total)</u> | Auger<br>Downtime<br>(h)                      | Number of<br>Events<br><u>(auger off)</u> |
|--|---|------------------------------------|---|---|
| 11/87<br>12/87<br>1/88<br>2/88         | 18.53<br>0.00<br>0.00<br>0.00                 | 2<br>0<br>0<br>0                   | 18.53<br>0.00<br>0.00<br>0.00                 | 2<br>0<br>0<br>0                          |
| 3/88<br>4/88<br>5/88<br>6/88           | 38.97<br>0.00<br>0.00<br>12.33                | 7<br>0<br>0<br>3                   | 38.97<br>0.00<br>0.00<br>11.58                | 6<br>0<br>2                               |
| 7/88<br>8/88<br>9/88<br>10/88<br>11/88 | 0.00<br>0.67<br>26.08<br>1.67<br><u>11.50</u> | 0<br>2<br>3<br>1<br>3              | 0.00<br>0.00<br>26.08<br>1.67<br><u>10.50</u> | 0<br>0<br>3<br>1<br>2                     |
| Total                                  | 109.75  | 21                                 | 107.33  | 16  |

## TABLE 8. MONTHLY ASH DRAG UNSCHEDULED MAINTENANCE.

| <u>Month</u>                           | Total<br>Maintenance<br>Time<br>(h)         | Number<br>Events<br><u>(total)</u> | Auger<br>Downtime<br>(h)             | Number of<br>Events<br><u>(auger off)</u> |
|--|---|------------------------------------|--------------------------------------|---|
| 11/87<br>12/87<br>1/88<br>2/88         | 0.00<br>4.00<br>3.17<br>4.77                | 0<br>3<br>5<br>8                   | 0.00<br>4.00<br>2.67<br>3.43         | 0<br>3<br>4<br>6                          |
| 3/88<br>4/88<br>5/88<br>6/88           | 4.72<br>6.58<br>9.65<br>9.75                | 27<br>33<br>37<br>29               | 3.73<br>6.55<br>6.90<br>.85          | 8<br>16<br>6<br>3                         |
| 7/88<br>8/88<br>9/88<br>10/88<br>11/88 | 2.98<br>3.25<br>1.83<br>8.30<br><u>1.35</u> | 14<br>4<br>1<br>15<br><u>3</u>     | 1.32<br>0.00<br>0.00<br>2.30<br>0.93 | 3<br>0<br>7<br>2                          |
| Total                                  | 60.35                                       | 179                                | 32.68                                | 58  |

TABLE 9. MONTHLY INSTRUMENTATION UNSCHEDULED MAINTENANCE.







••





11/00 Auger on Auger off Figure 22. Monthly Unscheduled Maintenance Times for the Instrumentation. 10/01 0/00 0/00 7/00 4/88 Month/Year 5/00 a fille and the second seco 5 4/00 and the state of the state of the state of the 3/88 2/08 100 1/88 · Janks 12/87 ----11/07 6.0+ ÷... 15.07 9.0 7.5 + S.+ 3.0-13.3 12.0 10.5 ò Hours

••••••

ì . .

1. - 1. S. C. S

がの**学会議員**を行うたいことで

**,** .

. 59





6<sup>.</sup>0





5

1. C. S. S.

in the state

1.1

Same and the second






· 63

2. 🐌





12-month operating period. The MTBF of each of these components was less than 7 days. Overall, the average time between component failure was 0.7 days, with a standard deviation of 1.2 days and a range of 0 to 9 days. The MTBF data show that the weigh hopper, shredder, kiln, and system instrumentation required the most frequent maintenance. The conveyor, feed hopper, and boiler also required frequent maintenance for problems such as plugging, binding, and fouling (e.g., buildup on boiler face plate). However, the total number of maintenance events related to these components was less than half that of the total for the weigh hopper, shredder, kiln, and instrumentation.

#### (2) Interlocks

Auger instrumentation interlock events contributed significantly to the system downtime. These interlocks provide for operation of the system within prescribed permit operating limits through the monitoring of specified system parameters. Table 10 is a list of the interlocks monitored along with codes used to identify them. Table 11 contains the downtime and number of system interlock events for each month of operation. Figures 28 and 29 display the downtime associated with the system interlock events and the number of interlock events that occurred, respectively, for each month of operation. The largest downtime was recorded during the months of December 1987 and April 1988. About 30% of the downtime in December was attributed to the low kiln outlet temperature (LKOT) interlock. In April, over 60% of the downtime was caused by the high average feed rate (HAFR) interlock. The largest number of events occurred in December 1987 and February 1988. The LKOT and the low retention time (LRT) interlocks contributed more than half of the events in February.

The downtime, the number of events, and the average downtime for each interlock are listed in Table 12. Figures 30 and 31 display the interlock downtime and number of events, respectively. The HAFR and LKOT interlocks accounted for 56% of the total number of events and 65% of the total downtime. Two other interlocks also occurred

| <u>Code</u> | Interlock                        |
|-------------|----------------------------------|
| CE          | Combustion efficiency            |
| COA         | CO analyzer out                  |
| HAFR        | High average feed rate           |
| HARPM       | High auger RPM                   |
| НСО         | High CO                          |
| КОТВ        | Kiln outlet temperature burnout  |
| KTSO        | Kiln temperature sensor out      |
| LKOD        | Low kiln outlet draft            |
| LKOT        | Low kiln outlet temperature      |
| L02         | Low oxygen                       |
| LPTR        | Low packed tower recirculation   |
| LRT         | Low retention time               |
| LSOT        | Low secondary outlet temperature |
| SRL         | Scrubber recirculation low       |
| STBO        | Secondary temperature burnout    |
| STSO        | Secondary temperature sensor out |

TABLE 10. AUGER INTERLOCK CODE IDENTIFICATION.

£.,

| Month | Downtime<br>(h) | Number of<br><u>Interlocks</u> | Average<br>Downtime<br>(min) |
|-------|-----------------|--------------------------------|------------------------------|
| 11/87 | 5.22            | 130                            | 2.4                          |
| 12/87 | 78.13           | 2,445                          | 1.9                          |
| 1/88  | 17.98           | 1,466                          | 0.7                          |
| 2/88  | 39.03           | 2.318                          | 1.0                          |
| 3/88  | 42.78           | 1,585                          | 1.6                          |
| 4/88  | 54.08           | 1,622                          | 2.0                          |
| 5/88  | 31.72           | 1,348                          | 1.4                          |
| 6/88  | 16.23           | 785                            | 1.2                          |
| 7/88  | 20.28           | 676                            | 1.8                          |
| 8/88  | 18.82           | 522                            | 2.2                          |
| 9/88  | 26.77           | 599                            | 2.7                          |
| 10/88 | 33.80           | 690                            | 29                           |
| 11/88 | 8.53            | 275                            | 1.9                          |
| Total | 393.37          | 14,461                         | 1.6                          |

TABLE 11. MONTHLY INTERLOCK EVENTS.







|                                  | <u>Interlock</u> | Downtime<br>(h) | Number<br><u>Interlocks</u> | Average<br>Downtime<br>_(min) |
|----------------------------------|------------------|-----------------|-----------------------------|-------------------------------|
| Combustion Efficiency            | (CE)             | 12.18           | 282                         | 2.6                           |
| Carbon Monoxide Analyzer Out     | (COÁ)            | 0.72            | 90                          | 0.48                          |
| High Average Feed Rate           | (HAFŔ)           | 180.35          | 4961                        | 2.2                           |
| High Auger RPM                   | (HARPM)          | 15.82           | 181                         | 5.2                           |
| High Carbon Monoxide             | (HCO)            | 37.15           | 647                         | 3.4                           |
| Kiln Outlet Temperature Burnout  | (KOTB)           | 0.87            | 76                          | 0.68                          |
| Kiln Temperature Sensor Out      | (KTSO)           | 0.02            | 1                           | 1.2                           |
| Low Kiln Outlet Draft            | (LKOD)           | 14.48           | 2471                        | 0.35                          |
| Low Kiln Outlet Temperature      | (LKOT)           | 75.03           | 3145                        | 1.4                           |
| Low Oxygen                       | (L02)            | 9.37            | 410                         | 1.4                           |
| Low Packed Tower Recirculation   | (LPTŘ)           | 1.87            | 95                          | 1.2                           |
| Low Retention Time               | (LRT)            | 16.45           | 1425                        | 0.69                          |
| Low Secondary Outlet Temperature | (LSOT)           | 26.73           | 430                         | 3.3                           |
| Scrubber Recirculation Low       | (SRL)            | 1.67            | 185                         | 0.54                          |
| Secondary Temperature Burnout    | (STBO)           | 0.63            | 10                          | 3.8                           |
| Secondary Temperature Sensor Out | (STSO)           | 0.03            | 2                           | <u>1.0</u>                    |
|                                  | Total            | 393.37          | 14,461                      | 1.6                           |

## TABLE 12. INDIVIDUAL INTERLOCK DOWNTIME.

ŧ





frequently--low-kiln outlet draft (LKOD) and low retention time (LRT). Combined, the four interlocks accounted for 83% of the interlock events and 73% of the downtime. Tables 13 through 16 contain the monthly downtime and number of events for each of these interlocks. Over the 359 days of operation used as a basis for this evaluation, on the average, 1.1 hours per day of downtime was experienced with a daily average of about 40 system interlock events.

By far the largest contributor to downtime was the HAFR interlock, with an interlock occurring nearly every day. The number of HAFR interlocks per month (Table 13) began to decrease in March 1988. At that time an instantaneous feed readout feature was added to the computer program. This allowed the operators to maintain more control on the quantity of soil they were feeding to the incinerator. Although there was a decrease in the number of HAFR interlocks, an increase in the total downtime and the downtime per interlock resulted.

For the LKOD, LKOT, and LRT interlocks (Tables 14, 15, and 16), the number of events and the downtimes started high and then began to decline around April or May 1988. Thus, it can be inferred that as the program progressed, equipment stabilized, and experience was gained, the system operation was affected less by these instrumentation interlock events. The data in Tables 14 and 15 show that the kiln outlet draft and kiln outlet temperature were harder to maintain. They both experienced a large number of events; however, LKOT accounted for more system downtime.

(3) Scheduled Maintenance

Scheduled maintenance was maintenance performed on equipment during the scheduled outages. The scheduled outages were performed when the quantity of particulate in the SCC reached 25% of SCC capacity.

| <u>Month</u>                           | Downtime<br>(min)                        | Number of<br><u>Interlocks</u>        | Average<br>Downtime<br>(min)                |
|--|--|---------------------------------------|---|
| 11/87<br>12/87<br>1/88<br>2/88         | 0<br>80<br>157<br>607                    | 0<br>449<br>540<br>1212               | 0.18<br>0.29<br>0.50                        |
| 3/88<br>4/88<br>5/88<br>6/88           | 1114<br>2050<br>1376<br>752              | 296<br>659<br>411<br>183              | 3.76<br>3.11<br>3.35<br>4.11                |
| 7/88<br>8/88<br>9/88<br>10/88<br>11/88 | 669<br>650<br>1092<br>1890<br><u>384</u> | 139<br>152<br>305<br>539<br><u>76</u> | 4.81<br>4.28<br>3.58<br>3.51<br><u>5.05</u> |
| Total                                  | 10,821                                   | 4,961                                 | 2.18  |

## TABLE 13. MONTHLY HAFR INTERLOCKS.

۶.

| <u>Month</u> | Downtime<br>_(min) | Number of<br><u>Interlocks</u> | Average<br>Downtime<br>(min) |
|--------------|--------------------|--------------------------------|------------------------------|
| 11/87        | 4                  | 4                              | 1.00                         |
| 12/87        | 45                 | 54                             | 0.83                         |
| 1/88         | 1                  | 2                              | 0.50                         |
| 2/88         | 91                 | 245                            | 0.37                         |
| 3/88         | 337                | 594                            | 0.57                         |
| 4/88         | 83                 | 191                            | 0.43                         |
| 5/88         | 124                | 564                            | 0.22                         |
| 6/88         | 72                 | 389                            | 0.19                         |
| 7/88         | 32                 | 148                            | 0.22                         |
| 8/88         | 12                 | 82                             | 0.15                         |
| 9/88         | 26                 | 70                             | 0.37                         |
| 10/88        | 24                 | 51                             | 0.47                         |
| 11/88        | 18                 | 7                              | <u>0.23</u>                  |
| Total        | 869                | 2,471                          | 0.35                         |

#### TABLE 14. MONTHLY LKOD INTERLOCKS.

•

| Month          | Downtime<br>(min) | Number of<br><u>Interlocks</u> | Average<br>Downtime<br>(min) |
|----------------|-------------------|--------------------------------|------------------------------|
| 11/87          | 80                | 44                             | 1.82                         |
| 12/87          | 1443              | 634                            | 2.28                         |
| 1/88           | 398               | 629                            | 0.63                         |
| 2/88           | 808               | 323                            | 2.50                         |
| 3/88           | 253               | 247                            | 1.02                         |
| 4/88           | 537               | 437                            | 1.23                         |
| 5/88           | 177               | 198                            | 0.89                         |
| 6/38           | 51                | 90                             | 0.57                         |
| 7/38           | 277               | 230                            | 1.20                         |
| 8/88           | 217               | 149                            | 1.46                         |
| 9/88           | 254               | 148                            | 1.72                         |
| 10/88<br>11/88 | 5<br>2<br>4502    | 1<br>15<br>3145                | 5.00<br><u>0.13</u><br>1.43  |

TABLE 15. MONTHLY LKOT INTERLOCKS.

| Month | Downtime<br>_(Min.) | Number of<br>Interlocks | Average<br>Downtime<br>_(Min.) |
|-------|---------------------|-------------------------|--------------------------------|
| 11/87 | 58                  | 31                      | 1.87                           |
| 12/87 | 301                 | 864                     | 0.35                           |
| 1/88  | 112                 | 165                     | 0.68                           |
| 2/88  | 183                 | 177                     | 1.03                           |
| 3/88  | 201                 | 85                      | 2.36                           |
| 4/88  | 38                  | 9                       | 4.22                           |
| 5/88  | 12                  | 6                       | 2.00                           |
| 6/88  | 3                   | 3                       | 1.00                           |
| 7/88  | 1                   | 2                       | 0.50                           |
| 8/88  | 9                   | 13                      | 0.69                           |
| 9/88  | 3                   | 2                       | 1.50                           |
| 10/88 | 2                   | 5                       | 2.50                           |
| 11/88 | <u>- 64</u>         | <u>63</u>               | <u>1.02</u>                    |
| Total | 987                 | 1425                    | 0.69                           |

# TABLE 16. MONTHLY LRT INTERLOCKS.

----

Scheduled maintenance accounted for a total of 1,521.55 hours of downtime for the 166 events reported. Table 17 is a list, by month, of the downtime incurred, the total number of events, along with the number of events that resulted in the feed auger being off, and the average duration of maintenance for both the total number of events and the events during which the auger was off. The feed auger was off for 1,485.46 hours (97.6%) of the scheduled maintenance time reported. The data from Table 17 is displayed in Figures 32 and 33. The data reported for September and November 1988 include not only maintenance time associated with soil processing, but also 77.7 hours in September and 110.5 hours early in November that are associated with burning of program-generated wood and trash.

Scheduled maintenance events were more frequent early in the program and less frequent starting in May 1988 (Figure 33). On the other hand, scheduled maintenance times started high, dropped, and then increased near the end of the program (Figure 32). Again, this trend resembles the bathtub curve. This may be attributable to system initial startup and wear phenomena; but it may be that maintenance time is inversely proportional to the number of scheduled maintenance events. Scheduled maintenance activities became less frequent mainly due to the changes in the operating parameters such as showing the rotation of the kiln and lowering the draft through the system. These changes resulted in scheduled outages every 59 days rather than every 30 days. While the decrease in scheduled outages may have contributed to an increase in maintenance problems in August and September 1988, the lack of a preventive maintenance program was the prime contributor to the maintenance problems.

(4) System Downtime

Scheduled maintenance accounted for 56.1% of the system downtime, unscheduled maintenance 29.1%, and interlocks 14.7%. This is depicted in Figure 34. Table 18 is a monthly list of the system unscheduled

|              | Total              |            | Average      |                    |             | Average      |
|--------------|--------------------|------------|--------------|--------------------|-------------|--------------|
|              | Maintenance        | Numbers of | Maintenance  | Auger              | Number of   | Auger        |
|              | Time               | Events     | Time         | Downtime           | Events      | Downtime     |
| <u>Month</u> | <u>(h)</u>         | (total)    | <u>(h)</u>   | <u>(h)</u>         | (auger off) | <u>(h)</u>   |
| 11/87        | 1.30               | 3          | 0.43         | 1.30               | 3           | 0.43         |
| 12/87        | 304.79             | 15         | 20.32        | 301.27             | 13          | 23.17        |
| 1/88         | 146.35             | 28         | 5.32         | 141.93             | 24          | 5.91         |
| 2/88         | 113.42             | 36         | 3.15         | 107.35             | 30          | 3.58         |
| 3/88         | 141.02             | 33         | 4.27         | 135.72             | 27          | 5.01         |
| 4/88         | 92.55              | 25         | 3.70         | 88.03              | 21          | 4.19         |
| 5/88         | 82.60              | 1          | 82.60        | 82.60              | 1.          | 82.60        |
| 6/88         | 0.67               | 2          | 0.34         | 0.00               | 0           |              |
| 7/88         | 162.28             | 2          | 81.14        | 162.28             | 2           | 81.14        |
| 8/88         | 192.52             | 1          | 192.52       | 192.52             | 1           | 192.52       |
| 9/88         | 81.82 <sup>a</sup> | 9          | 9.09         | 77.90 <sup>a</sup> | 5           | 15.58        |
| 10/88        | 5.08,              | 4          | 1.27         | 0.00,              | 0           |              |
| 11/88        | <u>197.17</u> D    | 7          | <u>28.17</u> | <u>194.50</u> D    | 5           | <u>38.90</u> |
| Total        | 1521.55            | 166        | 9.17         | 1485.46            | 132         | 11.25        |
|              |                    |            |              |                    |             |              |

TABLE 17. MONTHLY SCHEDULED MAINTENANCE.

a. Includes 77.7 h for burning trash

b. Includes 110.5 h for burning trash

| <u>Month</u> | Unscheduled<br>Maintenance<br>(h) | Interlock<br>Downtime<br>(h) | Scheduled<br>Maintenance<br>(h) | Total<br>Average<br><u>(h)</u> | Daily<br>(h) |   |
|--------------|-----------------------------------|------------------------------|---------------------------------|--------------------------------|--------------|---|
| 11/87        | 54.23                             | 5.22                         | 1.3                             | 60.75                          | 11.5         | 1 |
| 12/87        | 40.15                             | 78.13                        | 301.27                          | 419.55                         | 13.5         |   |
| 1/88         | 80.63                             | 17.98                        | 141.93                          | 140.54                         | 7.8          |   |
| 2/88         | 56.78                             | 39.03                        | 107.35                          | 203.16                         | 7.0          |   |
| 3/88         | 87.75                             | 42.78                        | 135.72                          | 266.25                         | 8.6          |   |
| 4/88         | 25.42                             | 54.08                        | 88.03                           | 167.53                         | 5.6          |   |
| 5/88         | 38.85                             | 31.72                        | 82.60                           | 153.17                         | 4.9          |   |
| 6/88         | 35.72                             | 16.23                        | 0.00                            | 51.95                          | 1.7          |   |
| 7/88         | 21.47                             | 20.28                        | 162.28                          | 204.03                         | 6.6          |   |
| 8/88         | 89.97                             | 18.82                        | 192.58                          | 301.37                         | 9.7          |   |
| 9/88         | 159.98                            | 26.77                        | 77.90                           | 264.65                         | 8.8          |   |
| 10/88        | 51.57                             | 33.80                        | 0.00                            | 85.37                          | 2.8          |   |
| 11/88        | 27.33                             | 8.53                         | _194.50                         | 230.36                         | <u>12.1</u>  |   |
| Total        | 769.85                            | 393.37                       | 1485.46                         | 2648.68                        | 7.3          |   |
|              |                                   |                              |                                 |                                |              |   |

TABLE 18. MONTHLY AUGER DOWNTIME.



Ζ.

ť





and scheduled maintenance downtimes and the interlock downtimes, along with the average downtime per day of operation. The data show that the feed auger was shut down a total of 2,648 hours for all three of the system event types. The system was shut down an average of 7.3 hours per day. The monthly system downtime is shown in Figure 35.

b. Soil Processed

A total of 26,058.4 tons of soil was processed through the incinerator between November 25, 1987 and November 19, 1988. The monthly totals are shown in Table 19. Also listed are the on-line times for the auger, amount of soil processed, and average soil feed rates. The auger operated about 68% of the time with an average of about 72 tons of soil being processed each day.

Figure 36 is a plot of the amount of soil processed (tons) and Figure 37 displays the average feed rate in tons per hour based on total operating hours available for the month. The feed rate ranged from 1.5 tons/h to 4.4 tons/h, averaging 3.0 tons/h.

The monthly processing rate or feed rate based on auger on-line (available hours-downtime) time in hours is shown in Figure 38. Based on a normal distribution, this feed rate was statistically constant except during the first few days of operation in November 1987. An average of about 4.4 tons/h were fed into the incinerator during the soil incineration operating period.

Overall, the data showed that the tons of soil processed steadily increased from the start of the program (November 1987) until it reached a peak in June 1988. It then declined from June to September 1988. This is in agreement with observations made in the discussion of the data in the previous section. Namely, wear-out appeared to become important after June 1988. Also, soil processed in the latter part of the program was more troublesome because it contained a larger volume of materials (such as large rocks and metal) that were difficult to process. The soil processing increase in October 1988 (Figure 36) occurred after the new shredder was installed.



ŕ

12 5 50

| <u>Month</u> | Auger<br>On-line<br>(h) | Auger<br>On-line<br>(%) | Soil<br>Processed<br>(tons) | Average<br>On-line<br>Feedrate<br><u>(tons/h)</u> | Average<br>Hourly<br>Feedrate<br><u>(tons/h)</u> | Average<br>Daily<br>Feedrate<br>(tons/d) |
|--------------|-------------------------|-------------------------|-----------------------------|---|--|--|
| 11/87        | 65.8                    | 52.0                    | 189.0                       | 2.9   | 1.5  | 35.7                                     |
| 12/87        | 324.5                   | 43.6                    | 1440.6                      | 4.4   | 1.9  | 46.5                                     |
| 1/88         | 498.6                   | 67.0                    | 1865.7                      | 3.7   | 2.5  | 60.2                                     |
| 2/88         | 506.8                   | 72.8                    | 2081.9                      | 4.1   | 3.0  | 71.8                                     |
| 3/88         | 495.3                   | 66.6                    | 2183.5                      | 4.4   | 2.9  | 70.4                                     |
| 4/88         | 558.9                   | 77.6                    | 2563.9                      | 4.6   | 3.6  | 85.5                                     |
| 5/88         | 588.8                   | 79.1                    | 2829.6                      | 4.8   | 3.8  | 91.3                                     |
| 6/88         | 655.0                   | 92.4                    | 3178.8                      | 4.8   | 4.4  | 106.0                                    |
| 7/88         | 535.3                   | 72.0                    | 2278.3                      | 4.3   | 3.1  | 73.5                                     |
| 8/88         | 421.2                   | 56.5                    | 1935.2                      | 4.6   | 2.6  | 62.4                                     |
| 9/88         | 357.7                   | 49.7                    | 1572.1                      | 4.4   | 2.2  | 52.4                                     |
| 10/83        | 666.3                   | 89.6                    | 2987.7                      | 4.5   | 4.0  | 96.4                                     |
| 11/88        | 207.7                   | 45.5                    | 952.3                       | 4.6   | 2.1  | 50.1                                     |
| Total        | 5891.9                  | 68.1                    | 26058.4                     | 4.4   | 3.0  | 72.3                                     |

TABLE 19. MONTHLY SOIL PROCESSED.







ala interio II norma

STORE 21 MARS AND AN

Figure 38. Monthly Average Processing Rate.

Production in April, May, and June 1988 increased dramatically because ENSCO was trying to set new production records. The motivation to increase production was due to a modification of the ENSCO contract. Basically, the contract change called for a higher fee for higher production. The quantity of soil processed in June 1988 was particularly high as ENSCO delayed needed maintenance on the incinerator until after the higher production goal was reached.

As shown on Figure 36 (also Table 19), production started to decrease in July 1988. This decrease is attributed to: (1) problems with the shredder (plugging and hydraulics), (2) problems with the ash drag bearings, drive chain, and drag flights, and (3) the average feed ratio/h was reduced (maximum of 3 tons/h) for several days while waiting for approval of an EPA permit extension concerning an increase in the quantity of soil that could be processed. The reduction in feed rate allowed us to continue to operate while waiting for EPA approval on the permit extension. Continuing to operate at the normal 5 tons/h may have meant that we would reach the existing permit soil quantity level and would have had to shut the operation down. Production continued to decrease in August 1988 (Figure 36, Table 19). This decrease in production was caused by the following: (1) shredder hydraulic and motor seals problems, (2) ash drag drive chain, (3) lost production time caused by a Hurricane Condition III Alert, and (4) repositioning of the weigh hopper/shredder/conveyor system to excavate contaminated plots. This repositioning of the weigh hopper/shredder/ conveyor system took 8 days, during which time production was halted. On August 29, 1988, the shredder motor and seals failed, halting production again. Production did not resume until September 2, 1988.

EG&G Idaho and ENSCO personnel decided to use the new shredder to shred large rocks stockpiled near the incinerator. Erroneous high average feed rate (HAFR) interlocks and several broken side panels resulted from the large rocks bouncing around inside the weigh hopper. Other problems that plagued the incinerator during September were: (1) ash drag bearings, (2) the loss of several rows of refractory brick from the kiln, (3) conveyor belt wear, and (4) the last original hollow trunnion broke. Processing of ordinary soil (versus large rocks) and 90% incinerator on-line time resulted in October being a high production month.

the sup surgestion exist a partition solve is a solve the solvest of the

c. Costs

The monthly cost of incinerator operations during the period from December 1987 through November 1988 ranged from \$7,094 (November 1988) to \$10,824 (February 1988) per day. Detailed monthly costs are shown in Table 20. These costs are for incinerator operations only. A plot of the same information is shown in Figure 39. The large materials cost in February may be due to a time lag in vendors invoicing ENSCO, and in turn ENSCO invoicing EG&G Idaho. Evaluation of cost data was limited to the major component repair or replacement parts costs as listed in Table 21. The parts costs, excluding the final repair of the incinerator at the ENSCO facilities in White Bluff, Tennessee, amounted to \$169,878. Nearly 70% of these costs were for the shredder (02) and kiln (05). Most of these costs were incurred in March, July, and September. During March, the shredder teeth were changed and the kiln refractory was repaired and seals replaced. During July, the shredder teeth bearings, seals, lock nuts, end caps, and spacers were replaced. The largest part: cost of \$60,000 (35% of the major parts costs) was incurred in September for replacement of the shredder.

Upon shipment of the incinerator to ENSCO facilities at White Bluff, Tennessee, it was given a thorough examination for wear by ENSCO personnel. This examination showed the incinerator to be in better condition than was originally anticipated when it left the NCBC. The only major items in need of repair were the ash drag and the kiln seals, which were completely worn out. The ash dr is discussed further in Section VI.A.3.

The list of parts required to make the repairs at White Bluff, Tennessee are shown in Table 22. The parts cost for these repairs were \$13,132.



Figure 39. Graph of Operations Monthly Cost.

Total Incinerator Operations Cost

1. 1. S. 1. S. 1.

TABLE 20. INCINERATOR OPERATIONS SPREAD SHEET

1

NCBC INCINERATION PROJECT INCINERATOR OPERATIONS MAY 1987 THROUGH FEBRUARY 1989

|                         |                    | 10 101                 |                         |                         |                       |
|-------------------------|--------------------|------------------------|-------------------------|-------------------------|-----------------------|
| MONTHLY MONETARY TOTALS |                    | TAT 8/<br>\$191,169.31 | JUNE 8/<br>\$102,017.69 | JULY 87<br>\$106,564.48 | AUG 87<br>\$87,299.00 |
| ITEM EXPENDITURES       | · INIT TOTALS ·    |                        |                         |                         |                       |
|                         |                    |                        |                         |                         |                       |
| INCINERATOR LEASE       | : \$1.501.632.50 : | 87 299 00              | 87 200 00               | 00 000 10               | CA 000 TO             |
| ABC RENTAL              | 57 268 B6          | 1 442 00               | 46.00                   | DD. 663, 10             | 01,643,10             |
| HERTZ DENTAL            |                    |                        | 10.01                   |                         |                       |
| ITAN TANAT              | : 42.5c1,124 :     | 6,163.00               |                         |                         |                       |
| LABOR                   | :\$1,018,804.00 :  | 62,111.00              |                         |                         |                       |
| NATURAL GAS             | : \$974,144.52 :   | 18,780.84              | 12.978.90               | 18 946 24               |                       |
| WATER                   | : \$14,749.02 :    | 1 959 85               | 1 375 13                |                         |                       |
| SEWAGE                  | : \$3.392.93 :     |                        |                         |                         |                       |
| ELECTRICITY             | : \$87,447.49      | 306.12                 | 318 66                  | 10 21                   |                       |
| FRONT END LOADER        | : \$83,936.62      |                        |                         | 43.010                  |                       |
| FORKL I FT              | : \$26,673.94      |                        |                         |                         |                       |
| MATERIALS               | : \$612,205.86 :   | 13,107.50              |                         |                         |                       |

•

93

in i

これでは、現在学校のないなどの多なのです。

NCBC INCINERATION PROJECT INCINERATOR OPERATIONS MAY 1987 THROUGH FEBRUARY 1989

| MONTHLY MONETARY TOTALS |                   | SEPT 87<br>\$149,524.98 | 0CT 87<br>\$164,294.68 | NOV 87<br>\$176,943.55 | DEC 87<br>\$272,582.63 |
|-------------------------|-------------------|-------------------------|------------------------|------------------------|------------------------|
| ITEM EXPENDITURES       | : UNIT TOTALS :   |                         |                        |                        |                        |
| INCINERATOR LEASE       | :\$1,501,632.50 : | 87,299.00               | 87,299.00              | 87,299.00              | 87,299.00              |
| ABC KENIAL              | : \$7,268.86 :    |                         | 187.62                 |                        | 612.00                 |
| HEKIZ KENIAL            | : \$3/,153.54 :   |                         | 1,496.00               | 2,793.10               | 6,005.00               |
| LABUR                   | :51,018,804.00 :  | 46,645.00               | 52,093.00              | 71,529.00              | 65,879.00              |
| NATURAL 4A3             | : \$9/4,144.52 :  |                         | 3,322.50               |                        | 84,825.64              |
| WAJEK<br>Schast         | : \$14,749.02 :   |                         | 33.25                  | 2.85                   | 813.20                 |
| DEWAGE<br>Firstoisitu   | : \$3,392.93 :    |                         | 19.95                  | 1.42                   | 487.82                 |
| ELEUIKIULIY             | : \$87,447.49 :   |                         | 269.09                 | 289.65                 | 2.794.22               |
| FKUNI ENU LUADEK        | : \$83,936.62 :   | 945.00                  | 2,597.00               |                        | 4.717.00               |
| FUKKLIFI                | : \$26,673.94 :   | 1,500.00                | 581.94                 | 2,120.00               | 2.720.00               |
| MAIEKIALS               | : \$612,205.86 :  | 13,135.98               | 16,395.33              | 12,908.53              | 16,429.75              |

ないでは、日本のないである。

١,

94

•

•

NCBC INCINERATION PROJECT INCINERATOR OPERATIONS MAY 1987 THROUGH FEBRUARY 1989

| MONTHLY MONETARY TOTALS |                    | JAN 88<br>\$249,208.53 | FEB 88<br>\$313,908.84 | MAR 88<br>\$273,385.15 | APRIL 88<br>\$224,029.36 |
|-------------------------|--------------------|------------------------|------------------------|------------------------|--------------------------|
| ITEM EXPENDITURES       | : UNIT TOTALS :    |                        |                        |                        |                          |
| INCINERATOR LEASE       | : \$1,501,632.50 : | 60.371.00              | 59.371.00              | 61 549 00              | 61 549 DD                |
| ABC RENTAL              | : \$7,268.86 :     | •                      | 117.38                 | 45.58                  | 2022200                  |
| NERIZ RENIAL            | : \$37,153.54 :    | 2,968.00               | 7,935.11               | 2.666.10               | 5.510.62                 |
| LABOR                   | :\$1,018,804.00 :  | 77,170.00              | 63,424.00              | 61,927.00              | 47.054.00                |
| NATUKAL GAS             | : \$974,144.52 :   | 67,129.00              | 75,606.00              | 83, 199, 83            | 61.705.83                |
| WALEK                   | : \$14,749.02 :    | 635.00                 | 766.00                 | 846.93                 | 901.03                   |
| SEMAGE                  | : \$3,392.93 :     | 380.00                 | 459.00                 | 507.78                 | 540.55                   |
|                         | : \$87,447.49 :    | 5,282.22               | 5,946.81               | 4,852.51               | 6.037.24                 |
| FRUNI ENU LOADER        | : \$83,936.62 :    | 2,597.00               | 2,597.00               | 2,597.00               | 5.247.00                 |
| FUKKLIFI                | : \$26,673.94 :    | 2,150.00               | 2,905.00               | 2,507.00               | 1.097.10                 |
| MAIEKIALS               | : \$612,205.86 :   | 30,526.31              | 94,731.54              | 52,686.42              | 34,094.38                |

•

95

l

\*

₹

NCBC INCINERATION PROJECT INCINERATOR OPERATIONS MAY 1987 THROUGH FEBRUARY 1989

| MONTHLY MONETARY TOTALS |                    | MAY 88<br>\$263,942.83 | JUNE 88<br>\$228,984.28 | JULY 88<br>\$250,497.81 | AUG 88<br>\$246,733.09 |
|-------------------------|--------------------|------------------------|-------------------------|-------------------------|------------------------|
| ITEM EXPENDITURES       | : UNIT TOTALS :    |                        |                         |                         |                        |
| INCINERATOR LEASE       | : \$1,501,632.50 : | 61.549.00              | 61.549.00               | 61 549 00               | 61 640 00              |
| ABC RENIAL              | : \$7,268.86 :     | 199.02                 |                         |                         | 00.0FC,10              |
| HEKIZ RENIAL            | : \$37,153.54 :    |                        | 568.88                  |                         | 00.001                 |
| LABUR                   | : \$1,018,804.00 : | 78,821.00              | 51,369.00               | 70.039.00               | 62 723 00              |
| NATURAL GAS             | : \$974,144.52 :   | 65,959.08              | 73, 595.67              | 68.267.10               | 63 663 57              |
| WALEK                   | : \$14,749.02 :    | 1,149.03               | 1,241.18                | 1.073.98                | 10.000,00              |
| SEWAGE                  | : \$3,392.93 :     |                        |                         |                         | co                     |
| ELECIRICITY             | : \$87,447.49 :    | 5.761.73               | 6. 395 37               | 7 138 87                | C3 101 0               |
| FRONT END LOADER        | : \$83,936.62 :    | 5.247.00               | 247 00                  | 5 247 00                | 0,124.03<br>5 717 70   |
| FORKLIFT                | : \$26,673.94 -    | 1 007 10               | 1 210 00                |                         | 00.742.c               |
| MATERIALS               |                    |                        | 00.612.1                | 01.180.1                | 01.191.10              |
|                         | : 08.003,2104 :    | 44,159.8/              | 21,299.18               | 36,0C5.76               | 43,177.28              |

· ···· · · · · · ·

たちのないのないないであるというです。

And the second second second second

j

NCBC INCINERATION PROJECT INCINERATOR OPERATIONS MAY 1987 THROUGH FEBRUARY 1989

| MONTHLY MONETARY 10TALS         |                                      | SEPT 88<br>\$285,207.06 | 0CT 88<br>\$280,452.19 | NOV 88<br>\$212,813.27 | DEC 88<br>\$182,171.88 |
|---------------------------------|--------------------------------------|-------------------------|------------------------|------------------------|------------------------|
| ITEM EXPENDITURES               | : UNIT TOTALS :                      |                         |                        |                        |                        |
| INCINERATOR LEASE<br>ARC BENTAL | :\$1,501,632.50 :                    | 59,882.00               | 59,882.00              | 59,882.00              | 59,882.00              |
| HERTZ RENTAL                    | : \$37,153.54 :                      | 906.57                  | 638.63                 | 621.35                 | 1,196.16               |
| LABOR<br>Natural cas            | :\$1,018,804.00:                     | 59,490.00               | 75,307.00              | 57,917.00              | 15.246.00              |
| WATER                           | : \$9/4, 144.52 :<br>: \$14 749 02 · | 61,589.79               | 82,441.98              | 56,925.                | 15,206.92              |
| SEWAGE                          | : \$3,392.93 :                       | fn . 307                | 00.444                 | 646.00                 | 722.48                 |
| ELECIKICIIY<br>FRANT FNA LAAAFD | : \$87,447.49 :                      | 6,240.81                | 6,803.02               | 7,469.37               | 6.576.40               |
| FORKITET                        |                                      | 5,247.00                | 11,937.46              | 8,586.00               | 8,586.00               |
| MATERIAL S                      | . \$20,0/3.94 :                      | 1,09/.10                | 1,097.10               | 1,097.10               | 1,097.10               |
|                                 | : 00.00, 210t .                      | 4/.lcn'ns               | 41,406.70              | 19,668.82              | 13,658.82              |

.

ないないないのであるのである
TABLE 20. INCINERATOR OPERATIONS SPREAD SHEET (CONCLUDED)

NCBC INCINERATION PROJECT INCINERATOR OPERATIONS MAY 1967 THROUGH FEBRUARY 1989

| MCNTHLY MONETARY TOTALS |                        | 11.936,973 | FEB 89<br>\$25,653.56 |
|-------------------------|------------------------|------------|-----------------------|
| ITEM EXPENDITURES       | : UNIT TOTALS :        |            |                       |
| INCINCOATOD LEACT       |                        |            |                       |
| INCINERATOR LEASE       | :\$1,501,632.50 :      | 59,882.00  | 14.794.50             |
| ABC KENIAL              | : <b>\$7</b> ,268.86 : | 319.06     | 249 05                |
| HERTZ RENTAL            | . 637 153 54           |            |                       |
| I ABOR                  |                        |            | 1,047.73              |
|                         | : 11, UIQ, 5U4. UU :   |            |                       |
| NAIUKAL GAS             | : \$974,144.52 :       |            |                       |
| WATER                   | : 14,749.02 :          | 141 08     |                       |
| SENAGE                  | . 59 392 cv            |            | 18 200                |
| ELECTRICITY             | · (87 447 40 ·         | 5 244 44   | 14.066                |
| CDANT FUD LANCO         |                        | D, C44.44  | 60.111                |
| FRUNT ENU LUAUEK        | : \$83,936.62 :        | 3,339.00   | 3.956.15              |
| FUKKLIFI                | : \$26,673.94 :        | 1,097.10   | 1.097.10              |
| MAIEKIALS               | : \$612,205.86 :       | 9,946.43   | 2,735,52              |
|                         |                        |            |                       |

|   | Major<br><u>Component</u> | Cost<br>(\$)        |
|---|---------------------------|---------------------|
| Miscellaneous<br>Weigh Hopper<br>Shaaddam | (01)                      | 900<br>3,075        |
| Conveyor<br>Food Honor                    | (02)                      | 352                 |
| Kiln<br>Ash Drag                          | (05)                      | 25,026              |
| Cyclones<br>Secondary Combustion Chamber  | (07)                      | 1,505<br>0<br>9,993 |
| Divert Tee<br>Boiler                      | (09)                      | 0                   |
| Deaerator<br>Boiler Outlet                | (11)<br>(12)              | 0                   |
| Quench Elbow<br>ENT/Quench Tank           | (13)<br>(14)              | 392<br>779          |
| Cross-Over Duct<br>Packed Tower           | (15)<br>(16)              | 2,250               |
| Scrubber Jel<br>Scrubber Pump<br>Demister | (17)<br>(18)<br>(19)      | 2,154               |
| Stack<br>Instrumentation                  | (20)<br>(21)              | 0<br>6,170          |
| Settling Tank<br>Raw Water System         | (22)<br>(23)              | 825                 |
| POTW<br>Cameras                           | (24)<br>(25)              | 2,395               |
| lreated water<br>Desilicizer              | (26)<br>(27)              | 444                 |
| Total                                     |                           | 169,878             |

# TABLE 21. MAJOR COMPONENT PARTS COST.

## TABLE 22. PARTS LIST FOR FINAL EQUIPMENT REPAIR.

Scrubber System

Scrubber Pumps 1 and 2 Seal #RAE74-V 1-1/2" Ball check valve CPVC 1-1/4" Ball check valve CPVC 1" Ball valve CPVC 3/4" Ball valve CPVC 2" Ball valve CPVC PSI Gage 0-300 1/2" Con. bowl water trap Scrubber nozzle Scrubber sight glass

#### ENT System

ENT Pumps 1 and 2 Seals E75-VV dulb. Woods max rpm 7600 Rear cover, item 106 Flex housing #55C35

Treated Water System

Treated Water Pumps Flex coup. pat. #2867 102 Impeller size 1.5XF-6/60 2" Cast strainer

#### Boiler Trailer

Boiler Pumps Complete rebuilt pump #2 Seal 12.5B, 13B, and 14B Seal cup #2B Flinger #21B 12.5B Stationary 13.B Drive collar 14.B Rotating elem. 1-1/2" Gate valve long stem 1-1/2" Steam valve 3" Brass gate valve TABLE 22. PARTS LIST FOR FINAL EQUIPMENT REPAIR (CONCLUDED).

Kiln Trailer

Sec.

いって、やすいな、たいななな などの

Webbco flex-steel seals, 3 modules each set complete for 80" diameter sealing surface

Ash Conveyor Assembly

Flights (53 Reg'd) Drag chain Sprockets - 6 tooth for tank (2 required) Sprockets - 8 tooth for tank (2 required) Drive sprocket and chain Structure

Packed Tower Assembly

4" (CPVC) Basket strainer (Hayward)
4" (CPVC) flange #80
2" (CPVC) Ball valve
4 x 8 Sheet plexiglass

## 2. Specific Components

This section discusses the items that contributed to the availability of the incinerator. Most of these were corrected at some time during the project while others need corrective action for future projects.

#### a. Packed Tower Tellerettes

No operational damage to the tellerettes occurred during the project. These can be damaged if the packed tower temperatures are allowed to get too high. The tellerettes were usually changed during the scheduled outage. The only damage to them occurred during the handling process. A noticeable change to the tellerettes was their brittleness caused by the sustained exposure to 160°F or higher temperatures. Figure 40 shows the tellerettes upon removal from the packed tower and Figure 41 shows the tellerettes after cleaning. The cleaning consisted of soaking the tellerettes in water for a period of time and then knocking the particulates from them.

#### b. Shredder Inspection

The original condition of the shredder is shown in Figure 42. The inspection of the shredder showed a great deal of wear to the teeth and wipers on the right side of the shredder. The third wiper on the right is bent towards the back of the shredder into the space for the second wiper (Figure 43). Several wipers are worn to a thin razor's edge (Figure 44). Wiper 17 is missing, apparently having broken off at the weld (Figure 45).

The size of the teeth on the right side were noticeably smaller than those on the left. The teeth on the right are 0.6 inches wide, those on the left are 0.75 inches. The teeth were originally one inch wide.

On the radius, the right front teeth were worn by 1.5 inches, whereas those on the left and in the middle of the shredder had worn radially by approximately 0.5 inches.



T Notes

ŝ

.

States and the second

朝鮮にある



Service -



-----





· ...

~

.,

÷



The difference in wear between the right and left side is attributed to the right side shaft turning about twice as fast as the left shaft. This difference in shaft speed provides a tearing as well as a shearing action. The observed wear is considered to be normal for this type of operation. An overall view of the shredder in the used condition is shown in Figure 46. The teeth in back appear virtually untouched.

c. Ash Drag Inspection

The inspection of the ash drag identified considerable wear on several parts of the system:

(1) Drag Flights

The drag flights had an excessive amount of wear on the ends of the flight. This can be seen in Figure 47. Some of the flights show wear on both ends and both sides. This indicates that the flight was turned over to use the second side. This is shown in Figure 48.

The side arms of the drag flights where the drag chain king pins slip through the bushings also show considerable wear. Not only are the bushing areas worn down from the metal to metal drag, but several of the brass bushing are missing, and the drag chain king pins are worn down to the cotter pin holes. This area is shown in Figure 49, Figure 50, and Figure 51.

(2) Drag Chute

Although not no<sup>+</sup>iceable in photographs, the bottom of the chute was worn thin enough that it had to be patched several times to prevent leaks. The chain guides on each side had grooves worn in them that matched the shape of a drag flight. These grooves are shown in Figure 52. The original chain guides were made from a mild steel. After wearing out the original guides, a 5/8-inch thick, AR-400 plate was used.

1 , **!** -110

;

1

Á

1

Figure 46. Shredder After Use.







Figure 49. Side Arm Wear on Ash Drag Flights.







In front of the drag chute, a pipe was welded across the opening of the chute to knock the ash from the drag flights as they rotated around the drive gears. As can be seen in Figure 53, more than 50% of this knock-off pipe is missing. This pipe was a feature added to the drag chute at NCBC when it was discovered that quite a bit of ash was adhering to the drag flights and not drepping off into the ash pan.

۶,

d. Soil Conveyor System Inspection

The inspection of the soil conveyor system showed extensive wear on several of the rollers where the conveyor belt rubbed. The holes worn in some of the rollers are shown in Figures 54 through 57. Virtually all of the roller had flat spots from continuously rubbing the conveyor belt.

Because the conveyor belt was burned in the incinerator at the end of the project, it was not inspected. However, during the year of soil processing, the conveyor belt broke several times requiring it to be respliced. The breaks in the conveyor belt were usually caused by foreign objects (metal rods, tools, etc.) tearing holes in the conveyor belt.

e. Effluent Neutralization Tank (ENT) Inspection

An inspection at the end of the project showed no changes to the particulate tank itself; however, the lemallas (baffles) in the tank were packed with particulate. During the project, attempts were made to clean the lemallas but apparently only resulted in cleaning the center portion. The lemallas are made from a thin, corrugated plastic and are used to: (1) slow the water flow in the ENT and (2) provide a large surface area for the particulate to collect.

To completely clean the ENT, it was necessary to remove the lemallas. Because of their prolonged exposure to hot water, the lemallas had become very brittle; therefore, during their removal from the ENT, they broke into several pieces. Figures 58 through 60 show the lemallas being removed from the ENT and compacted with particulate.









Figure 56. Conveyor Rollers.

2.4.4.4.4.4.4









N.



and the second sec

¥.

#### f. Demister/Demister Pad Inspection

The demister and demister pads were not inspected during the dismantling of the soil processing unit; however, they were inspected during the scheduled outage the first part of November 1988.

The demister was inspected during this outage because small pieces of the plastic demister pads were showing up in the y-strainers of the scrubber pumps. During the inspection, three of the four demister pads showed considerable damage. The damaged pads were replaced with new pads during this scheduled outage. The damaged demister pads are shown in Figures 61 through 63.

Damage to the demister pads is considered normal. The life of the demister pads depends on the water and steam pressure used to keep the draft in the kiln. As the boiler tubes become plugged, the water and steam pressures are increased to compensate for this condition. Because these plastic pads had become brittle during their prolonged exposure to 190°F temperatures, and the increase in pressures tended to break them. Although there are no statistical data to determine the life of the pads, it has been estimated by ENSCO personnel to be 10 months.

g. Particulate Carryover

Particulate carryover from the kiln into the SCC, packed tower, and boiler was the major contributor to scheduled maintenance downtime. Scheduled outages were always based on the quantity of particulate in the SCC, usually 20-25% of SCC capacity. In the early stages of soil processing, those outages occurred approximately every 30 days. Particulate carryover was reduced dramatically, starting in March, by slowing the rotation of the kiln and lowering the draft through the systems. Those actions reduced the source of particulate (fluffing of soil in the kiln) and by decreasing the air velocity through the system, the ability of the airborne particulate to carryover to the boiler was also reduced. This resulted in a scheduled outage for maintenance occurring



in the second second

9

N. W. States and the second second



WITH THE ANTIN' WARANTS THE A Same with the same Sec. 2. 15 Figure 63. Damaged Demister Pad. CE2 20 **G**7 129

every 59 days for the remainder of the project. The particulate was cleaned from the SCC, boiler, and packed tower every scheduled outage. In addition, approximately every 7 to 10 days the system was shut down for 30 minutes to 4 hours to clean the boiler tubes and scrape the boiler face plate. These outages were usually classified as unscheduled maintenance.

h. Scheduled/Preventive Maintenance

There was no planned scheduled/preventive maintenance for the NCBC Demonstration Project. Maintenance was performed either: (1) after the part or equipment failed, or (2) during so-called "scheduled" outages. The scheduled outages were based on the quantity of particulate in the SCC. When the quantity of particulate in the SCC reached 20-25% of SCC capacity, a scheduled outage was planned. During these outages, repairs were made to equipment that had noticeable defects or had failed during operations but where redundant systems were available to use as backup and avoid unscheduled outages.

i. Use of Gunnite<sup>R</sup> in Kiln

In early March 1988, while the incinerator was down for scheduled maintenance, a decision was made to replace some missing refractory brick in the kiln. Because refractory brick was not readily available at either the site or at a local vendor, Gunnite<sup>R</sup> (a grout type material) was used as a replacement. The cost of the Gunnite<sup>R</sup> repair work was \$3,800. Twelve days later the incinerator had to be shutdown to replace the Gunnite<sup>R</sup>. This unscheduled outage cost \$1,137 for the refractory brick, vendor labor, and 31 hours of production time.

j. Feed Auger

The original feed auger for the kiln had to be replaced in February 1988 because of excessive wear (approximately one inch) to the auger flights. To minimize this wear, a design change was made to the auger flight pitch. The original auger had a six inch pitch for the first 36 inches of its length, which were the loading flights in the feed hopper. For the last 40 inches of the auger, the flights had a 12 inch pitch. The new auger design called for a uniform 12 inch pitch for all flights. Other auger design changes were made during the project and are discussed below.

(1) Auger Shear Bolt

As the first feed auger wore down, it started to wobble inside the auger chute. This wobbling caused the auger shear bolt holes to become elongated (out of round). Although a new auger was installed, the wobbling effect could still take place because of the space around the shear bolt holes. This wobbling caused the shear bolts to snap, which in turn meant an hour or two of downtime to dig the soil out of the feed hopper to replace the bolts. A change in design, placing the shear bolts on the auger shaft outside of the feed hopper was made to expedite this procedure.

(2) Overlay on Auger Flights

The feed augers used on this project were fabricated from stainless steel. The first auger processed 3,325 tons of soil before wearing the flights down to the point that the auger wobbled in the auger chute, which caused the shear bolts to break several times. To minimize the feed auger wear, a 2-inch tungsten carbide cap was plated onto the replacement auger. The auger with overlay processed 11,429 tons of soil before being replaced with a similar type of auger. Measurements showed the auger flights had been worn by approximately 1/2 inch. If left in place, this auger would have processed the remaining 6,500 tons of soil.

k. Kiln Seals

The kiln seals are flexible steel seals between the kiln end plates and the barrel of the kiln. The seals are there to maintain the negative pressure in the kiln. For the first few months of operation, the seals were allowed to rub directly on the kiln (metal-to-metal friction) resulting in the seals wearing out very rapidly. The periodic use of a lubricant on the replacement seals allowed the seals to last through the remainder of the project.

1. Weigh Hopper/Feed System

The system used on the NCBC Demonstration Project had the weigh hopper/scales first, followed by the shredder. During the processing of large rocks and wood (cross-ties) the shredder would bounce, thus causing the weigh hopper/scale unit to bounce. This resulted in erroneous weight readings and erroneous HAFR interlocks. This problem is not easily corrected and was, therefore, continued throughout the project.

m. Water Jacket on Auger Chute

The water jacket is designed to keep the auger and auger chute cool during processing of high British Thermal Unit (BTU) materials; however, the moisture in the soil processed was enough to keep the auger and auger chute at a cool operating temperature. The water jacket was used until it developed a leak allowing the water to come in contact with the contaminated soil inside of the kiln. The water in the water jacket was also used for the ash drag makeup water and could have carried contamination from the feed auger to the ash drag, thus potentially contaminating the processed soil and jeopardizing delisting and the site cleanup criteria.

## SECTION VI CONCLUSIONS AND RECOMMENDATIONS

## A. CONCLUSIONS

The following conclusions were reached as a result of this evaluation. Significant observations are discussed and, where appropriate, recommendations are proposed.

Over the course of the soils incineration operation (the period from November 25, 1987 through November 19, 1988), a total of 26,058.4 tons of soil were processed. This evaluation indicates that the soil composition not only had a significant effect on feed and processing rates, but also on equipment unscheduled maintenance. For example, the months of August and September 1988, required a higher maintenance effort than the preceding months. This was, in part, caused by equipment wear-out (shredder), but was also heavily influenced by a larger-than-usual quantity of steel and large rocks in the soil.

A total of 1,223 maintenance records, which are comprised of 358 scheduled events and 865 unscheduled events, were evaluated. These scheduled and unscheduled maintenance events resulted in component or system downtime for 1,521.6 hours and 899.1 hours, respectively. The system feed auger was shut down for approximately 86% of the unscheduled maintenance events and 98% of the scheduled events. Additionally, 1,081 instrumentation interlock (specific system monitoring set points) records were retained for evaluation. These records showed that a total of 14,461 interlock alarms were received that accounted for 393.7 hours of system downtime. Overall, scheduled maintenance accounts for 56.1% of system downtime, unscheduled maintenance 29.1%, and system interlocks 14.8%.

A few maintenance events were caused by conditions external to the incinerator, e.g., weather and loss of area electrical power. The most significant of these occurred in September 1988. A hurricane alert and
electrical power failures resulted in 64.5 hours of the system downtime. The burning of system-generated trash accounted for an additional 77.7 hours.

The number of events requiring system shutdown dropped significantly during the months of February through June 1988. This is attributed to the system having gone through a break-in period.

The major components that were the largest contributors to the number of failure events and system or component downtimes were the weigh hopper (01), shredder (02), kiln (05), ash drag (06), and system instrumentation (21). Of these components, the shredder required the most maintenance time. In fact, the shredder had to be replaced in September. After the shredder, the kiln and ash drag required the most maintenance time.

The data for most of the components exhibited a random, but somewhat cyclic nature. Only the shredder showed typical wear-out traits that could be compared to the so-called bathtub curve. However, looking at the data overall, typical wear-out patterns are apparent. For those components that required the most maintenance, the amount of system downtime might have been reduced if: (1) necessary spare parts or components were made immediately available and (2) if scheduled (preventive) maintenance had been maintained at a constant level throughout the program (or, adjusted to reflect changes in the unscheduled maintenance rate). Another indicator that should be considered in establishing rates is the component MTBF data.

Instrumentation interlock events also contributed significantly to the number of events and system downtime, especially in the early stages of the program. The LKOD, LKOT, LRT, and HAFR were the largest contributors. Combined, these interlocks accounted for 83% of the number of interlock events and 73% of the interlock related downtime.

The above comments emphasize the problems and potential results that can be experienced in a program of this nature. Because it is not possible to anticipate exactly what will be encountered in the soil, it becomes more

important that the worst be anticipated. Equipment should be as new and up-to-date as possible, an adequate parts inventory should be maintained, and a good preventive maintenance program should be developed and maintained. Equipment that may have minimized system downtime are: (1) magnets to remove metals from the shredder, (2) a sizer to reduce large items to a size easily handled by the shredder, (3) a larger shredder that cculd handle the types of materials encountered, and (4) screens (possibly a rotating type) that could sort large items out of the feed stream. Before any of these or similar equipment is used, a cost/benefit analysis should be performed.

The overall availability of the incinerator was 68%. This is based on the total available hours for the 360 days of soil processing versus the total downtime for scheduled maintenance, unscheduled maintenance, and instrumentation interlocks of 2,648 hours or 110 days.

#### B. RECOMMENDATIONS

The following are items that contributed to the availability of the incinerator. Most of these were corrected at some time during the project, while others need corrective action for future projects.

1. Trunnion Rollers

The original trunnion rollers for the kiln were hollow with the bearing plates welded to them. Several of these rollers broke prompting a change to a solid roller. As each hollow roller broke, it was replaced with the new solid type. The solid trunnion rollers cost \$2,626 each.

The first trunnion roller to break caused the incinerator to be shut down for approximately 6 hours. This was largely because of the incinerator configuration during the initial setup. The settling bin had been placed between the control room and the kilns, allowing very little room for equipment maneuverability. The settling bin had to be removed before the trunnion roller could be replaced. The settling bin was moved to a new location to prevent a recurrence of this situation.

#### 2. Shredder

During the project, a large volume of protective clothing, wood, ground cloth, and other waste products that required incineration were generated. The shredder used for the first 9 months of the project was inadequate to shred this material for incineration. In the latter part of August 1988, this shredder broke down. The time for repair was estimated to be approximately 2 weeks, as bearings had to be ordered from the factory. A decision was made at that time to purchase a used, larger shredder (Saturn Model No. 5232HT) that would perform much better. Table 23 lists the specifications for the 5232HT shredder. This new shredder also eliminated the need for a wood chipper to cut approximately 600 railroad ties being used by the project for loading and unloading ramps. The shredder was received and installed within a few days, solving many problems. A shredder with similar capabilities should be used for future remediation projects.

Although it did require several attempts to sharpen the teeth, the project was completed with the one set of teeth for the larger shredder.

3. Kiln Seals

The first set of seals (front and back) for the kiln wore out within a few months. When a new set of seals was installed in March, it was suggested a lubricant be used to reduce the friction during the constant rotation of the kiln. Periodically using Molylub<sup>R</sup> allowed the seals to last through the remainder of the project.

4. Weigh Hopper/Feed System

A necessary design change for future soil incineration projects would be to separate the weighing system from the shredder. The system used had the weigh hopper first and then the shredder; whereas, a better system would be to place the shredder first and then a weighing system completely separate from the shredder. This would eliminate the fluctuations in recorded weights on the computer monitoring system as the shredder bounced around trying to shred rocks and wood. This was especially noticeable during September after the installation of the new shredder, when large

|   | 5232HT             |
|---|--------------------|
| No. of Motors                                     | 2                  |
| HP of Motors                                      | 75                 |
| Total Electric Motor HP                           | 150                |
| No. of Hydraulic Pumps                            | 2                  |
| Hydraulic Pump Displacement (Cu In/Rev/Pump)      | 8.69               |
| Total Flow to Hydraulic Motor (GPM)               | 135.40             |
| Hydraulic Motor                                   | MRH 525            |
| Hydraulic Motor Displacement (Cu In/Rev)          | 523.90             |
| Hydraulic Motor Shaft Speed (RPM)                 | 59.70              |
| Hydraulic Motor Torque (ft-#'s)                   | 15,941             |
| Shaft Torque (Ft-#'s)<br>Slow Shaft<br>Fast Shaft | 46,771<br>33,875   |
| Gear Ratio<br>Slow Shaft<br>Fast Shaft            | 2.934:1<br>2.125:1 |
| Shaft Speed (RPM)<br>Slow Shaft<br>Fast Shaft     | 20.30<br>28.10     |
| Cutter diameter (inches)                          | 15.75              |
| Tooth Force (1bs)                                 | 71,270             |
|   |                    |

# TABLE 23. SATURN 5232HT SHREDDER SPECIFICATIONS

ř.

すたかしところでいたとうでない

1.1

' }

137

.

rocks were being processed. On a couple of days, the computer saw weight changes in the weigh hopper equal to 100 tons, when the actual tonnage processed was in the 60-ton range according to the weigh hopper log sheets. Under the same conditions as this project, a conveyor weigh system may probably work better.

5. Water Jacket on Auger Chute

The water jacket is designed to keep the auger and auger chute cool during processing of high BTU materials. The moisture in the soil processed was enough to keep the auger and auger chute at a cool operating temperature. For a similar soil processing project it would probably not be necessary to have this feature. A solid auger chute would be adequate to perform soil processing.

6. Feed Auger

The original feed auger for the kiln had to be replaced in late February 1988 because of excessive wear (approximately one inch) to the auger flights. At that time it was determined that a uniform 12 inch pitch for the auger flights would work best. The replacement auger was fabricated with the uniform 12 inch pitch for all auger flights. Other feed auger design changes are discussed below.

7. Auger Shear Bolt

As the first feed auger wore down, it started to wobble inside the auger chute. This wobbling caused the auger shear bolt holes to become elongated (out of round). Although a new auger was installed, the wobbling effect could still take place because of the space around the shear bolt holes. This wobbling caused the shear bolts to snap, which in turn meant an hour or two of downtime to dig the soil out of the feed hopper to replace the bolts. A change in design, placing the shear bolts on the auger shaft outside of the feed hopper was made, expediting this procedure.

## 8. Overlay on Auger Flights

The feed augers used on this project were fabricated from stainless steel. The first auger processed 3,325 tons of soil before wearing the flights down to the point that the auger wobbled in the auger chute causing the shear bolts to break several times. To minimize the feed auger wear, a 2-inch tungsten carbide cap was plated onto the first replacement auger. The auger with overlay processed 11,429 tons of soil before being replaced with a similar type. Measurements showed the auger flights had been worn approximately 1/2 inch. If left in place, this auger would have processed the remaining 6,500 tons of soil.

9. Setting Process Equipment on Contaminated Plots

During the initial setup of the incinerator in the fall of 1986, the weigh hopper/conveyor system was set on plots already characterized as being contaminated. As the project neared completion, it became necessary to move the weigh hopper/conveyor system to complete soil excavation. The unit downtime to complete this change was approximately four days, at a cost of \$100,000 (based on an estimated cost of \$25,000 per day). For the NCBC Demonstration Project, setting equipment on contaminated plots was unavoidable. Regardless of the original positioning of the equipment, it had to be moved to complete soil excavation.

10. Using Gunnite<sup>R</sup> As Replacement for Refractory Brick

In early March 1988, during a schedule outage, a decision was made to replace some of the loose refractory brick. Rather than replacing the loose brick with new brick, a decision, based on the vendor's evaluation, was made to patch the area with Gunnite<sup>3</sup> (a grout type material). The Gunnite<sup>3</sup> patch lasted less than two weeks, at which time the unit was shut down again to make repairs. The second repair was made using refractory brick.

It is very probable that the Gunnite<sup>R</sup> material would hold up under normal operating conditions; however, the abrasive materials that were being processed at NCBC probably contributed to the early failure of the Gunnite<sup>3</sup>.

### 11. Particulate Carryover

Particulate carryover from the kiln into the SCC, packed tower, and boiler was the major contributor to scheduled maintenance downtime. Scheduled outages were always based on the quantity of particulate in the SCC. usually 20-25% of SCC capacity. In the early stages of soil processing, those outages occurred approximately every 30 days. Particulate carryover was reduced dramatically, starting in March 1988, by slowing the rotation of the kiln, and lowering the draft through the system, resulting in a scheduled outage for maintenance occurring every 59 days for the remainder of the project. The particulate was cleaned from the SCC, boiler, and packed tower every scheduled outage. In addition, it was often necessary (approximately every 7 to 10 days), to shut down the system for 2 to 4 hours to clean the boiler tubes or scrape the boiler face. These outages were usually classified as unscheduled maintenance. The operating changes mentioned above were made to minimize the inadequacy of the cyclone separators. To fully resolve the particulate carryover problem, a change should be made in the design of the cyclones.

### 12. Preventive Maintenance

The lack of a comprehensive preventive maintenance program was another major contributor to system availability. In this case, it was usually in the form of unscheduled maintenance. The lack of a preventive maintenance program resulted in either finding mechanical problems during scheduled outages or the part or subsystem failing during operations. Depending on the part or subsystem, a failure during operations often resulted in a shut down of the incinerator.

### SECTION VII REFCRENCES

- Crockett, A. B., Propp, A., and Kimes, T., EG&G Idaho, Inc., <u>Herbicide</u> <u>Orange Site Characterization Study Naval Construction Battalion Center</u>, ESL-TR-85-21, Headquarters, Air Force Engineering and Services Center, Tyndall Air Force Base, Florida, April 1987.
- Haley, D. J. and Thomas, R. W., EG&G Idaho, <u>Full-Scale Incinerator</u> <u>System Demonstration at the Naval Construction Battalion Center</u>, <u>Gulfport, MW Volume II: Verification Burn for the USAF Installation</u> <u>Restoration Program</u>, ESL-TR-89-39, Headquarters, Air Force Engineering and Services Center, Tyndall Air Force Base, Florida, (in press).

# APPENDIX A SCHEDULED MAINTENANCE FORM

Carrier and the second

and the state of the second state of the second

Shirle to be read

143 (The reverse of this page is blank.)

## SCHEDULED MAINTENANCE REPORT FORM

1 S 15 15 ---

Sec. and the second

and the second secon

| (item or Component    | Maintained)              |   | (Sub system Number)      |        |
|-----------------------|--------------------------|---|--------------------------|--------|
|                       |                          |   | (Component Number)       |        |
| (Date)                | (Hours Minutes)          | Time system went dow  | vn                       |        |
| Datei                 | Hours Minutes)           | Time system operation   | a resumed                |        |
| Date)                 | (Hours Minutes)          | Total system down tim   | <b>9</b> .               |        |
| Date                  | (Hours Minutes)          |   | down                     |        |
| Date)                 | (Hours Minutes)          | Time component oper   | ational                  |        |
|                       | (Hours Minutes)          |   | ple to this maintenance. |        |
|                       | (Hours Minutes)          | Time to switch to redu  | indant system, if used.  |        |
| Comments (Use pa      | ck of form if additional | i space is needed)  |                          |        |
|                       |                          |   |                          |        |
|                       |                          |   |                          |        |
|                       |                          | ال الله المحمول المحمول الله الله الله الله المحمول الله الله الله الله الله الله الله ال |                          |        |
| and ude in comment    | ts the root-cause (com   | ponent failure] of maintenai  | nce)                     |        |
| Estimated cost asso   | crated with maintenan    | cerrepair:  |                          |        |
| Labor                 |                          | (man hours)   |                          |        |
| Par*s                 |                          |   |                          |        |
| Could design modifi   | cation have prevented    | l problem?  |                          |        |
|                       |                          | No  |                          |        |
| Person completing     | (cim)                    | (Date) .  | (Pevewor)                | (Date) |
|                       |                          |   |                          |        |
| Note: Record all iter | ms repaired whether h    | The Dirug cause the overall<br>The I have   | plant to shut down!      |        |

and the second second second

ないでない。

1. A.

.

# APPENDIX B

### UNSCHEDULED MAINTENANCE FORM

147 (The reverse of chis page is blank.)

# UNSCHEDULED MAINTENANCE REPORT FORM

(Description of Item Repaired)

2

(Sub system Number)

(Component Number)

|        |                   | . Time system went down                           |
|--------|-------------------|---|
| (Date) | (Hours : Minutes) |   |
|        |                   | Time system operation resumed.                    |
| (Date) | (Hours Minutes)   |   |
|        |                   | _ Total system down time.                         |
| (Date) | (Hours : Minutes) |   |
|        |                   |   |
| (Date) | (Hours : Minutes) |   |
|        |                   | _ Time component operational                      |
| (Date) | (Hours : Minutes) |   |
|        |                   | _ 10 Total time attributable to this repair* or   |
|        | (Hours : Minutes) | Repair time (check which)                         |
|        |                   | "(Total repair time includes administrative time) |
|        |                   | _ Time to switch to redundant system, if used.    |
|        | (Hours : Minutes) |   |

Where was component repaired? (circle) on-site/off-site is above component downtime attributable to:

Demand failure

ながらないないないで、ないできたので、

C Operational failure

2. Preventive maintenance

Comments: (Use back of form if additional space is needed)

| Include in comments the root-cause (o  | component failure) of mainte | enance)                 |        |
|--|------------------------------|-------------------------|--------|
| Estimated cost associated with mainter | nance/repair: Labor          | (man hours)             |        |
|  | Parts                        |                         |        |
| Could preventive maintenance have pr   | evented problem?             | Yes No                  |        |
| Could design modification have prever  | ited problem? Yes            | No                      |        |
|  |                              |                         |        |
| Person completing form)                | (Date)                       | (Reviewer)              | (Date) |
| Note: Record all items repaired whethe | ar or not they cause the eve | and plant to shut down! |        |
| total i secta al tonis repaised whethe | an or not may cause the ove  | nan prant to shut down. |        |
| ,                                      | 149<br>The meyones of this   | and is black )          |        |
| (                                      | The reverse of this          | page is blank.)         |        |

APPENDIX C MAINTENANCE DATA BASE L

151 (The reverse of this page is blank.)

.

.

.

and the second second

| RECORD<br>NUMBER | DATE     | TYPE    | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|---------|-----------------------|------------------------|-----------------------|---------------|---------------|-----------|--------------------------------------|
| 1                | 11/25/87 | U       | 04                    | 04                     | 10                    | 0.00          | 0             | PL        | -                                    |
| 2                | 11/27/87 | U       | 0508                  | 05                     | 433                   | 0.00          | ŏ             | PL        | -                                    |
| 3                | 11/2//8/ | U       | 0304                  | 03                     | 3                     | 0.00          | 0             | BD        | +                                    |
| 4                | 11/2//8/ | 2       | 2103                  | 21                     | 8                     | 0.00          | 0             | CL        | -                                    |
| 5                | 11/2//0/ | U<br>1  | 0202                  | 02                     | 3                     | 0.00          | 0             | PL        | +                                    |
| 7                | 11/27/97 |         | 0503                  | 05                     | 30                    | 0.00          | 0             | FO        | -                                    |
| ,<br>8           | 11/28/87 | 1       | 06                    | 0                      | 0                     | 0.00          | 0             | LP        | -                                    |
| 9                | 11/26/87 | Ŭ<br>Ŭ  | 05                    | 00                     | 23                    | 0.00          | 0             | UN        | -                                    |
| 10               | 11/28/87 | ŭ       | 0508                  | 05                     | 1089                  | 0.00          | 0             | UN        | -                                    |
| 11               | 11/28/87 | Š       | 2103                  | 21                     | 300                   | 0.00          | 0             | PL        | -                                    |
| 12               | 11/29/87 | Ŭ       | 01                    | 01                     | 55                    | 0.00          | 0             |           | -                                    |
| 13               | 11/29/87 | Ŭ       | 01                    | 01                     | 32                    | 0.00          | 0<br>C        |           | +                                    |
| 14               | 11/29/87 | U       | 01                    | 01                     | 11                    | 0.00          | 0             | PI        | -                                    |
| 15               | 11/30/87 | S       | 2103                  | 21                     | 35                    | 0.00          | õ             | CL        |                                      |
| 10               | 11/30/87 | U       | 0503                  | 05                     | 321                   | 0.00          | ŏ             | FÖ        | •                                    |
| 10               | 11/30/8/ | U       | 0802                  | 80                     | 920                   | 0.00          | 0             | FO        | -                                    |
| 10               | 11/30/8/ | U       | 04                    | 04                     | 3                     | 0.00          | 0             | PL        | +                                    |
| 20               | 12/01/87 | U<br>11 | 0503                  | 05                     | 7                     | 0.00          | 0             | FO        | -                                    |
| 21               | 12/02/87 | U<br>U  | 0303                  | 03                     | 12                    | 0.00          | 0             | FO        | -                                    |
| 22               | 12/03/87 | Ŭ       | 0503                  | 05                     | 10                    | 0.00          | 0             | UN<br>FO  | +                                    |
| 23               | 12/03/87 | Ũ       | 0302                  | 03                     | 39                    | 0.00          | 0             |           | -                                    |
| 24               | 12/03/87 | S       | 2103                  | 21                     | 108                   | 0.00          | ŏ             |           | -                                    |
| 25               | 12/05/87 | S       | 2103                  | 21                     | 6                     | 0.00          | õ             | ČĹ        | -                                    |
| 25               | 12/05/87 | ·U      | 0101                  | 01                     | 91                    | 0.00          | Û             | UN        | -                                    |
| 20               | 12/05/8/ | U       | 210202                | 21                     | 30                    | 0.00          | 0             | UN        | -                                    |
| 29               | 12/05/87 | U<br>11 | 0503                  | 05                     | 71                    | 0.00          | 77            | MA        | -                                    |
| 30               | 12/05/87 | 11      | 0503                  | 05                     | 19                    | 0.00          | 0             | FO        | -                                    |
| 31               | 12/06/87 | š       | 2103                  | 21                     | 30                    | 0.00          | 0             | FO        | -                                    |
| 32               | 12/06/87 | Ũ       | 0202                  | 02                     | 26                    | 0.00          | 0             |           | -                                    |
| 33               | 12/06/87 | U       | 0202                  | 02                     | 12                    | 0.00          | 0             |           | -                                    |
| 34               | 12/07/87 | S       | 230204                | 23                     | 30                    | 0.00          | ů<br>Č        | MΔ        | -                                    |
| 35               | 12/07/87 | U       | 0202                  | 02                     | 59                    | 0.00          | õ             | BD        | т<br>-                               |
| 36               | 12/07/87 | S       | 0                     | 0                      | 6981                  | 0.00          | ō             | MA        | •                                    |
| 3/               | 12/07/87 | S       | 1001                  | 10                     | 0                     | 4.00          | Ō             | MA        |                                      |
| 38               | 12/07/87 | S       | 1701                  | 17                     | 0                     | 1.00          | Ó             | MA        |                                      |
| 39               | 12/07/8/ | S       | 1301                  | 13                     | C                     | 1.00          | 0             | MA        |                                      |
| 40               | 12/0//8/ | 2       | 08                    | 08                     | 0                     | 8.00          | 975           | MA        |                                      |

| INCIN            | ERATUR (MWP | -2000) | SCHEDULEI             | J AND UN               | ISCHEDUL              | ED MAININ     | ENANCE D      | ATABASE - Co | nt'd                                 |
|------------------|-------------|--------|-----------------------|------------------------|-----------------------|---------------|---------------|--------------|--------------------------------------|
| RECORD<br>NUMBER | DATE        | TYPE   | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE    | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
| 41               | 12/07/87    | S      | 0502                  | 05                     | 0                     | 12.00         | 0             | MA           |                                      |
| 42               | 12/07/87    | S      | 0801                  | 08                     | 0                     | 4.00          | 0             | MA           |                                      |
| 43               | 12/07/87    | 2      | 1001                  | 10                     | 0                     | 1.00          | 0             | MA           |                                      |
| 44               | 12/07/07    | ы<br>П | 2103                  | 21                     | 4.5                   | 0.00          | 0             |              | -                                    |
| 40               | 12/12/87    | 11     | 0503                  | 05                     | 4                     | 0.00          | 0             | FU<br>50     | -                                    |
| 47               | 12/12/87    | ŭ      | 0503                  | 05                     | 4                     | 0.00          | 0             | FU<br>F0     | •                                    |
| 48               | 12/12/87    | ŭ      | 0503                  | 05                     | 3                     | 0.00          | 0             | FO           | -                                    |
| 49               | 12/12/87    | Ũ      | 0503                  | 05                     | 5                     | 0.00          | ŏ             | FO           | -                                    |
| 50               | 12/12/87    | U      | 0503                  | 05                     | 63                    | 0.00          | ŏ             | FO           | -                                    |
| 51               | 12/13/87    | U      | 0503                  | 05                     | 67                    | 0.00          | 0             | FO           | •                                    |
| 52               | 12/13/87    | U      | 0503                  | 05                     | 5                     | 0.00          | 0             | FO           | -                                    |
| 53               | 12/13/87    | U      | 01                    | 01                     | 10                    | 0.00          | 0             | PL           | +                                    |
| 54               | 12/13/8/    | Ű      | 0503                  | 05                     | 13                    | 0.00          | 0             | FO           | -                                    |
| 55               | 12/13/07    | 2<br>7 | 1002                  | 0                      | 1/32                  | 0.00          | 0             | MA           | •                                    |
| 57               | 12/13/87    | S      | 2103                  | 21                     | 0                     | 4.00          | 0             | MA<br>MA     |                                      |
| 58               | 12/13/87    | Š      | 210205                | 21                     | ŏ                     | 0.00          | õ             | MΔ           |                                      |
| 59               | 12/13/87    | Ŭ      | 0503                  | 05                     | 8                     | 0.00          | õ             | FO           | -                                    |
| 60               | 12/13/87    | U      | 0202                  | 02                     | 132                   | 0.00          | Ō             | BD           | -                                    |
| 61 .             | 12/13/87    | U      | 0503                  | 05                     | 6                     | 0.00          | 0             | FO           | -                                    |
| 62               | 12/13/87    | U      | 01                    | 01                     | 13                    | 0.00          | 0             | PL           | -                                    |
| 63               | 12/13/8/    | U ·    | 0503                  | 05                     | 9                     | 0.00          | 0             | FO           | -                                    |
| 04<br>65         | 12/13/8/    | U<br>U | 0502                  | 01                     | 10                    | 0.00          | 0             | PL           | +                                    |
| 66               | 12/13/87    |        | 0503                  | 05                     | 10                    | 0.00          | 0             | FU<br>50     | -                                    |
| 67               | 12/13/87    | ŭ      | 01                    | 01                     | 4                     | 0.00          | 0             |              | -                                    |
| 68               | 12/13/87    | Ū      | 01                    | 01                     | 4                     | 0.00          | õ             | PI           | +<br>+                               |
| 69               | 12/13/87    | U      | 0503                  | 05                     | 3                     | 0.00          | Ō             | FO           | -                                    |
| 70               | 12/13/87    | U      | 01                    | 01                     | 6                     | 0.00          | 0             | PL           | +                                    |
| 71               | 12/13/87    | Ŭ      | 0503                  | 05                     | 6                     | 0.00          | 0             | FO           | -                                    |
| 12               | 12/15/8/    | U      | 0503                  | 05                     | 6                     | 0.00          | 0             | FO           | -                                    |
| 73               | 12/15/8/    | 0      | 01                    | 01                     | 16                    | 0.00          | _0            | PL           | -                                    |
| 75               | 12/15/07    | 0      | 0411                  | 04                     | 12                    | 0.00          | //            | UN           | -                                    |
| 76               | 12/15/87    | 1      | 0304                  | 01                     | 4                     | 0.00          | 0             | PL           | +                                    |
| 77               | 12/16/87    | Ŭ      | 0306                  | 03                     | 5                     | 0.00          | n             |              | -                                    |
| 78               | 12/17/87    | บิ     | 0304                  | 03                     | 240                   | 0.00          | õ             | PI           | -<br>-                               |
| 79               | 12/17/87    | U      | 0304                  | 03                     | 1                     | 0.00          | õ             | PL           | +                                    |
| 80               | 12/17/87    | IJ     | 0304                  | 03                     | 6                     | 0 00          | ñ             | DI           |                                      |

"如外"为"是可以不是"的"""。

如此是一些,我们就是我们的是是是一些,我们就是我们的。"

.

.

1.

¢

+

あてんかった えいち したい かけないないでき

| RECORD<br>NUMBER  | DATE   | TYPE                                  | SUB-<br>COMP.<br>CODE   | MAJOR<br>COMP.<br>CODE  | TIME<br>DOWN<br>(min)   | LABÓR<br>(hr)  | PARTS<br>(\$)   | FAIL MODE  | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|---|--|---------------------------------------|---|---|---|--|---|--|--------------------------------------|
| 81<br>82<br>83<br>84<br>85<br>86<br>87<br>89<br>90<br>91<br>92<br>93<br>94<br>95<br>97<br>99<br>90<br>101<br>102<br>103<br>104<br>105 | 12/17/87<br>12/17/87<br>12/17/87<br>12/17/87<br>12/17/87<br>12/17/87<br>12/18/87<br>12/18/87<br>12/18/87<br>12/19/87<br>12/19/87<br>12/19/87<br>12/20/87<br>12/20/87<br>12/21/87<br>12/21/87<br>12/21/87<br>12/21/87<br>12/21/87<br>12/21/87 | ~~~~~~~~~~~~~~~~~~~                   | 2103<br>0503<br>2103<br>0304<br>0503<br>0304<br>01<br>2103<br>0503<br>0503<br>0503<br>2103<br>050608<br>2103<br>160105<br>0<br>1001<br>1301<br>0504<br>1002<br>1603<br>08<br>050801<br>160105<br>0501 | 21<br>05<br>21<br>03<br>05<br>03<br>01<br>21<br>05<br>05<br>21<br>05<br>21<br>16<br>0<br>10<br>13<br>05<br>10<br>16<br>05<br>16<br>05 | 30<br>21<br>11<br>6<br>15<br>3<br>8<br>30<br>33<br>24<br>40<br>60<br>58<br>33<br>24<br>40<br>60<br>58<br>33<br>30<br>9000<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | $\begin{array}{c} 0.00\\$ | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0     | CL<br>FO<br>CL<br>FO<br>PL<br>FO<br>FO<br>CL<br>A<br>CL<br>PL<br>A<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA | - + - + + + -                        |
| 106<br>107<br>108<br>109<br>110<br>111<br>112<br>113<br>114<br>115<br>116<br>117<br>118<br>119<br>120                                 | 12/28/87<br>12/28/87<br>12/28/87<br>12/28/87<br>12/29/87<br>12/29/87<br>12/29/87<br>12/29/87<br>12/29/87<br>12/29/87<br>12/30/87<br>12/31/87<br>12/31/87<br>12/31/87   | , , , , , , , , , , , , , , , , , , , | 180102<br>0202<br>0202<br>01<br>0503<br>0304<br>01<br>01<br>2103<br>01<br>2102<br>0504<br>2103<br>020302  | 18<br>02<br>01<br>05<br>03<br>01<br>07<br>21<br>01<br>21<br>05<br>21<br>05<br>21<br>02  | 180<br>121<br>8<br>13<br>2<br>109<br>7<br>7<br>7<br>7<br>12<br>70<br>210<br>360<br>0  | 24.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00  | 124<br>224<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | MA<br>MA<br>PL<br>PL<br>FO<br>PL<br>HE<br>LP<br>LP<br>LP<br>MA<br>CL<br>MA   | +                                    |

155

...

;

| RECORD<br>NUMBER | DATE     | ΤΥΡΕ   | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|--------|-----------------------|------------------------|-----------------------|---------------|---------------|-----------|--------------------------------------|
| 121              | 12/31/87 | U      | 1002                  | 10                     | 0                     | 1.00          | 0             | MA        | -                                    |
| 122              | 12/31/87 | U      | 0802                  | 08                     | 210                   | 0.00          | 0             | FO        | -                                    |
| 123              | 01/01/88 | U      | 0503                  | 05                     | 13                    | 0.00          | 0             | FO        | -                                    |
| 124              | 01/02/88 | Ŭ      | 0202                  | 02                     | 25                    | 0.00          | 0             | PL        | -                                    |
| 125              | 01/02/88 | 5      | 2103                  | 21                     | 11                    | 0.00          | 0             | CL        | -                                    |
| 120              | 01/02/88 | 0      | 0304                  | 03                     | 43                    | 0.00          | 0             | PL        | •                                    |
| 127              | 01/02/08 | 11     | 01                    | 01                     | 9                     | 0.00          | 0             | MA<br>DI  | -                                    |
| 120              | 01/02/88 | Ŭ      | 01                    | 01                     | 25                    | 0.00          | 0             |           | +                                    |
| 130              | 01/03/88 | ŭ      | 0201                  | 02                     | 11                    | 0.00          | 0             | MA        | -                                    |
| 131              | 01/03/88 | Š      | 0                     | 0                      | 253                   | 0.00          | ŏ             | MA        | -                                    |
| 132              | 61/03/88 | S      | 1603                  | 16                     | 0                     | 2.00          | Õ             | MA        |                                      |
| 133              | 01/03/88 | S      | 1002                  | 10                     | 0                     | 0.50          | 0             | MA        |                                      |
| 134              | 01/03/88 | S      | 09                    | 09                     | 0                     | 1.00          | 0             | MA        |                                      |
| 135              | 01/03/88 | S      | 0507                  | 05                     | 0                     | 1.00          | 0             | MA        |                                      |
| 136              | 01/03/88 | U      | 01                    | 01                     | 32                    | 0.00          | 0             | PL        | -                                    |
| 13/              | 01/03/88 | 0      | 0201                  | 01                     | 18                    | 0.00          | 0             | PL        | -                                    |
| 130              | 01/03/88 | 0      | 0201                  | 02                     | 108                   | 0.00          | 0             | MA<br>RD  | -                                    |
| 139              | 01/04/88 | s      | 2103                  | 21                     | 25                    | 0.00          | 0             | 60<br>CI  | -                                    |
| 141              | 01/04/88 | Ű      | 2114                  | 21                     | 30                    | 0.00          | 0             |           | -                                    |
| 142              | 01/04/88 | Ŭ      | 2112                  | 21                     | 40                    | 0.00          | 313           | MA        | +<br>-                               |
| 143              | 01/05/88 | S      | 2103                  | 21                     | 6                     | 0.00          | 0             | CL        | -                                    |
| 144              | 01/05/88 | U      | 0701                  | 07                     | 30                    | 0.00          | Ō             | PL        | +                                    |
| 145              | 01/05/88 | U      | 0508                  | 05                     | 93                    | 0.00          | 0             | PL        | -                                    |
| 146              | 01/05/88 | Ū      | 0503                  | 05                     | 18                    | 0.00          | 0             | FO        | -                                    |
| 14/              | 01/05/88 | U      | 260304                | 26                     | 27                    | 0.00          | 0             | PL        | +                                    |
| 148              | 01/06/88 | U      | 040101                | 04                     | 118                   | 0.00          | 0             | MA        | -                                    |
| 149              | 01/06/88 | 5<br>c | 180201                | 18                     | 120                   | 0.00          | 309           | MA        | -                                    |
| 150              | 01/07/88 | s<br>c | 1405                  | 14                     | 6006                  | 0.00          | 303           | MA<br>MA  | -                                    |
| 152              | 01/11/88 | 1      | 180102                | 18                     | 1313                  | 0.00          | 0             | MA<br>MA  | -                                    |
| 153              | 01/11/88 | ŭ      | 180102                | 18                     | 1313                  | 0.00          | 0<br>0        | MA        | +                                    |
| 154              | 01/12/88 | Š      | 0                     | 0                      | 1327                  | 0.00          | ŏ             | MA        | -                                    |
| 155              | 01/12/88 | S      | 180102                | 18                     | 0                     | 3.00          | 224           | MA        |                                      |
| 156              | 01/12/88 | S      | 160103                | 16                     | 0                     | 2.00          | 0             | MA        |                                      |
| 157              | 01/12/88 | S      | 040303                | 04                     | 0                     | 1.00          | 666           | MA        |                                      |
| 158              | 01/12/88 | U      | 0802                  | 08                     | 19                    | 0.00          | 0             | FO        | -                                    |
| 159              | 01/12/88 | S      | 180102                | 18                     | 180                   | 0.00          | 224           | MA        | +                                    |
| 160              | 01/12/88 | U      | 0408                  | 04                     | 7                     | 0.00          | 160           | MA        | -                                    |

| RECORD<br>NUMBER | DATE     | TYPE   | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|--------|-----------------------|------------------------|-----------------------|---------------|---------------|-----------|--------------------------------------|
| 161              | 01/12/88 | U      | 0202                  | 02                     | 7                     | 0.00          | 0             | Di        | L                                    |
| 162              | 01/12/88 | U      | 01                    | 01                     | 6                     | 0.00          | ň             | PI        | <b>+</b>                             |
| 163              | 01/13/88 | U      | 01                    | 01                     | õ                     | 0 00          | õ             | DI        | <b>+</b>                             |
| 164              | 01/13/88 | U      | 040101                | 04                     | 26                    | 0 00          | ň             | MA        | т<br>-                               |
| 165              | 01/13/88 | U      | 0402                  | 04                     | 3                     | 0 00          | ŏ             | MΔ        | -                                    |
| 166              | 01/13/88 | S      | 2103                  | 21                     | 33                    | 0.00          | ŏ             | 000<br>Cl | +                                    |
| 167              | 01/14/88 | S      | 2101                  | 21                     | 30                    | 0.00          | õ             | MA        | -                                    |
| 168              | 01/14/88 | U      | 010102                | 01                     | 0                     | 0.00          | õ             | IIN       | +                                    |
| 169              | 01/14/88 | S      | 010102                | 01                     | 98                    | 2.50          | 670           | MΔ        | +                                    |
| 170              | 01/15/88 | U      | 0304                  | 03                     | 6                     | 0.00          | 0.0           | Pi        | -                                    |
| 171              | 01/15/88 | U      | 0304                  | 03                     | 3                     | 0.00          | ŏ             | PI        | +                                    |
| 172              | 01/15/88 | U      | 01                    | 01                     | 14                    | 0.00          | Ő             | MΔ        | Ŧ                                    |
| 173              | 01/15/88 | U      | 04                    | 04                     | 2                     | 0.00          | ŏ             | PI        |                                      |
| 174              | 01/15/88 | U      | 01                    | 01                     | 43                    | 0.00          | Ő             | Pl        | +                                    |
| 175              | 01/15/88 | S      | 2103                  | 21                     | 10                    | 0.00          | ŏ             |           | -                                    |
| 176              | 01/15/88 | U      | 0304                  | 03                     | 14                    | 0.00          | ů             | MA        | -                                    |
| 177              | 01/16/88 | S.     | 2103                  | 21                     | 14                    | 0.00          | ŏ             | CI        | -                                    |
| 178              | 01/16/88 | U      | 01                    | 01                     | 5                     | 0.00          | Õ             | PL        | +                                    |
| 179              | 01/16/88 | U      | 1002                  | 10                     | 50                    | 0.00          | Ō             | MA        | -                                    |
| 180              | 01/16/88 | U      | 0401                  | 04                     | 4                     | 0.00          | Ō             | PL        | -                                    |
| 181              | 01/16/88 | ij     | 01                    | 01                     | 20                    | 0.00          | 0             | PL        | -                                    |
| 182              | 01/17/88 | U      | 16                    | 16                     | 210                   | ົງ.00         | 0             | PL        | -                                    |
| 183              | 01/17/88 | U      | 0401                  | 04                     | 4                     | 0.00          | 0             | MA        | -                                    |
| 184              | 01/17/88 | U      | 01                    | 01                     | 20                    | 0.00          | 0             | PL        | -                                    |
| 100              | 01/18/88 | U      | 04                    | 04                     | 1                     | 0.00          | 0             | PL        | -                                    |
| 100              | 01/18/88 | U      | 2103                  | 21                     | 67                    | 0.00          | 85            | CL        | -                                    |
| 107              | 01/18/28 | U      | 080204                | 08                     | 22                    | 0.00          | 0             | MA        | -                                    |
| 190              | 01/10/00 | U      | 01                    | 01                     | 9                     | 0.00          | 0             | PL        | -                                    |
| 109              | 01/10/00 | U      |                       | 01                     | 37                    | 0.00          | 0             | PL        | -                                    |
| 101              | 01/10/00 | 0      | 01                    | 01                     | 50                    | 0.00          | 0             | PL        | -                                    |
| 102              | 01/10/00 | U<br>U | 01                    | 01                     | 36                    | 0.00          | 0             | PL        | -                                    |
| 192              | 01/10/00 | 0      | 01                    | 01                     | 16                    | 0.00          | 0             | PL        | -                                    |
| 195              | 01/10/00 | 0      | 01                    | 10                     |                       | 0.00          | 0             | PL        | +                                    |
| 195              | 01/10/00 | 0      | 01                    | 01                     | 55                    | 0.00          | 0             | PL        | -                                    |
| 196              | 01/10/22 | c<br>c | 2102                  | 01                     | 5                     | 0.00          | 0             | PL        | +                                    |
| 197              | 01/10/80 | ы<br>П | C102                  | 21                     | 13                    | 0.00          | 0             | CL        | -                                    |
| 198              | 01/19/00 |        | 01                    | 01                     | 2                     | 0.00          | Q             | PL        | +                                    |
| 199              | 01/19/88 | н      | 01                    | 01                     | 1                     | 0.00          | 0             | PL        | +                                    |
| 200              | 01/20/88 | Š      | 0                     | 0                      | 11                    | 0.00          | 0             | PL        | +                                    |
|                  | ///      |        | ~                     | U                      | 170                   | 11 1111       | 414           | MA        |                                      |

| INCINERATOR (MWP-2000) | SCHEDULED AND | UNSCHEDULED | MAINTENANCE | DATABASE | -Cont' | d |
|------------------------|---------------|-------------|-------------|----------|--------|---|
|------------------------|---------------|-------------|-------------|----------|--------|---|

| RECORD<br>NUMBER | DATE                 | ΤΥΡΕ    | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------------------|---------|-----------------------|------------------------|-----------------------|---------------|---------------|-----------|--------------------------------------|
| 201<br>202       | 01/20/88<br>01/20/88 | S<br>S  | 1602<br>2112          | 16<br>21               | 0                     | 1.00<br>0.50  | 0<br>313      | ma<br>Ma  |                                      |
| 203              | 01/20/88             | S       | 0304                  | 03                     | 0                     | 0.00          | 0             | MA        |                                      |
| 204              | 01/20/88             | 3<br>11 | 0503                  | 10                     | 16                    | 0.50          | 0             | MA        |                                      |
| 206              | 01/20/88             | Š       | 2103                  | 21                     | 31                    | 0.00          | Ő             | CL        | -                                    |
| 207              | 01/20/88             | U       | 210301                | 21                     | 6                     | 0.00          | Ō             | CL        | -                                    |
| 208              | 01/21/88             | U       | 0202                  | 02                     | 2                     | 0.00          | 0             | BD        | +                                    |
| 209              | 01/21/88             | Ŭ       | 0202                  | 02                     | 00<br>3               | 0.00          | 0             | MA<br>Di  | +                                    |
| 211              | 01/21/88             | Ŭ       | 01                    | 01                     | 14                    | 0.00          | ŏ             | PL        | -                                    |
| 212              | 01/21/88             | U       | 0202                  | 02                     | 19                    | 0.00          | 0             | BD        | -                                    |
| 213              | 01/21/88             | 0       | 0503                  | 05                     | 200                   | 0.00          | 0             | FO        | -                                    |
| 215              | 01/22/88             | Ŭ       | 0503                  | 02                     | 46                    | 0.00          | 3512          | MA<br>FO  | -                                    |
| 216              | 01/22/88             | S       | 2103                  | 21                     | 13                    | 0.00          | ŏ             | CĽ        | -                                    |
| 217              | 01/22/88             | U       | 01                    | 01                     | 8                     | 0.00          | 0             | PL        | +                                    |
| 210              | 01/22/88             | U<br>Ll | 0202                  | 02                     | 10                    | 0.00          | 0             | PL        | +                                    |
| 220              | 01/22/88             | Ŭ       | 0202                  | 02                     | 5                     | 0.00          | 0             | PL        | +                                    |
| 221              | 01/22/83             | U       | 01                    | 01                     | 10                    | 0.00          | õ             | PL        | +                                    |
| 222              | 01/22/88             | U       | 0301                  | 03                     | 30                    | 0.00          | 0             | MA        | +                                    |
| 223              | 01/23/88             | U<br>S  | 2103                  | 03                     | 10                    | 0.00          | 0             | MA        | -                                    |
| 225              | 01/23/88             | Ŭ       | 0402                  | 04                     | 30                    | 0.00          | 0             | MA        | -                                    |
| 226              | 01/23/88             | U       | 0903                  | 09                     | 60                    | 0.00          | Õ             | MA        | +                                    |
| 227              | 01/23/88             | U<br>S  | 1002                  | 10                     | 21                    | 0.00          | 0             | MA        | -                                    |
| 229              | 01/24/88             | ง<br>1  | 180104                | 18                     | 9<br>30               | 0.00          | 0             | CL<br>DI  | -                                    |
| 230              | 01/24/88             | Ŭ       | 01                    | 01                     | 36                    | 0.00          | ŏ             | PL        | -                                    |
| 231              | 01/24/88             | U       | 0                     | 0                      | 20                    | 0.00          | 0             | HE        | -                                    |
| 232              | 01/25/88             | 0       | 0407                  | 04                     | 1181                  | 0.00          | 160           | MA        | -                                    |
| 234              | 01/25/88             | Ŭ       | 0406                  | 02                     | 45                    | 0.00          | 0             |           | +                                    |
| 235              | 01/25/88             | S       | 2103                  | 21                     | 10                    | 0.00          | ŏ             | CL        | -                                    |
| 236              | 01/25/88             | U       | 1002                  | 10                     | 40                    | 0.00          | 0             | MA        | -                                    |
| 238              | 01/25/88             | U       | 0401                  | 04                     | 10                    | 0.00          | 0             | BD        | -                                    |
| 239              | 01/25/88             | Ŭ       | 2112                  | 21                     | 3<br>47               | 0.00          | U<br>N        | MA<br>MA  | -                                    |
| 240              | 01/25/88             | Ū       | 04                    | 04                     | 2                     | 0.00          | ů<br>N        | PI        | -                                    |

1 8

Ý

!-

| RECORD<br>NUMBER | DATE     | TYPE   | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|--------|-----------------------|------------------------|-----------------------|---------------|---------------|-----------|--------------------------------------|
| 241              | 01/26/88 | U      | 04                    | 04                     | 3                     | 0.00          | 0             | PI        | _                                    |
| 242              | 01/27/88 | S      | 1602                  | 16                     | 146                   | 0.00          | ŏ             | MA        | -                                    |
| 243              | 01/28/88 | S      | 2103                  | 21                     | 16                    | 0.00          | ŏ             | C1        | -                                    |
| 244              | 01/28/88 | S      | 0406                  | 04                     | 45                    | 0.00          | ŏ             | MA        |                                      |
| 245              | 01/28/88 | U      | 0503                  | 05                     | 3                     | 0.00          | ŏ             | FO        | -                                    |
| 246              | 01/28/88 | S      | 04                    | 04                     | 10                    | 0.00          | Ő             | MA        | +                                    |
| 247              | 01/28/88 | U      | 01                    | 01                     | 19                    | 0.00          | 0             | PL        | +                                    |
| 248              | 01/29/88 | 5      | 2103                  | 21                     | 12                    | 0.00          | 0             | CL        | -                                    |
| 249              | 01/29/88 | U      | 100803                | 10                     | 30                    | 0.00          | 0             | PL        | +                                    |
| 250              | 01/29/83 | U<br>c | 0702                  | 07                     | 30                    | 0.00          | 0             | MA        | +                                    |
| 252              | 01/30/88 | 2      | 2103                  | 21                     | 8                     | 0.00          | 0             | CL        | •                                    |
| 253              | 01/31/00 |        | 1004                  | 02                     | 15                    | 0.00          | 0             | MA        | -                                    |
| 254              | 01/31/88 | 0      | 1004                  | 10                     | 5                     | 0.00          | 0             | AD        | +                                    |
| 255              | 01/31/88 | ŭ      | 0304                  | 02                     | .92                   | 0.00          | 0             | MA        | -                                    |
| 256              | 01/31/88 | Š      | 2103                  | 21                     | 30                    | 0.00          | 0             | PL<br>CL  | -                                    |
| 257              | 02/01/88 | Ŭ      | 2105                  | 21                     | a                     | 0.00          | 0             |           | -                                    |
| 258              | 02/01/88 | S      | 0401                  | 04                     | 119                   | 0.00          | 385           |           | -                                    |
| 259              | 02/01/88 | U      | 210203                | 21                     | 20                    | 0.00          | 0             | HE        | -                                    |
| 260              | 02/01/88 | U      | 0304                  | 03                     | 12                    | 0.00          | ŏ             | PI        | <b>7</b>                             |
| 261              | 02/02/88 | U      | 1001                  | 10                     | 8                     | 0.00          | · Õ           | MA        | +                                    |
| 262              | 02/02/88 | U      | 04                    | 04                     | 3                     | 0.00          | Ő             | PL        | -                                    |
| 263              | 02/02/88 | U      | 1008                  | 10                     | 210                   | 0.00          | Ō             | MA        | -                                    |
| 204              | 02/02/88 | S      | 2103                  | 21                     | 33                    | 0.00          | 0             | CL        | -                                    |
| 200              | 02/02/88 | U      | 1602                  | 16                     | 20                    | 0.00          | 0             | MA        | +                                    |
| 267              | 02/03/88 | U<br>S | 0402                  | 04                     | 21                    | 0.00          | 0             | MA        | +                                    |
| 268              | 02/03/00 | 3      | 2103                  | 21                     | 6                     | 0.00          | 0             | CL        | -                                    |
| 269              | 02/03/88 | н      | 0202                  | 02                     | 50                    | 0.00          | 0             | BD        | +                                    |
| 270              | 02/03/88 | 1      | 040303                | 03                     | 50                    | 0.00          | 0             | PL        | -                                    |
| 271              | 02/03/88 | ŭ      | 040303                | 04                     | 247                   | 0.00          | 0             | MA        | •                                    |
| 272              | 02/03/88 | š      | 040101                | 0                      | 70                    | 0.00          | 0             | MA        | -                                    |
| 273              | 02/03/88 | Š      | 1602                  | 16                     | 0                     | 1 00          | 0             | MA        | -                                    |
| 274              | 02/03/88 | S      | 1002                  | 10                     | õ                     | 0.50          | 0             | 51A<br>MA |                                      |
| 275              | 02/03/88 | S      | 1701                  | 17                     | õ                     | 1 00          | ň             | μ<br>MΔ   |                                      |
| 276              | 02/04/88 | U      | 0202                  | 02                     | 10                    | 0,00          | ñ             | PI        | т                                    |
| 277              | 02/04/88 | S      | 2103                  | 21                     | 6                     | 0.00          | č             | cī        | τ<br>-                               |
| 278              | 02/04/88 | U      | 01                    | 01                     | 3                     | 0.00          | Ō             | PL        | +                                    |
| 279              | 02/04/88 | U      | 0202                  | 02                     | 10                    | 0.00          | Ō             | PL        | +                                    |
| 280              | 02/04/88 | U      | 04                    | 04                     | 45                    | 0 00          | 0             |           | •                                    |

159

۱

C. 1413 3.0.

| RECORD<br>NUMBER | DATE     | τγρε   | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL      | . M    | 300      | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|--------|-----------------------|------------------------|-----------------------|---------------|---------------|-----------|--------|----------|--------------------------------------|
| 281              | 02/04/88 | U      | 0101                  | 01                     | 0                     | 0.00          | 0             | UN        |        |          | +                                    |
| 282              | 02/05/38 | U      | 01                    | 01                     | 5                     | 0.00          | 0             | PL        |        |          | +                                    |
| 283              | 02/05/88 | U      | 01                    | 01                     | 5                     | 0.00          | 0             | PL        |        |          | +                                    |
| 284              | 02/05/83 | U      | 02                    | 02                     | 9                     | 0.00          | 0             | MA        |        |          | +                                    |
| 285              | 02/05/83 | U      | 01                    | 01                     | 9                     | 0.00          | 0             | PL        |        |          | +                                    |
| 286              | 02/05/88 | U      | 0202                  | 02                     | 3                     | 0.00          | 0             | ΡL        |        |          | +                                    |
| 287              | 02/05/88 | U      | 01                    | 01                     | 3                     | 0.00          | 0             | HE        |        |          | +                                    |
| 288              | 02/05/88 | U      | 01                    | 01                     | 10                    | 0.00          | 0             | የኒ        |        |          | +                                    |
| 289              | 02/05/88 | U      | 01                    | 01                     | 16                    | 0.00          | 0             | ΡL        |        |          | +                                    |
| 290              | 02/05/88 | U      | 04                    | 04                     | 123                   | 0.00          | 0             | PL        |        |          | -                                    |
| 291              | 02/05/88 | U      | 04                    | 04                     | 29                    | 0.00          | 0             | PL        |        |          | -                                    |
| 292              | 02/05/88 | U      | 04                    | 04                     | 1                     | 0.00          | 0             | PL        |        |          | -                                    |
| 293              | 02/05/88 | U      | 020305                | 02                     | 45                    | 0,00          | C             | MA        |        |          | +                                    |
| 234              | 02/06/88 | 0      | 040101                | 04                     |                       | 0.00          | 0             | MA        |        |          | -                                    |
| 295              | 02/00/88 | 0      | 0305                  | 03                     | 122                   | 0.00          | 0             | UN        |        |          | -                                    |
| 290              | 02/00/88 | U .    | 2109                  | 21                     | 50                    | 0.00          | 0             | FR        | Ε      | W        | +                                    |
| 237              | 02/00/00 | 0      | 1008                  | 10                     | 8                     | 0.00          | 0             | UN        |        |          | +                                    |
| 290              | 02/06/88 | U<br>c | 2001                  | 20                     | 8                     | 0.00          | 0             | FR        | E      | W        | +                                    |
| 300              | 02/06/88 | د<br>د | 09                    | 0<br>no                | 33                    | 0.00          | Ŭ             | MA        |        |          | -                                    |
| 301              | 02/06/88 | s<br>c | 1007                  | 10                     | U O                   | 1.00          | U O           | MA        |        |          |                                      |
| 302              | 02/06/88 | s<br>c | 1602                  | 16                     | 0                     | 0.50          | 0             | MA N      |        |          |                                      |
| 303              | 02/06/88 |        | 2001                  | 20                     | 21                    | 1.00          | U             | MA        |        |          |                                      |
| 304              | 02/07/88 | U U    | 0101                  | 01                     | 21                    | 0.00          | 0             | P.K.      | Ł      | W        | -                                    |
| 305              | 02/07/88 | 1      | 0202                  | 02                     | 140                   | 0.00          | Ŭ             | 112       |        |          | ÷                                    |
| 306              | 02/07/38 | Ŭ      | 020206                | 02                     | 140                   | 0.00          | 0             | 80        |        |          | •                                    |
| 307              | 02/07/88 | ŭ      | 020303                | 04                     | 30                    | 0.00          | 0             | MA        |        |          | +                                    |
| 308              | 02/07/88 | ŭ      | 180104                | 18                     | 171                   | 0.00          | ň             | ED.       | c      | IJ       | •                                    |
| 309              | 02/07/83 | ŭ      | 180104                | 18                     | 1/5                   | 0.00          | ő             | F R.      | r<br>r | 91<br>LU | +                                    |
| 310              | 02/07/88 | Ŭ      | 180104                | 18                     | 10                    | 0.00          | n             | F N.      | r<br>r | 12       | +                                    |
| 311              | 02/08/88 | Ŭ      | 0202                  | 02                     | 20                    | 0.00          | n             | 80        | C,     | м        | <b>+</b>                             |
| 312              | 02/08/88 | ŝ      | 2112                  | 21                     | 60                    | 0.00          | 177           | MA        |        |          | -                                    |
| 313              | 02/08/88 | Ŭ      | 0202                  | 02                     | 1                     | 0 00          | 10            | 80        |        |          | +                                    |
| 314              | 02/08/88 | Š      | 0204                  | 02                     | 17                    | 0.00          | ő             | MΔ        |        |          | T<br>-                               |
| 315              | 02/08/88 | Ŝ      | 2103                  | 21                     | 7                     | 0 00          | õ             | <u>(1</u> |        |          | 7                                    |
| 315              | 02/08/88 | Ŭ      | 0802                  | 08                     | 37                    | 0.00          | ň             | HF        |        |          | -                                    |
| 317              | 02/08/88 | U      | 040101                | 04                     | 48                    | 0.00          | ถ้            | MA        |        |          |                                      |
| 318              | 02/09/88 | Ű      | 0304                  | 03                     | 103                   | 0.00          | ň             | P1        |        |          | -                                    |
| 319              | 02/09/88 | S      |                       | 0                      | 4679                  | 30.00         | õ             | MΔ        |        |          | -                                    |
| 320              | 02/09/88 | S      | 160105                | 16                     | Ő                     | 0.50          | ñ             | MΔ        |        |          | -                                    |

a ser a state of the second second second

| RECORD<br>NUMBER | DATE     | TYPE   | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|--------|-----------------------|------------------------|-----------------------|---------------|---------------|-----------|--------------------------------------|
| 321              | 02/09/88 | S      | 260304                | 26                     | 0                     | 1.00          | 0             | MA        |                                      |
| 322              | 02/09/88 | S      | 230204                | 23                     | 0                     | 1.00          | 0             | MA        |                                      |
| 223              | 02/09/88 | 2      | 0903                  | 09                     | Q                     | 1.00          | 0             | MA        |                                      |
| 324              | 02/09/85 | 5<br>c | 1603                  | 15                     | 0                     | 6.00          | 0             | MA        |                                      |
| 325              | 02/09/88 |        | 08                    | 08                     | 0                     | 8.00          | 1072          | MA        |                                      |
| 327              | 02/13/29 | U U    | 0304                  | 04                     | i                     | 0.00          | 0             | PL        | -                                    |
| 328              | 02/13/88 | 1      | 040101                | 03                     | 5                     | 0.00          | 0             | PL        | +                                    |
| 329              | 02/13/88 | 11     | 210301                | 21                     | 39                    | 0.00          | 0             | MA        | -                                    |
| 330              | 02/13/88 | ŭ      | 0304                  | 03                     | 10                    | 0.00          | 0             | MA        | -                                    |
| 331              | 02/13/88 | Ŭ      | 2102                  | 21                     | 5<br>77               | 0.00          | 0             | PL        | •                                    |
| 332              | 02/14/88 | บั     | 04                    | 04                     | 2                     | 0.00          | 0             |           | -                                    |
| 333              | 02/14/88 | Š      | 2103                  | 21                     | 29                    | 0.00          | 0             | PL        | -                                    |
| 334              | 02/14/38 | Ū      | 040101                | 04                     | 91                    | 0.00          | 0             |           | •                                    |
| 335              | 02/14/38 | U      | 04                    | 04                     | 10                    | 0.00          | 0             | MA<br>DI  | -                                    |
| 336              | 02/14/88 | U      | 0503                  | 05                     | 28                    | 0.00          | ő             | FO        | +                                    |
| 337              | 02/14/88 | U      | 040101                | 04                     | 45                    | 0.00          | ŏ             | MA        | -                                    |
| 338              | 02/15/88 | U      | 0101                  | 01                     | 148                   | 0.00          | ŏ             | MA        | -                                    |
| 339              | 02/15/88 | U      | 0301                  | 03                     | 99                    | 0.00          | Ō             | MA        | -                                    |
| 240              | 02/15/88 | S      | 040101                | 04                     | 36                    | 0.00          | 0             | MA        | -                                    |
| 341              | 02/16/58 | Ű      | 0504                  | 05                     | 401                   | 0.00          | 2616          | MA        | -                                    |
| 342              | 02/16/88 | ک<br>د | 0102                  | 01                     | 35                    | 0.00          | 0             | MA        | +                                    |
| 344              | 02/16/88 | 3      | 140302                | •                      | 180                   | 0.00          | 224           | MA        | +                                    |
| 345              | 02/16/88 | · 11   | 0304                  | 02                     | 207                   | 0.00          | 932           | MA        | •                                    |
| 346              | 02/17/88 | Ŭ      | 0101                  | 03                     | 17                    | 0.00          | 0             | PL        | -                                    |
| 347              | 02/17/88 | Ŭ      | 0101                  | 01                     | 1.0                   |               | 0             | MA        | •                                    |
| 348              | 02/17/88 | Ū      | C4                    | 04                     | 1                     | 0.00          | 0             | RD<br>BD  | ÷                                    |
| 349              | 02/17/88 | Ŭ      | 01                    | 01                     | 6                     | 0.00          | 0             |           | +                                    |
| 350              | 02/17/88 | U      | 1002                  | 10                     | 132                   | 0.00          | 0             | PL<br>MA  | +                                    |
| 351              | 02/17/88 | U      | 0101                  | 01                     | 16                    | 0.00          | ň             | MA<br>MA  | •                                    |
| 352              | 02/17/88 | U      | 1602                  | 16                     | 60                    | 0.00          | ŏ             | DI DI     | +                                    |
| 353              | 02/18/88 | U      | 0802                  | 03                     | 20                    | 0.00          | ŏ             | FO        | +                                    |
| 354              | 02/18/88 | U      |                       | 0                      | 44                    | 0.00          | ŏ             | LP E      | -                                    |
| 355              | 02/18/88 | IJ     | 0202                  | 02                     | 1                     | 0.00          | 0             | PL -      | +                                    |
| 300              | 02/18/88 | 5      | 150105                | 16                     | 26                    | 0.00          | 0             | PL        | +                                    |
| 252<br>252       | 02/18/88 | U<br>c | 2122                  | 0                      | 0                     | 0.00          | 0             | UN        | +                                    |
| 350              | 02/13/88 | 5      | 2103                  | 21                     | 30                    | 0.00          | 0             | CL        | •                                    |
| 360              | 02/10/00 | 0      | 0401                  | 01                     | 2                     | 0.00          | 0             | PL        | -                                    |
| 5.50             | 04/10/00 | U      | 0401                  | 04                     | 1                     | 0.00          | 0             | BD        | •                                    |

| RECORD<br>NUMBER | DATE     | TYPE   | SUB-<br>Comp.<br>Code | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|--------|-----------------------|------------------------|-----------------------|---------------|---------------|-----------|--------------------------------------|
| 361              | 02/18/88 | U      | 04                    | 04                     | 2                     | 0.00          | 0             | PL        | -                                    |
| 362              | 02/18/88 | U      | 04                    | 04                     | 5                     | 0.00          | 0             | PL        | -                                    |
| 363              | 02/18/88 | U      | 04                    | 04                     | 2                     | 0.00          | 0             | PL        | -                                    |
| 364              | 02/19/88 | 2      | 2103                  | 21                     | 15                    | 0.00          | 0             | CL        | •                                    |
| 303              | 02/19/88 | U<br>c | 210301                | 21                     | 8/                    | 0.00          | 0             | CL        | -                                    |
| 367              | 02/19/88 | 3<br>  | 0504                  | 10                     | 31                    | 0.00          | 2616          | MA        | -                                    |
| 368              | 02/19/88 | Ű      | 0304                  | 03                     | <u>د، د</u>           | 0.00          | 2010          | mA<br>DI  | -                                    |
| 369              | 02/20/88 | ŭ      | 0202                  | 02                     | 20                    | 0.00          | 0             | PL<br>DI  | +                                    |
| 370              | 02/20/88 | ū      | 01                    | 01                     | 7                     | 0.00          | ŏ             | PL        | +                                    |
| 371              | 02/20/88 | S      | 2103                  | 21                     | 5                     | 0.00          | Ŭ             | ĊĹ        | -                                    |
| 372              | 02/20/88 | U      |                       | 0                      | 8                     | 0.00          | Ō             | UN        | -                                    |
| 373              | 02/20/88 | U      | 0202                  | 02                     | 6                     | 0.00          | 0             | 6D        | +                                    |
| 3/4              | 02/20/88 | U      | 0202                  | 02                     | 15                    | 0.00          | 0             | BD        | -                                    |
| 3/5              | 02/20/88 | U      | 0202                  | 02                     | 2                     | 0.00          | 0             | PL        | +                                    |
| 370              | 02/20/88 | 0      | 0202                  | 02                     | 2                     | 0.00          | 0             |           | +                                    |
| 378              | 62/21/88 | Ŭ      | 0202                  | 02                     | 5                     | 0.00          | 0             | PL<br>DI  | +                                    |
| 379              | 02/21/88 | Ŭ      | 0202                  | 02                     | 3                     | 0.00          | ő             | PL        | +                                    |
| 380              | 02/21/88 | Ū      | 0304                  | 03                     | 79                    | 0.00          | ů             | PL        | -<br>-                               |
| 381              | 02/21/88 | U      | 01                    | 01                     | 1                     | 0.00          | õ             | HÊ        | +                                    |
| 382              | 02/21/88 | U      | 0202                  | 02                     | 15                    | 0.00          | Ō             | BD        | -                                    |
| 383              | 02/21/88 | U      | 0202                  | 02                     | 1                     | 0.00          | 0             | BD        | +                                    |
| 384              | 02/21/88 | S      | 2103                  | 21                     | 15                    | 0.00          | 0             | CL        | -                                    |
| 385              | 02/21/88 | 3      | 1002                  | 10                     | 30                    | 0.00          | 0             | MA        | •                                    |
| 387              | 02/22/88 | Š      | 0202                  | 02                     | 40                    | 0.00          | 0             | PL<br>MA  | +                                    |
| 388              | 02/22/88 | Ŭ      | 0503                  | 05                     | 5                     | 0.00          | ő             | FO        | •                                    |
| 389              | 02/22/88 | S      |                       | Õ                      | 55                    | 0.00          | ŏ             | MA        | •                                    |
| 390              | 02/23/88 | S      |                       | Ó                      | 448                   | 0.00          | 363           | MA        | -                                    |
| 391              | 02/23/88 | S      | 0401                  | 04                     | 0                     | 6.00          | 363           | MA        |                                      |
| 392              | 02/23/88 | S      | 1604                  | 16                     | 0                     | 1.00          | 0             | MA        |                                      |
| 393              | 02/23/88 | S      | 0304                  | 03                     | 0                     | 0.50          | 0             | MA        |                                      |
| 394              | 02/23/88 | Ъ<br>с | 150105                | 16                     | 0                     | 0.50          | 0             | MA        | •                                    |
| 30K<br>232       | 02/23/58 | 3      | 2103                  | 21                     | 8                     | 0.00          | 0             | CL        | •                                    |
| 397              | 02/23/88 | 1      | 01                    | 01                     | 12                    | 0.00          | U<br>O        |           | +                                    |
| 398              | 02/23/88 | Ŭ      | <b>4 1</b>            | 0                      | 17                    | 0.00          | 0             |           | +                                    |
| 399              | 02/23/88 | Š      | 1002                  | ĩo                     | 21                    | 0.00          | ů<br>N        | MA        | -                                    |
| 400              | 02/24/88 | Ū      | 01                    | 01                     | 7                     | 0.00          | ŏ             | PL        | +                                    |
|                  | • •      |        |                       |                        |                       |               | -             |           |                                      |

I was to be interested in the second of the second second second second second second second second second sec

1.1.1

いるのにいていていると言語がたいでいると言語のです。「「「「「」」」の「「」」と言語のないないできると言語をなると言語である。

| RECORD<br>NUMBER | DATE     | ΤΥΡΕ   | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|--------|-----------------------|------------------------|-----------------------|---------------|---------------|-----------|--------------------------------------|
| 401              | 02/24/98 | IJ     | 01                    | 01                     | 3                     | 0.00          | ٥             | DI        |                                      |
| 402              | 02/24/88 | U      | 01                    | 01                     | 18                    | 0.00          | ň             |           | + .                                  |
| 403              | 02/24/88 | U      | 0202                  | 02                     | 2                     | 0.00          | ň             | PL<br>DI  | -                                    |
| 404              | 02/24/88 | U      | 0503                  | 05                     | 9                     | 0.00          | ň             | FO        | +                                    |
| 405              | 02/24/88 | U      | 01                    | 01                     | 4                     | 0.00          | 0             | DI        | -                                    |
| 406              | 02/24/88 | U      | 01                    | 01                     | 8                     | 0.00          | 0             |           | - <b>-</b>                           |
| 407              | 02/25/88 | U      | 0503                  | 05                     | ž                     | 0 00          | ň             | F0        | +                                    |
| 408              | 02/25/88 | S      | 2103                  | 21                     | 17                    | 0.00          | ň             |           | -                                    |
| 409              | 02/25/88 | S      |                       | Õ                      | 67                    | 0.00          | ŏ             | MA        | -                                    |
| 410              | 02/25/88 | S      | 1603                  | 16                     | 288                   | 0.00          | 212           | ומ        | -                                    |
| 411              | 02/26/38 | U      | 0102                  | 01                     | 10                    | 0.00          | 134           |           | -                                    |
| 412              | 02/26/88 | ป      | 210301                | 21                     | 15                    | 0 00          | 134           |           | -                                    |
| 413              | 02/26/88 | S      | 0507                  | 05                     | 24                    | 0.00          | ň             | MA        | •                                    |
| 414              | 02/26/88 | S      | 1002                  | 10                     | 61                    | 0.00          | ň             | EN .      | •                                    |
| 415              | 02/27/88 | U      | 01                    | 01                     | 6                     | 0.00          | ň             | DI        | -                                    |
| 416              | 02/27/88 | U      | 01                    | 01                     | 3                     | 0.00          | ň             | DI        | +                                    |
| 417              | 02/27/88 | S      | 2103                  | 21                     | 17                    | 0.00          | õ             |           | 7                                    |
| 418              | 02/27/88 | S      | 0102                  | 01                     | 45                    | 0.00          | 134           | MA        | -                                    |
| 419              | 02/27/88 | S      | 210205                | 21                     | 60                    | 0.00          | 0             | MA        | +                                    |
| 420              | 02/27/88 | S      | 1002                  | 10                     | 0                     | 0.50          | ō             | MA        | -                                    |
| 421              | 02/27/88 | S      | 1602                  | 16                     | 0                     | 1.00          | Ō             | MA        |                                      |
| 422              | 02/27/88 | S      | 0304                  | 03                     | 0                     | 0.50          | Õ             | MA        |                                      |
| 423              | 02/28/88 | S      | 1002                  | 10                     | 60                    | 0.00          | Ō             | MA        | -                                    |
| 424              | 02/28/88 | S      | 210205                | 21                     | 0                     | 0.00          | 0             | MA        |                                      |
| 425              | 02/28/88 | S      | 1602                  | 16                     | 0                     | 1.00          | 0             | MA        |                                      |
| 420              | 02/28/88 | 2      | 210205                | 21                     | 0                     | 0.00          | 0             | MA        |                                      |
| 427              | 02/28/88 | 2      | 210205                | 21                     | 0                     | 0.00          | 0             | MA        |                                      |
| 420              | 02/20/00 | 2      | 210205                | 21                     | 0                     | 0.00          | 0             | MA        |                                      |
| 423              | 02/20/88 | 2      | 210205                | 21                     | 0                     | 0.00          | 0             | MA        |                                      |
| 431              | 02/23/00 | U II   | 2112                  | 21                     | 8                     | 0.00          | 0             | CL        | -                                    |
| 432              | 02/23/00 | 0<br>c | 0202                  | 02                     | 13                    | 0.00          | 0             | PL        | -                                    |
| 432              | 02/23/00 | S<br>C | 1002                  | 10                     | 66                    | 0.00          | 0             | MA        | -                                    |
| 433              | 02/23/00 | د<br>۲ | 1602                  | 16                     | 0                     | 1.00          | 0             | MA        |                                      |
| 435              | 02/23/88 | د<br>ح | 210205                | 03                     | 0                     | 0.50          | 0             | MA        |                                      |
| 436              | 02/29/29 | c<br>c | 210205                | 21                     | 0                     | 0.00          | 0             | MA        |                                      |
| 437              | 02/20/20 | c<br>c | 210205                | 21                     | U                     | 0.00          | 0             | MA        |                                      |
| 438              | 03/01/89 | с<br>С | 210205                | 21                     | U                     | 0.00          | 0             | MA        |                                      |
| 439              | 03/01/88 | 3<br>  | 2103                  | 21                     | 12                    | 0.00          | 0             | CL        | -                                    |
| 440              | 03/01/99 | 11     | 0202                  | 02                     | 3                     | 0.00          | 0             | PL        | +                                    |
| 779              | 00/01/00 | 0      | U I                   | UI I                   | 6                     | 0.00          | 0             | PI        | 1                                    |

| RECORD<br>NUMBER | DATE      | TYPE   | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MOD | AUGER<br>STATUS<br>ON=(+)<br>E OFF=(-) |
|------------------|-----------|--------|-----------------------|------------------------|-----------------------|---------------|---------------|----------|--|
| 441              | 03/01/88  | U      | 01                    | 01                     | 12                    | 0.00          | C             | PL       | + .                                    |
| 442              | 03/01/88  | U      | 0503                  | 05                     | 5                     | 0.00          | 0             | FÖ       | -                                      |
| 443              | 03/02/88  | U      | 2503                  | 25                     | 20                    | 0.00          | 0             | MA       | -                                      |
| 444              | 33/02/88  | U      | 2503                  | 25                     | 25                    | 0.00          | 0             | MA       | -                                      |
| 45               | 03/02/88  | U      | 0802                  | 03                     | 25                    | 0.00          | 0             | FO E     | W -                                    |
| 445              | J3/02/88  | U      | 0202                  | 02                     | 5                     | 0.00          | 0             | ዖL       | +                                      |
| 447              | 03/02/88  | U      | 0102                  | 01                     | 40                    | 0.00          | 0             | MA       | +                                      |
| 448              | 0.3/02/88 | U      | 01                    | 01                     | 26                    | 0.00          | 0             | PL       | -                                      |
| 449              | 93/02/88  | Ŭ      | 0202                  | 02                     | 11                    | 0.00          | 0             | PL       | •                                      |
| 439              | 03/02/88  | 2      | 1000                  | U<br>1C                | 60                    | 0.00          | 0             | MA       | -                                      |
| 451              | 03/02/08  | 5      | 1002                  | 10                     | 0                     | 1.00          | 0             | MA       |  |
| 452              | 03/02/88  | с<br>с | 210201                | 21                     | 10                    | 0.50          | 0             | MA       | ·                                      |
| 454              | 03/02/88  |        | 01                    | 01                     | 10                    | 0.00          | 0             |          | -                                      |
| 455              | 03/03/88  | ŭ      | 0202                  | 02                     | 1                     | 0.00          | 0             |          | -                                      |
| 456              | 03/03/88  | Ŭ      | 0406                  | 04                     | 10                    | 0.00          | 0             | MA       | +                                      |
| 457              | 03/03/88  | Ŭ      | 01                    | 01                     | 8                     | 0.00          | 0             | DI       | +                                      |
| 458              | 03/03/88  | S      | 2103                  | 21                     | 18                    | 0.00          | ŏ             | CI       | +                                      |
| 459              | 03/03/88  | Ű      | 0202                  | 02                     | 6                     | 0.00          | ŏ             | PL       | +                                      |
| 460              | 03/03/88  | U      | 020306                | 02                     | 60                    | 0.00          | Ō             | MA       | +                                      |
| 451 .            | 03/03/88  | U      | 2101                  | 21                     | 107                   | 0.00          | 0             | MA       | -                                      |
| 462              | 03/03/88  | U      | 0301                  | 03                     | 46                    | 0.00          | 0             | BD       | -                                      |
| 463              | 03/04/88  | S      | 050302                | 05                     | 11                    | 0.00          | 0             | MA       | +                                      |
| 404              | 03/04/88  | U      | 0503                  | 05                     | 15                    | 0.00          | 0             | FO       | -                                      |
| 400              | 03/04/88  | U<br>S | 0503                  | 05                     | 6                     | 0.00          | 0             | FO       | -                                      |
| 400              | 03/04/08  | s<br>c | 2103                  | 21                     | 4                     | 0.00          | 0             | CL       | •                                      |
| 468              | 03/05/89  | c<br>c | 0507                  | 05                     | 24                    | 0.00          | 0             | MA       | +                                      |
| 469              | 03/05/88  | Š      | 08                    | 00                     | 1099                  | 4 00          | 1175          | MA       | •                                      |
| 470              | 03/05/88  | Š      | 1603                  | 16                     | 0                     | 2 00          | 11/5          | MA<br>MA |  |
| 471              | 03/05/88  | Š      | 1601                  | 16                     | ñ                     | 1 00          | 0             | MA<br>MA |  |
| 472              | 03/05/88  | Š      | 2302                  | 23                     | õ                     | 1.00          | ň             | MΔ       |  |
| 473              | 03/05/88  | S      | 1402                  | 14                     | õ                     | 1.00          | õ             | MA       |  |
| 474              | 03/05/88  | S      | 0502                  | 05                     | ŏ                     | 8.00          | 3799          | MA       |  |
| 475              | 03/05/38  | S      | 1002                  | 10                     | Ó                     | 0.50          | 0             | MA       |  |
| 476              | 03/05/88  | S      | 1001                  | 10                     | 0                     | 4.00          | ŏ             | MA       |  |
| 477              | 03/05/88  | S      | 0504                  | 05                     | 0                     | 3.00          | 2616          | MA       |  |
| 478              | 03/05/88  | S      | 1701                  | 17                     | 0                     | 1.00          | 0             | MA       |  |
| 479              | 03/05/88  | S      | 1604                  | 16                     | 0                     | 1.00          | 0             | MA       |  |
| 480              | 03/05/88  | S      | 1602                  | 16                     | 0                     | 1.00          | 0             | MA       |  |

| RECORD<br>NUMBER  | DATE   | τγρε   | SUB-<br>COMP.<br>CODE   | MAJOR<br>COMP.<br>CODE  | TIME<br>DOWN<br>(min)  | LABOR<br>(hr)   | PARTS<br>(\$)   | FAIL MODE   | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|---|--|--|---|---|--|---|---|---|--------------------------------------|
| RECORD<br>NUMBER<br>481<br>482<br>483<br>484<br>485<br>486<br>487<br>488<br>489<br>490<br>491<br>492<br>493<br>494<br>495<br>495<br>497<br>498<br>499<br>500<br>501<br>502<br>503<br>504<br>505<br>506<br>507<br>508<br>509<br>510<br>511<br>512<br>513 | DATE<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/10/88<br>03/10/88<br>03/10/88<br>03/10/88<br>03/10/88<br>03/10/88<br>03/11/88<br>03/11/88<br>03/12/88<br>03/12/88<br>03/12/88 | TYPE<br>\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$UUU\$UU\$UU\$UU\$UU\$UU\$UU\$U | COMP.<br>CODE<br>100501<br>1301<br>01<br>0508<br>160104<br>1802<br>0501<br>050606<br>0501<br>050306<br>080206<br>010101<br>220101<br>0202<br>050602<br>0602<br>2103<br>0602<br>2103<br>0602<br>2103<br>0602<br>2103<br>0602<br>2103<br>0602<br>2103<br>0507<br>0507<br>0507<br>2103<br>0202<br>140402<br>210205<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0502<br>2103<br>0507<br>0502<br>2103<br>0507<br>0507<br>0507<br>0507<br>0507<br>0507<br>0507<br>05 | COMP.<br>CODE<br>10<br>13<br>01<br>05<br>16<br>18<br>05<br>05<br>05<br>05<br>05<br>05<br>05<br>06<br>21<br>05<br>06<br>21<br>05<br>06<br>21<br>05<br>06<br>21<br>05<br>06<br>21<br>05<br>05<br>05<br>05<br>05<br>05<br>05<br>05<br>05<br>05<br>05<br>05<br>05 | DOWN<br>(min)<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | LABOR<br>(hr)<br>1.00<br>2.00<br>2.00<br>2.00<br>0.50<br>4.00<br>4.00<br>24.00<br>1.00<br>1.00<br>1.00<br>24.00<br>1.00<br>1.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00 | PARTS<br>(\$)<br>0<br>0<br>0<br>109<br>0<br>0<br>1350<br>0<br>986<br>224<br>13872<br>0<br>0<br>986<br>224<br>13872<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | FAIL MODE<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA |                                      |
| 514<br>515<br>516<br>517<br>518<br>519<br>520   | 03/12/88<br>03/12/88<br>03/13/88<br>03/13/88<br>03/13/88<br>03/13/88   | U<br>S<br>U<br>U<br>U  | 210205<br>0507<br>210205<br>210205<br>0202<br>0201  | 21<br>05<br>21<br>21<br>02<br>02  | 0<br>20<br>0<br>23<br>64<br>15   | 0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00  | 45<br>0<br>0<br>0<br>0<br>0   | MA<br>AD<br>AD<br>UN<br>BD<br>BD  | -<br>+<br>-<br>+<br>-                |

| INCINERATOR (MWP-2000) | SCHEDULED AND | UNSCHEDULED MAINTENANC | E DATABASE - | Cont'd |
|------------------------|---------------|------------------------|--------------|--------|
|------------------------|---------------|------------------------|--------------|--------|

٠.

| RECORD<br>NUMBER | DATE     | TYPE     | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|----------|-----------------------|------------------------|-----------------------|---------------|---------------|-----------|--------------------------------------|
| 521              | 03/14/88 | S        | 2103                  | 21                     | 41                    | 0.00          | 0             | CL        | -                                    |
| 522              | 03/14/88 | S        | 1602                  | 16                     | 60                    | 0.00          | Ō             | PL        | +                                    |
| 523              | 03/14/88 | U        | 0503                  | 05                     | 9                     | 0.00          | 0             | FO        | -                                    |
| 524              | 03/14/88 | U        | 210205                | 21                     | 0                     | 0.00          | 0             | AD        | +                                    |
| 525              | 03/14/88 | U        | 210205                | 21                     | 0                     | 0.00          | 0             | AD        | +                                    |
| 526              | 03/15/88 | U        | 210205                | 21                     | 0                     | 0.00          | 0             | AD        | +                                    |
| 527              | 03/15/88 | U        | 210205                | 21                     | 0                     | 0.00          | C             | AD        | +                                    |
| 528              | 03/15/88 | U        | 210205                | 21                     | 0                     | 0.00          | 0             | AD        | +                                    |
| 529              | 03/15/88 | U        | 01                    | 01                     | 19                    | 0.00          | 0             | PL        | +                                    |
| 530              | 03/15/88 | S        | 2103                  | 21                     | 25                    | 0.00          | 0             | CL        | -                                    |
| 531              | 03/16/88 | U        | 1405                  | 14                     | 30                    | 0.00          | 0             | MA        | +                                    |
| 532              | 03/16/88 | 5        | 2103                  | 21                     | 31                    | C.00          | 0             | CL        | -                                    |
| 533              | 03/16/88 | <u>ک</u> | 1002                  | 10                     | 0                     | 0.50          | 0             | MA        |                                      |
| 534              | 03/10/88 | 2        | 0507                  | 05                     | 0                     | 0.50          | 45            | MA        |                                      |
| 535              | 03/10/88 | U<br>11  | 210205                | 21                     | 207                   | 0.00          | 1127          | AD        | +                                    |
| 530              | 03/17/88 | 11       | 210201                | 05                     | 39/                   | 0.00          | 1137          | MA        | -                                    |
| 539              | 03/17/00 | 0        | 210301                | 21                     | 100                   | 0.00          | 0             | MA<br>DD  | +                                    |
| 530              | 03/12/22 | 11       | 0202                  | 00                     | 190                   | 0.00          | U<br>O        | 80        | -                                    |
| 540              | 03/18/88 | 11       | 0202                  | 02                     | 2                     | 0.00          | 0             |           | +                                    |
| 541              | 03/18/88 | ŭ        | 0507                  | 05                     | 23                    | 0.00          | 0             | ΡL<br>ΜΛ  | <b>+</b> .                           |
| 542              | 03/18/88 | ŭ        | 0507                  | 05                     | 1                     | 0.00          | 0             | MA        | -                                    |
| 543              | 03/19/88 | Š        | 0507                  | 05                     | 43                    | 0.00          | 45            | MΔ        | -                                    |
| 544              | 03/19/88 | ŝ        | 1502                  | 16                     | 0                     | 0.50          |               | MA        | -                                    |
| 545              | 03/19/88 | S        | 1002                  | 10                     | ŏ                     | 0.50          | õ             | MA        |                                      |
| 546              | 03/19/88 | S        | 210205                | 21                     | Ō                     | 0.00          | Ō             | MA        |                                      |
| 547              | 03/19/88 | S        | 2103                  | 21                     | 6                     | 0.00          | Ō             | CL        | -                                    |
| 548              | 03/19/88 | U        | 060101                | 06                     | 2                     | 0.00          | 0             | UN        | -                                    |
| 549              | 03/19/88 | U        | 0507                  | 05                     | 18                    | 0.00          | 45            | MA        | +                                    |
| 550              | 03/20/88 | U        | 0507                  | 05                     | 4                     | 0.00          | 0             | MA        | +                                    |
| 551              | 03/20/88 | U        | 0507                  | 05                     | 10                    | 0.00          | 0             | MA        | -                                    |
| 552              | 03/20/88 | S        | 0204                  | 02                     | 60                    | 0.00          | 0             | MA        | +                                    |
| 553              | 03/20/88 | S        | 2103                  | 21                     | 7                     | 0.00          | 0             | CL        | -                                    |
| 554              | 03/20/88 | IJ       | 0202                  | 02                     | 2                     | 0.00          | 0             | BD        | +                                    |
| 555              | 03/20/88 | U        | 0202                  | 02                     | 5                     | 0.00          | 0             | BD        | +                                    |
| 556              | 03/20/38 | U        | 0202                  | 02                     | 4                     | 0.00          | 0             | BD        | +                                    |
| 55/              | 03/20/88 | U        | 0507                  | 05                     | 69                    | 0.00          | 0             | MA        | -                                    |
| 558              | 03/20/88 | U        | 0202                  | 02                     | 5                     | 0.00          | 0             | RD        | +                                    |
| 227              | 03/20/88 | U        | 050/                  | 05                     | 17                    | 0.00          | 0             | MA        | -                                    |
| 000              | 03/21/88 | U        | UZU3U4                | 02                     | 53                    | U.00          | 0             | UN        | -                                    |

A set of the set of the set of

| RECORD<br>NUMBER | DATE     | TYPE    | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|---------|-----------------------|------------------------|-----------------------|---------------|---------------|-----------|--------------------------------------|
| 561              | 03/21/88 | U       | 020304                | 02                     | 18                    | 0.00          | 0             | MA        | -                                    |
| 562              | 03/21/88 | U       | 020304                | 02                     | 5                     | 0.00          | 0             | MA        | +                                    |
| 563              | 03/21/88 | U       | 210205                | 21                     | 0                     | 0.00          | 0             | AD        | +                                    |
| 564              | 03/21/88 | U       | 020304                | 02                     | 7                     | 0.00          | 0             | MA        | +                                    |
| 565              | 03/21/88 | U       | 2503                  | 25                     | 10                    | 0.00          | 0             | UN        | -                                    |
| 565              | 03/21/88 | U       | 01                    | 10                     | 22                    | 0.00          | 0             | PL        | -                                    |
| 567              | 03/21/88 | 2       | 1002                  | 10                     | 51                    | 0.00          | 0             | MA        | -                                    |
| 200              | 03/21/88 | 0       | 1002                  | 10                     | 101                   | 0.00          | 0             | DI        | -                                    |
| 509              | 03/22/00 | 0       | 210205                | 21                     | 2                     | 0.00          | 0             |           | +<br>⊥                               |
| 571              | 03/22/88 | 11      | 210205                | 21                     | 16                    | 0.00          | õ             | MA        | -                                    |
| 572              | 03/22/88 | ŭ       | 0202                  | 02                     | 4                     | 0.00          | ŏ             | BD        | +                                    |
| 573              | 03/23/88 | Ū       | 2101                  | 21                     | 10                    | 0.00          | ŏ             | MA        | +                                    |
| 574              | 03/23/88 | Ū       | 210205                | 21                     | 13                    | 0.00          | 0             | AD        | +                                    |
| 575              | 03/23/88 | U       | 210205                | 21                     | 0                     | 0.00          | 0             | AD        | +                                    |
| 576              | 03/23/88 | U       | 040101                | 04                     | 83                    | 0.00          | 0             | MA        | -                                    |
| 577              | 03/23/88 | S       | 1502                  | 16                     | 13                    | 0.00          | 0             | PL        | +                                    |
| 5/8              | 03/23/88 | 0       | 0301                  | 03                     | /                     | 0.00          | 0             | RU        | +                                    |
| 580              | 03/23/88 | 0       | 0304                  | 03                     | 5                     | 0.00          | 0             | MA<br>MΔ  | +                                    |
| 581              | 03/23/88 | Š       | 2103                  | 21                     | 17                    | 0.00          | Ő             | CI        | -                                    |
| 582              | 03/23/88 | Ŭ       | 210205                | 21                     | 55                    | 0.00          | ō             | MĂ        | -                                    |
| 583              | 03/24/88 | Ŭ       | 0301                  | 03                     | 3                     | 0.00          | 0             | BD        | +                                    |
| 584              | 03/24/88 | S       | 2103                  | 21                     | 12                    | 0.00          | 0             | CL        | -                                    |
| 585              | 03/24/88 | U       | 0304                  | 03                     | 15                    | 0.00          | 0             | PL        | +                                    |
| 586              | 03/25/88 | U       | 0202                  | 02                     | 29                    | 0.00          | 0             | PL        | -                                    |
| 587              | 03/25/88 | U       | 0202                  | 02                     | 5                     | 0.00          | 0             | 80        | +                                    |
| 588              | 03/25/88 | 0       | 210205                | 21                     | 240                   | 0.00          | 0             | AU        | +                                    |
| 209              | 03/25/00 | 0       | 2102                  | 21                     | 248                   | 0.00          | 0             |           | -                                    |
| 590              | 03/25/88 | 3<br> } | 0401                  | 04                     | 25                    | 0.00          | 0             | RD        | -                                    |
| 592              | 03/26/88 | Ü       | 210205                | 21                     | 0                     | 0.00          | õ             | AD        | +                                    |
| 593              | 03/26/88 | Ŭ       | 0507                  | 05                     | ĝ                     | 0.00          | ŏ             | MA        | -                                    |
| 594              | 03/26/88 | Š       | 2103                  | 21                     | 8                     | 0.00          | Ő             | CL        | -                                    |
| 595              | 03/27/88 | U       |                       | 0                      | 151                   | 0.00          | 224           | MA        | -                                    |
| 596              | 03/27/88 | U       | 180103                | 18                     | 45                    | 0.00          | 109           | MA        | -                                    |
| 597              | 03/27/88 | U       | 210205                | 21                     | 0                     | 0.00          | 0             | AD        | +                                    |
| 598              | 03/27/88 | ប       | 2001                  | 20                     | 96                    | 0.00          | 0             | MA        | -                                    |
| 599              | 03/29/88 | U       | 0202                  | 02                     | 10                    | 0.00          | 0             | PL<br>CL  | •                                    |
| 500              | 03/28/88 | 2       | 2103                  | 21                     | ō                     | 0.00          | U             | υL        | -                                    |

「日本のなくなる」というなどのないである。

۰.

| RECORD<br>NUMBER  | DATE   | TYPE  | SUB-<br>COMP.<br>CODE   | MAJOR<br>COMP.<br>CODE  | TIME<br>DOWN<br>(min)  | LABOR<br>(hr)   | PARTS<br>(\$)                          | FAIL MODE   | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-)   |
|---|--|---|---|---|--|---|--|---|--|
| RECORD<br>NUMBER<br>601<br>602<br>603<br>604<br>605<br>606<br>607<br>608<br>609<br>610<br>611<br>612<br>613<br>614<br>615<br>616<br>617<br>618<br>519<br>620<br>621<br>622<br>623<br>624<br>625<br>626<br>627<br>628<br>629<br>630<br>631<br>632<br>632 | DATE<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/30/88<br>03/30/88<br>03/30/88<br>03/30/88<br>03/31/88<br>03/31/88<br>03/31/88<br>03/31/88<br>03/31/88<br>03/31/88<br>03/31/88<br>04/01/88<br>04/01/88<br>04/02/88<br>04/02/88<br>04/02/88<br>04/02/88<br>04/02/88<br>04/02/88<br>04/02/88<br>04/02/88<br>04/02/88<br>04/02/88<br>04/02/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88 | TYPE<br>UUUSUUSSSSUUUUUUUUSUSSUUUSS<br>UUUSSUSSUUUUSSSSUUUUSS | COMP.<br>CODE<br>0401<br>0401<br>04<br>2112<br>2103<br>0304<br>0507<br>210301<br>2103<br>180103<br>2103<br>2103<br>2103<br>2103<br>2103<br>2103<br>0503<br>2503<br>0101<br>1002<br>0802<br>050309<br>2102<br>2102<br>2102<br>040101<br>2102<br>2102<br>1008<br>2103<br>210205<br>1802<br>2102<br>2102<br>2102 | ACOOR<br>COMP.<br>CODE<br>04<br>04<br>04<br>21<br>21<br>03<br>05<br>21<br>21<br>18<br>21<br>0<br>21<br>25<br>01<br>10<br>05<br>25<br>01<br>10<br>05<br>21<br>21<br>0<br>0<br>21<br>21<br>10<br>21<br>21<br>10<br>21<br>21<br>10<br>21<br>21<br>10<br>21<br>21<br>10<br>21<br>21<br>21<br>21<br>21<br>0<br>21<br>21<br>21<br>21<br>21<br>0<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21 | DOWN<br>(min)<br>112<br>75<br>2<br>0<br>5<br>30<br>5<br>6<br>4<br>56<br>31<br>24<br>7<br>4<br>30<br>5<br>6<br>4<br>56<br>31<br>24<br>7<br>4<br>30<br>15<br>28<br>0<br>9<br>9<br>12<br>15<br>131<br>180<br>5<br>0<br>15<br>0<br>45<br>8 | LABOR<br>(hr)<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0. | PARTS (\$)                             | FAIL MODE<br>MA<br>MA<br>PL<br>CL<br>CL<br>PL<br>MA<br>CL<br>MA<br>CL<br>FO<br>UN<br>MA<br>AD<br>AD<br>AD<br>AD<br>AD<br>AD<br>AD<br>MA<br>AD<br>UN<br>MA<br>AD<br>UN<br>MA<br>AD<br>UN<br>MA<br>AD<br>UN<br>MA<br>AD<br>UN<br>MA<br>AD<br>CL<br>UN<br>MA<br>AD<br>CL<br>UN<br>MA<br>AD<br>CL<br>UN<br>MA<br>AD<br>AD<br>AD<br>AD<br>AD<br>AD<br>AD<br>AD<br>AD<br>AD<br>AD<br>AD<br>AD | STATUS<br>ON=(+)<br>OFF=(-)<br>-<br>-<br>+<br>-<br>+<br>-<br>+<br>-<br>+<br>-<br>+<br>-<br>+<br>-<br>+<br>+<br>-<br>-<br>+<br>+<br>-<br>-<br>+<br>+<br>-<br>-<br>+<br>+<br>-<br>-<br>+<br>+<br>-<br>-<br>+<br>+<br>-<br>-<br>+<br>+<br>-<br>-<br>-<br>+<br>+<br>-<br>-<br>-<br>+<br>+<br>-<br>-<br>-<br>-<br>+<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- |
| 634<br>635<br>636<br>637<br>638<br>639<br>640   | 04/05/88<br>04/05/88<br>04/06/88<br>04/06/88<br>04/06/88<br>04/06/88<br>04/06/88   | 5 U U S U S U S U S   | 0202<br>0401<br>2103<br>0702<br>0504  | 04<br>02<br>04<br>21<br>07<br>0<br>05<br>05   | 143<br>37<br>63<br>19<br>35<br>60<br>78<br>1920  | 0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.0                 | 385<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | MA<br>BD<br>MA<br>CL<br>MA<br>MA<br>MA<br>MA  | -<br>-<br>-<br>+<br>-  |

INCINERATOR (MWP-2000) SCHEDULED AND UNSCHEDULED MAINTENANCE DATABASE - Cont'd

| RECORD<br>NUMBER                | DATE   | TYPE                  | SUB-<br>COMP.<br>CODE                    | MAJOR<br>COMP.<br>CODE           | TIME<br>DOWN<br>(min)     | LABOR<br>(hr)                        | PARTS<br>(\$)                           | FAIL MODE                  | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|---------------------------------|--|-----------------------|--|----------------------------------|---------------------------|--------------------------------------|---|----------------------------|--------------------------------------|
| 641<br>642<br>643<br>644<br>645 | 04/07/88<br>04/07/88<br>04/07/88<br>04/07/88<br>04/07/88 | s<br>s<br>s<br>s      | 1005<br>0504<br>080201<br>06<br>1001     | 10<br>05<br>08<br>06<br>10       | 0<br>0<br>0<br>0          | 0.75<br>4.00<br>1.00<br>0.00<br>4.00 | 0<br>2615<br>1224<br>662<br>0           | MA<br>MA<br>MA<br>MA       |                                      |
| 646<br>647<br>648<br>649<br>650 | 04/07/88<br>04/07/88<br>04/07/88<br>04/07/88<br>04/07/88 | 5<br>5<br>5<br>5<br>5 | 1002<br>1801<br>2110<br>1701<br>2103     | 10<br>18<br>21<br>17<br>21       | 0<br>0<br>0<br>0          | 0.50<br>1.00<br>0.00<br>1.00<br>0.50 | 0<br>0<br>0<br>0                        | MA<br>MA<br>MA<br>MA<br>MA |                                      |
| 651<br>652<br>653<br>654<br>655 | 04/07/88<br>04/07/88<br>04/07/88<br>04/08/88<br>04/08/88 | S<br>S<br>U<br>U      | 050309<br>2112<br>180201<br>01<br>0202   | 05<br>21<br>18<br>01<br>02       | 0<br>0<br>2<br>7          | 0.50<br>0.50<br>0.50<br>0.00<br>0.00 | 0<br>0<br>0<br>0                        | MA<br>MA<br>MA<br>PL<br>BD | -                                    |
| 656<br>657<br>658<br>659<br>660 | 04/08/88<br>04/09/88<br>04/09/88<br>04/09/88<br>04/10/88 | U<br>U<br>S<br>U<br>S | 2102<br>2102<br>2103<br>010102<br>2103   | 21<br>21<br>21<br>01<br>21       | 162<br>0<br>39<br>16<br>8 | 0.00<br>0.00<br>0.00<br>0.00<br>0.00 | 0<br>0<br>0                             | AD<br>AD<br>DL<br>MA<br>CL | -<br>+<br>-<br>-                     |
| 662<br>663<br>664<br>665        | 04/10/88<br>04/10/88<br>04/10/88<br>04/10/88             | ก<br>ก<br>ก           | 2102<br>2102<br>2102<br>050608<br>010102 | 21<br>21<br>21<br>05<br>01       | 0<br>2<br>0<br>74<br>11   | 0.00<br>0.00<br>0.00<br>0.00<br>0.00 | 0<br>0<br>133<br>0                      | AD<br>AD<br>AD<br>MA<br>MA | +<br>-<br>+<br>-                     |
| 667<br>668<br>669<br>670        | 04/11/88<br>04/11/88<br>04/12/88<br>04/12/88<br>04/12/88 | ม<br>ม<br>ม<br>ม      | 05<br>2103<br>2101<br>2102<br>2103       | 05<br>21<br>21<br>21<br>21<br>21 | 15<br>5<br>6<br>10        | 0.00<br>0.00<br>0.00<br>0.00<br>0.00 | 46<br>0<br>0<br>0                       | FO<br>CL<br>MA<br>UN<br>CL | •                                    |
| 672<br>673<br>674<br>675        | 04/12/88<br>04/12/88<br>04/12/88<br>04/13/88<br>04/13/88 | U<br>U<br>U<br>S      | 2102<br>0201<br>0503<br>2102<br>2103     | 21<br>02<br>05<br>21<br>21       | 0<br>20<br>3<br>0<br>5    | 0.00<br>0.00<br>0.00<br>0.00<br>0.00 | 0<br>0<br>0                             | AD<br>MA<br>FO<br>AD       | -<br>+<br>-<br>+                     |
| 6 5<br>677<br>678<br>679<br>680 | 04/14/88<br>04/15/88<br>04/15/88<br>04/15/88<br>04/15/88 | U<br>U<br>U<br>U<br>U | 2102<br>0202<br>0508<br>0503<br>1602     | 21<br>02<br>05<br>05<br>16       | 10<br>5<br>15<br>29<br>3  | 0.00<br>0.00<br>0.00<br>0.00<br>0.00 | 000000000000000000000000000000000000000 | UN<br>BD<br>PL<br>FO       | -<br>+<br>-                          |

いんのう こうちち ちょう しょうしょう

S. Spirkers & Start Back

のないないないないというないないないないないとう

169

| RECORD<br>NUMBER | DATE     | TYPE   | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|--------|-----------------------|------------------------|-----------------------|---------------|---------------|-----------|--------------------------------------|
| 681              | 04/15/88 | U      | 0202                  | 02                     | 9                     | 0.00          | 0             | PL        |                                      |
| 682              | 04/15/88 | U      | 2103                  | 21                     | 6                     | 0.00          | Ō             | CL        | -                                    |
| 683              | 04/15/88 | U      | 210302                | 21                     | 27                    | 0.00          | ŏ             | MA        | -                                    |
| 684              | 04/15/88 | U      | 1002                  | 10                     | 28                    | 0.00          | ŏ             | MA        | -                                    |
| 685              | 04/15/88 | U      | 1602                  | 16                     | 7                     | 0.00          | Ō             | PL        | -                                    |
| 686              | 04/15/88 | U      | 0301                  | 03                     | 9                     | 0.00          | Ō             | BD        | -                                    |
| 687              | 04/15/88 | S      | 2103                  | 21                     | 7                     | 0.00          | 0             | CL        | -                                    |
| 688              | 04/15/88 | U      | 2102                  | 21                     | 7                     | 0.00          | 0             | UN        | -                                    |
| 689              | 04/15/88 | U      | 2102                  | 21                     | 0                     | 0.00          | 0             | AD        | +                                    |
| 690              | 04/16/88 | U      | 1001                  | 10                     | 58                    | 0.00          | 0             | MA        | -                                    |
| 691              | 04/16/88 | U      | 0202                  | 02                     | 5                     | 0.00          | 0             | BD        | +                                    |
| 692              | 04/16/88 | U      | 0802                  | 08                     | 110                   | 0.00          | 0             | FO        | -                                    |
| 693              | 04/16/88 | S      | 2103                  | 21                     | 19                    | 0.00          | 0             | CL        | -                                    |
| 694              | 04/17/88 | U      | 1602                  | 16                     | 3                     | 0.00          | 0             | PL        | +                                    |
| 695              | 04/1//88 | U      | 1008                  | 10                     | 30                    | 0.00          | 0             | PL        | ÷                                    |
| 696              | 04/17/88 | U      | 0504                  | 05                     | 32                    | 0.00          | 0             | MA        | -                                    |
| 697              | 04/17/88 | U      | 0202                  | 02                     | 12                    | 0.00          | 0             | BD        | -                                    |
| 600<br>600       | 04/17/88 | 0      | 0506                  | 05                     | 20                    | 0.00          | 0             | UN        | +                                    |
| 700              | 04/1//00 | U      | 0102                  | 01                     | 38                    | 0.00          | U             | MA        | +                                    |
| 700              | 04/17/00 | U<br>S | 0102                  | 01                     | 29                    | 0.00          | U             |           | +                                    |
| 702              | 04/17/00 | 2<br>C | 2102                  | 21                     | 10                    | 0.00          | 0             | MA<br>CL  | -                                    |
| 702              | 04/18/88 | c<br>c | 2103                  | 21                     | 19                    | 0.00          | 0             |           | -                                    |
| 703              | 04/18/88 | 1      | 210302                | 21                     | 2                     | 0.00          | 0             |           | -                                    |
| 705              | 04/18/88 | š      | 1002                  | 10                     | 57                    | 0.00          | ň             | MΔ        | Ŧ                                    |
| 706              | 04/19/88 | ů      | 1602                  | 16                     | 41                    | 0.00          | ñ             | MΔ        | -                                    |
| 707              | 04/19/88 | Ũ      | 210205                | 21                     | Ō                     | 0.00          | õ             | UN        | +                                    |
| 708              | 04/19/88 | Ū      | 2102                  | 21                     | ō                     | 0.00          | Ō             | AD        | -                                    |
| 709              | 04/19/88 | U      | 1602                  | 16                     | 7                     | 0.00          | Ō             | PL        | +                                    |
| 710              | 04/19/88 | U      | 1002                  | 10                     | 3                     | 0.00          | Õ             | MA        | -                                    |
| 711              | 04/20/88 | S      | 1002                  | 10                     | 174                   | 0.00          | 0             | MA        | -                                    |
| 712              | 04/20/88 | S      | 2103                  | 21                     | 9                     | 0.00          | 0             | MA        | -                                    |
| 713              | 04/21/88 | U      | 2102                  | 21                     | 0                     | 0.00          | 0             | AD        | -                                    |
| 714              | 04/21/88 | U      | 2103                  | 21                     | 7                     | 0.00          | 0             | MA        | -                                    |
| 715              | 04/21/88 | U      | 2102                  | 21                     | 0                     | 0.00          | 0             | AD        | -                                    |
| 716              | 04/22/88 | U      | 210302                | 21                     | 19                    | 0.00          | 0             | AD        | -                                    |
| 717              | 04/22/88 | U      | 0504                  | 05                     | 122                   | 0.00          | 2616          | MA        | -                                    |
| 718              | 04/22/88 | U      | 0701                  | 07                     | 25                    | 0.00          | 0             | PL        | -                                    |
| 719              | 04/22/88 | U      | 0202                  | 02                     | 3                     | 0.00          | 0             | BD        | +                                    |
| 720              | 04/22/88 | S      | 2101                  | 21                     | 1                     | 0.00          | 0             | MΔ        | +                                    |

170

, 5 States we have a state for a loss

| RECORD<br>NUMBER | DATE     | τγρε     | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE   | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|----------|-----------------------|------------------------|-----------------------|---------------|---------------|-------------|--------------------------------------|
| 721              | 04/23/88 | U        | 2102                  | 21                     | 0                     | 0 00          | ٥             | ۵n          |                                      |
| 722              | 04/23/88 | U        | 2102                  | 21                     | ŏ                     | 0.00          | Õ             |             | +<br>+                               |
| 723              | 04/24/88 | U        | 2102                  | 21                     | õ                     | 0.00          | õ             | A0          | +<br>-                               |
| 724              | 04/24/88 | U        | 2102                  | 21                     | Ō                     | 0.00          | ŏ             | AD          | +                                    |
| 725              | 04/25/88 | S        | 1002                  | 10                     | 22                    | 0.00          | õ             | MA          | -                                    |
| 726              | 04/26/88 | U        | 2105                  | 21                     | Ō                     | 0.00          | ŏ             | AD          | +                                    |
| 727              | 04/26/88 | U        | 050307                | 05                     | 4                     | 0.00          | Õ             | FO          | -                                    |
| 728              | 04/27/88 | S        | 160105                | 16                     | 30                    | 0.00          | Ō             | MA          | +                                    |
| 729              | 04/27/88 | U        | 2105                  | 21                     | 0                     | 0.00          | Ō             | UN          | +                                    |
| 730              | 04/29/88 | S        |                       | 0                      | 2880                  | 0.00          | Ō             | MA          | -                                    |
| 731              | 04/29/88 | S        | 1602                  | 16                     | 0                     | 4.00          | 0             | MA          |                                      |
| 732              | 04/29/88 | S        | 1503                  | 16                     | 0                     | 2.00          | 0             | MA          |                                      |
| /33              | 04/29/88 | S        | 240303                | 24                     | 0                     | 4.00          | 2355          | MA          |                                      |
| /34              | 04/29/88 | S        | 1701                  | 17                     | 0                     | 1.00          | 0             | MA          |                                      |
| /35              | 04/29/88 | S        | 1802                  | 18                     | 0                     | 1.00          | 0             | MA          |                                      |
| /30              | 04/29/88 | <u> </u> | 1901                  | 19                     | 0                     | 3.00          | 0             | MA          |                                      |
| 730              | 04/29/88 | <u> </u> | 1902                  | 19                     | 0                     | 2.00          | 0             | MA          |                                      |
| 730              | 04/29/00 | 3<br>c   | 040102                | 04                     | 0                     | 0.00          | 1937          | MA          |                                      |
| 740              | 04/29/88 | s<br>c   | 190201                | 10                     | 0                     | 1.00          | 133           | MA          |                                      |
| 741              | 65/01/88 | с<br>ç   | 0301                  | 10                     | 4056                  | 1.00          | 208           | MA          |                                      |
| 742              | 05/01/88 | s<br>s   | 0301                  | 03                     | 4930                  | 10.00         | 0             | MA          | -                                    |
| 743              | 05/01/88 | Š        | 16                    | 16                     | Ő                     | 1.00          | 0             | MA<br>MA    |                                      |
| 744              | 05/01/88 | Š        | 0501                  | 05                     | ñ                     | 24 00         | 176           | 81/A<br>M A |                                      |
| 745              | 05/01/88 | Š        | 0201                  | 02                     | õ                     | 4 00          | 1/0           | MA          |                                      |
| 746              | 05/01/88 | Š        | 14                    | 14                     | õ                     | 2 00          | 0             | MΔ          |                                      |
| 747              | 05/01/88 | S        | 0301                  | 03                     | ō                     | 2.00          | Ő             | MA          |                                      |
| 748              | 05/01/88 | S        | 13                    | 13                     | Ō                     | 2.00          | Ő             | MA          |                                      |
| 749              | 05/01/83 | S        | 27                    | 27                     | Ó                     | 3.00          | 176           | MA          |                                      |
| 750              | 05/01/88 | S        | 230203                | 23                     | 0                     | 2.00          | Ō             | MA          |                                      |
| 751              | 05/01/88 | S        | 180201                | 18                     | 0                     | 3.00          | 176           | MA          |                                      |
| 752              | 05/02/88 | S        | 0507                  | 05                     | 0                     | 2.00          | 0             | MA          |                                      |
| 753              | 05/02/88 | S        | 0201                  | 02                     | 0                     | 0.25          | 0             | MA          |                                      |
| /54              | 05/02/88 | S        | 08                    | 08                     | 0                     | 8.00          | 1162          | MA          |                                      |
| / 55             | 05/02/88 | S        | 0801                  | 08                     | 0                     | 1.00          | 0             | MA          |                                      |
| / 30             | 05/02/88 | 5        | 1601                  | 16                     | 0                     | 0.50          | 0             | MA          |                                      |
| /3/<br>750       | 05/02/88 | 2        | 2601                  | 26                     | 0                     | 0.50          | 0             | MA          |                                      |
| 750              | 05/02/88 | 2        | 0/                    | 07                     | 0                     | 8.00          | 0             | MA          |                                      |
| 759              | 05/02/88 | ک<br>د   | 100501                | 10                     | 0                     | 1.50          | 0             | MA          |                                      |
| /00              | UJ/UZ/88 | 2        | 2302                  | 23                     | 0                     | 0 50          | n             | MA          |                                      |

ł

171

| RECORD<br>NUMBER | DATE     | ΤΥΡΕ | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL     | MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|------|-----------------------|------------------------|-----------------------|---------------|---------------|----------|------|--------------------------------------|
| 761              | 05/02/88 | S    | 0403                  | 04                     | 0                     | 0.25          | 0             | MA       |      |                                      |
| 762              | 05/02/88 | S    | 10                    | 10                     | 0                     | 6.00          | 0             | MA       |      |                                      |
| 763              | 05/02/88 | S    | 0101                  | 01                     | 0                     | 9.50          | 241           | MA       |      |                                      |
| /64              | 05/02/88 | S    | 0203                  | 02                     | 0                     | 0.50          | 143           | MA       |      |                                      |
| /65              | 05/02/88 | 2    | 0705                  | 07                     | 0                     | 16.00         | 0             | MA       |      |                                      |
| 700              | 05/03/88 | 5    | 0502                  | 05                     | 0                     | 18.50         | 3332          | MA       |      |                                      |
| /0/              | 05/03/88 | 0    | 1005                  |                        | 120                   | 0.00          | 0             | MA       |      | +                                    |
| 760              | 05/03/88 | U    | 2/                    | 27                     | 30                    | 0.00          | 268           | MA       |      | +                                    |
| 709              | 05/03/88 | 0    | 2112                  | 21                     | 30                    | 0.00          | 0             | MA       |      | +                                    |
| 771              | 05/03/08 | 0    | 2101                  | 21                     | 120                   | 9.00          | 0             | MA       |      | +                                    |
| 772              | 05/04/88 | 0    | 180201                | 19                     | 20                    | 0.00          | 0             |          |      | +                                    |
| 773              | 05/05/88 | ŭ    | 1405                  | 14                     | 20                    | 0.00          | 0             | MA<br>MA |      | +                                    |
| 774              | 05/05/88 | ŭ    | 050308                | 05                     | 96                    | 0.00          | 0             | MΔ       |      | +                                    |
| 775              | 05/06/88 | Ŭ    | 2102                  | 21                     | 0                     | 0.00          | õ             |          |      | -                                    |
| 776              | 05/05/88 | Ū    | 2102                  | 21                     | ŏ                     | 0.00          | Ő             | AD       |      | +                                    |
| 777              | 05/07/88 | U    | 0104                  | 16                     | 60                    | 0.00          | õ             | MA       |      | +                                    |
| 778              | 05/07/88 | U    | 1001                  | 16                     | 120                   | 0.00          | Õ             | MA       |      | +                                    |
| 779              | 05/07/88 | U    | 160105                | 16                     | 30                    | 0.00          | 0             | MA       |      | +                                    |
| 780              | 05/08/88 | U    | 180201                | 12                     | 15                    | 0.00          | 0             | MA       |      | +                                    |
| 781              | 05/08/88 | U    | 2102                  | 21                     | 0                     | 0.00          | 0             | AD       |      | +                                    |
| 782              | 05/08/88 | U    |                       | 0                      | 38                    | 0.00          | 0             | LP       | E    | -                                    |
| /83              | 05/08/88 | U    | 2103                  | 21                     | 8                     | 0.00          | 0             | MA       |      | -                                    |
| 784              | 05/09/88 | U    | 0306                  | 03                     | 53                    | 0.00          | 0             | MA       |      | -                                    |
| 705              | 05/09/88 | 0    | 0405                  | 04                     | 30                    | 0.00          | 160           | MA       |      | +                                    |
| 787              | 05/09/08 | 0    | 2402                  | 03                     | 14                    | 0.00          | 0             | MA       | -    | -                                    |
| 788              | 05/09/88 | 1    | 2102                  | 24                     | 120                   | 0.00          | U             | MA       | Ł    | +                                    |
| 789              | 05/09/88 | 11   | 2102                  | 21                     | 0                     | 0.00          | 0             | AU       |      | +                                    |
| 790              | 05/09/88 | ŭ    | 2102                  | 21                     | ñ                     | 0.00          | 0             |          |      | +                                    |
| 791              | 05/10/88 | Ŭ    | 2103                  | 21                     | 352                   | 0.00          | n             | MΔ       |      | +                                    |
| 792              | 05/10/88 | Ū    | 040302                | 04                     | 30                    | 0.00          | 176           | MΔ       |      | -                                    |
| 793              | 05/10/88 | U    | 2112                  | 21                     | 15                    | 0.00          | 437           | MA       |      | -                                    |
| 794              | 05/10/88 | U    | 0301                  | 03                     | 563                   | 0.00          | 56            | MA       |      | -                                    |
| 795              | 05/11/88 | U    | 01                    | 01                     | 10                    | 0.00          | 0             | MA       |      | +                                    |
| 796              | 05/11/88 | U    | 2102                  | 21                     | 0                     | 0.00          | Ō             | AD       |      | +                                    |
| 797              | 05/12/88 | U    | 05                    | 05                     | 4                     | 0.00          | 0             | FO       |      | -                                    |
| 798              | 05/12/88 | U    | 2102                  | 21                     | 0                     | 0.00          | 0             | AD       |      | +                                    |
| 799              | 05/12/88 | U    | 2102                  | 21                     | 0                     | 0.00          | 0             | AD       |      | +                                    |
| 800              | 05/13/88 | U    | 2102                  | 21                     | 0                     | 0.00          | 0             | AD       |      | +                                    |

۶.

| RECORD<br>NUMBER                                     | DATE   | TYPE   | SUB-<br>COMP.<br>CODE  | MAJOR<br>COMP.<br>CODE                             | TIME<br>DOWN<br>(min)                 | LABOR<br>(hr)  | PARTS<br>(\$)                | FAIL MODE                                    | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|--|--|--|--|--|---------------------------------------|--|------------------------------|--|--------------------------------------|
| 801<br>802<br>803<br>804<br>805<br>806<br>807<br>808 | 05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/14/88<br>05/14/88<br>05/14/88<br>05/14/88 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | 2102<br>0202<br>2102<br>2102<br>2101<br>0802<br>2102<br>0202 | 21<br>02<br>21<br>21<br>21<br>21<br>08<br>21<br>02 | 0<br>5<br>0<br>11<br>31<br>25<br>2    | 0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00 | 0<br>0<br>0<br>77<br>0<br>0  | AD<br>PL<br>AD<br>AD<br>MA<br>FO<br>UN<br>BD | +<br>+<br>+<br>-<br>-                |
| 809<br>810<br>811<br>812<br>813<br>814<br>815        | 05/14/88<br>05/15/88<br>05/15/88<br>05/15/88<br>05/15/88<br>05/15/88<br>05/15/88             |  | 2102<br>1001<br>1002<br>160105<br>1602<br>1602<br>1801       | 21<br>10<br>16<br>16<br>16<br>16                   | 0<br>135<br>6<br>30<br>30<br>5<br>30  | 0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00         |                              | AD<br>MA<br>MA<br>PL<br>PL<br>PL             | + - + + + + +                        |
| 816<br>817<br>818<br>819<br>820<br>821<br>822        | 05/16/88<br>05/16/88<br>05/16/88<br>05/16/88<br>05/16/88<br>05/16/88<br>05/16/88             |  | 2502<br>0102<br>2102<br>2103<br>2102<br>2102<br>2102<br>1002 | 25<br>01<br>21<br>21<br>21<br>21<br>21<br>21       | 15<br>30<br>0<br>3<br>0<br>0          | 0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00         |                              | PL<br>MA<br>AD<br>UN<br>UN<br>UN             | +<br>+<br>+<br>+<br>+                |
| 823<br>824<br>825<br>826<br>827<br>828<br>828<br>829 | 05/18/88<br>05/18/88<br>05/19/88<br>05/20/88<br>05/20/88<br>05/20/88                         | ບ<br>ບ<br>ບ<br>ບ<br>ບ<br>ບ   | 2112<br>160105<br>180201<br>2102<br>2102<br>2102<br>1002     | 21<br>16<br>18<br>21<br>21<br>21<br>21<br>10       | 5<br>15<br>10<br>0<br>0<br>36         | 0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00 | 0<br>216<br>0<br>0<br>0<br>0 | MA<br>CL<br>MA<br>UN<br>MA<br>UN<br>MA       | -<br>+<br>+<br>+<br>+                |
| 830<br>831<br>832<br>833<br>834<br>835<br>836        | 05/21/88<br>05/21/88<br>05/21/88<br>05/21/88<br>05/22/88<br>05/22/88<br>05/22/88             |  | 0503<br>0503<br>1002<br>0102<br>1001<br>0101<br>0102         | 05<br>05<br>10<br>01<br>10<br>01<br>01             | 8<br>8<br>20<br>123<br>387<br>5<br>30 | 0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00 | 0<br>0<br>134<br>0<br>0<br>0 | FO<br>FO<br>MA<br>MA<br>AD<br>MA             | -<br>-<br>-<br>+<br>-                |
| 837<br>838<br>839<br>840                             | 05/27/88<br>05/27/88<br>05/27/88<br>05/28/88   | บ<br>บ<br>บ<br>บ   | 2102<br>240303<br>0201<br>0307                               | 21<br>24<br>02<br>03                               | 0<br>120<br>15<br>68                  | 0.00<br>0.00<br>0.00                                 | 0<br>0<br>48                 | AD<br>MA E S<br>PL<br>MA                     | +<br>-<br>-                          |

•

AN REAL

.

| RECORD<br>NUMBER | DATE     | TYPE    | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE  | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|---------|-----------------------|------------------------|-----------------------|---------------|---------------|------------|--------------------------------------|
| 841              | 05/28/88 | U       | 0102                  | 01                     | 30                    | 0.00          | 0             | MA         | -                                    |
| 842              | 05/28/88 | U       | 0102                  | 01                     | 15                    | 0.00          | 0             | MA         | +                                    |
| 843              | 05/23/88 | U       | 0307                  | 03                     | 66                    | 0.00          | 48            | MA         | -                                    |
| 844              | 05/28/88 | U       | 2102                  | 21                     | Ĵ                     | 0.00          | 0             | AD         | +                                    |
| 845              | 05/28/88 | U       | 2102                  | 21                     | 0                     | 0.00          | 0             | AD         | +                                    |
| 846              | 05/28/88 | U       | 2112                  | 21                     | 10                    | 0.00          | 0             | MA         | +                                    |
| 847              | 05/29/88 | U       | 0201                  | 02                     | 35                    | 0.00          | 0             | MA         | -                                    |
| 848              | 05/29/88 | U       | 0202                  | 02                     | 14                    | 0.00          | 0             | BD         | -                                    |
| 849              | 05/29/88 | U       | 1002                  | -10                    | 24                    | 0.00          | 0             | MA         | -                                    |
| 850              | 05/29/88 | U       | 2102                  | 21                     | 0                     | 0.00          | 0             | AD         | +                                    |
| 851              | 05/30/88 | U       | 2202                  | 02                     | 8                     | 0.00          | 0             | PL         | +                                    |
| 852              | 05/30/88 | U       | 0201                  | 02                     | 35                    | 0.00          | 0             | MA         | -                                    |
| 853              | 05/31/88 | IJ      | 2192                  | 21                     | 0                     | 0.00          | 0             | AD         | +                                    |
| 854              | 05/31/88 | 9       | 2102                  | 21                     | 0                     | 0.00          | 0             | AD         | +                                    |
| 822              | 05/31/88 | 0       | 2102                  | 21                     | 20                    | 0.00          | 0             | AU         | +                                    |
| 300              | 06/01/68 | 0       | 0201                  | 02                     | 30                    | 0.00          | 80            | MA         | +                                    |
| 83/              | 05/01/08 | 0       | 1002                  | 10                     | 32                    | 0.00          | ů,            | MA         | •                                    |
| 020              | 06/01/86 | U<br>II | 1001                  | 19                     | 933                   | 0.00          | 0             | MA<br>MA   | •                                    |
| 009              | 06/01/88 | 0       | 2009                  | 21                     | 17                    | 0.00          | 0             |            | +                                    |
| 961              | 06/01/00 | 11      | 2102                  | 21                     | 0                     | 0.00          | 0             | AU<br>MA   | +                                    |
| 862              | 05/02/88 | 1       | 2102                  | 21                     | 2<br>0                | 0.00          | 0             |            | <b>+</b>                             |
| 863              | 06/02/88 | ц<br>Ц  | 1604                  | 15                     | 11                    | 0.00          | ŏ             | MA         | <b>T</b>                             |
| 864              | 06/02/00 | 1       | 1603                  | 10                     | 272                   | 0.00          | 1612          | D1         | -                                    |
| 865              | 06/03/88 | ü       | 0406                  | 14                     | 10                    | 0.00          | 10.2          | ۵ <u>۵</u> | -                                    |
| 866              | 06/03/88 | Ű       | 160105                | 16                     | 15                    | 0.00          | ň             | IIN        | ÷                                    |
| 867              | 06/03/88 | - Ū     | 1501                  | 15                     | 10                    | 0.00          | ŏ             | MA         | ,                                    |
| 868              | 05/04/38 | Ū       | 050305                | 05                     | 3                     | 0.00          | 90            | МД         | -                                    |
| 869              | 06/04/83 | Ű       | 160105                | 16                     | 30                    | 0.00          | Ö             | MA         | +                                    |
| 870              | 06/05/88 | U       | 0701                  | 07                     | 1                     | 0.00          | Õ             | PL         | •                                    |
| 871              | 06/05/89 | IJ      | 2102                  | 21                     | 0                     | 0.00          | Ó             | AD         | +                                    |
| 872              | 06/06/88 | Ų       | 020305                | 02                     | 5                     | 0.00          | 0             | MA         | +                                    |
| 373              | 06/07/33 | IJ      | 2503                  | 25                     | 30                    | 0.00          | 250           | MA         | +                                    |
| 874              | 06/08/88 | U       | 140302                | 14                     | 90                    | 0.00          | 0             | MA         | +                                    |
| 875              | 06/08/88 | 15      | 160104                | 15                     | 20                    | 0.00          | 0             | MA         | +                                    |
| 876              | 06/08/83 | IJ      | 2111                  | 21                     | 5                     | 0.00          | 0             | MA         | +                                    |
| 877              | 06/08/88 | U       | 0202                  | 02                     | 15                    | 0.00          | 0             | PL         | •                                    |
| 878              | 06/09/88 | U       | 2102                  | 21                     | 0                     | 0.00          | 0             | AD         | +                                    |
| 873              | 06/09/38 | U       | 060105                | 06                     | 45                    | 0.00          | 0             | AD         | +                                    |
| 085              | 06/09/88 | U       | 1801                  | 18                     | 90                    | 0.00          | 620           | MA         | +                                    |

Ash to see to

The second state of the Second and the Second

| RECORD<br>NUMBER | DATE     | ΤΥΡΕ | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE          | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|------|-----------------------|------------------------|-----------------------|---------------|---------------|--------------------|--------------------------------------|
| 881              | 06/09/88 | U    | 0202                  | 02                     | 69                    | 0 00          | n             | BD                 |                                      |
| 882              | 06/09/88 | U    | 0509                  | 05                     | 15                    | 0.00          | ů<br>n        | MA                 | -                                    |
| 883              | 06/09/88 | U    | 010102                | 01                     | 2                     | 0.00          | ñ             | ΔΠ                 | +                                    |
| 884              | 06/10/83 | U    | 0201                  | 02                     | 64                    | 0.00          | ň             | MA                 | +                                    |
| 885              | 06/10/83 | U    | 140302                | 14                     | 180                   | 0.00          | 127           | MA                 | -                                    |
| 886              | 06/11/88 | U    | 0403                  | 04                     | 10                    | 0.00          | 10            | MA                 | +                                    |
| 887              | 06/11/88 | U    | 160105                | 16                     | 60                    | 0.00          | õ             | MQ.                | •                                    |
| 888              | 06/12/88 | U    | 0509                  | 05                     | 15                    | 0.00          | Õ             | MΔ                 | +<br>+                               |
| 889              | 06/12/88 | U    | 2114                  | 21                     | 5                     | 0.00          | Ő             | AN                 | +<br>•                               |
| 890              | 06/13/88 | S    | 2109                  | 21                     | 15                    | 0.00          | ō             | MA                 | +                                    |
| 891              | 06/13/88 | S    | 2109                  | 21                     | 25                    | 0.00          | õ             | MA                 | +                                    |
| 892              | 06/13/88 | U    | 0501                  | 05                     | 20                    | 0.00          | Ő             | MA                 | +                                    |
| 893              | 06/13/88 | U    | 1405                  | 14                     | 128                   | 0.00          | 0             | MA                 | •                                    |
| 294<br>955       | 06/16/88 | U    | 1402                  | 14                     | 20                    | 0.00          | 119           | MA                 | +                                    |
| 695              | 06/10/88 | 0    | 2109                  | 21                     | 90                    | 0.00          | 0             | CL                 | +                                    |
| 897              | 06/10/88 | 0    | 0509                  | 05                     | 30                    | 0.00          | 0             | MA                 | ÷                                    |
| 808              | 06/17/88 | 0    | 190201                | 19                     | 10                    | 0.00          | 0             | MA                 | +                                    |
| 899              | 06/18/88 | 0    | 040101                | 04                     | 7                     | 0.00          | 0             | UN                 | +                                    |
| 900              | 06/18/88 |      | 2102                  | 21                     | 0                     | 0.00          | 0             | AD                 | +                                    |
| 901              | 06/18/88 | 0    | 2102                  | 21                     | 0                     | 0.00          | 0             | AD                 | +                                    |
| 902              | 06/19/88 | 1    | 2102                  | 21                     | 0                     | 0.00          | 0             | AD                 | +                                    |
| 903              | 06/19/88 | ŭ    | 2102                  | 21                     | 0                     | 0.00          | 0             | AD                 | +                                    |
| 904              | 06/19/88 | Ŭ    | 0509                  | 05                     | 15                    | 0.00          | 0             | AD                 | +                                    |
| 905              | 05/19/88 | ŭ    | 2109                  | 21                     | 15                    | 0.00          | 0             | MA                 | +                                    |
| 905              | 06/19/88 | ŭ    | 180104                | 18                     | 10                    | 0.00          | U O           | MA                 | +                                    |
| 907              | 06/20/88 | Ũ    | 1002                  | 10                     | 12                    | 0.00          | 0             | MA                 | ŧ.                                   |
| 908              | 06/20/83 | U    | 2102                  | 21                     | 10                    | 0.00          | 0             | <u>М</u> А<br>А.О. | •                                    |
| 909              | 06/21/88 | U    | 210302                | 21                     | 20                    | 0.00          | n n           | MD                 | +                                    |
| 910              | 06/21/88 | U    | 210302                | 21                     | 30                    | 0.00          | ň             | MA                 | •                                    |
| 911              | 06/22/98 | U    | 2106                  | 21                     | 5                     | G.00          | õ             | MA                 | +                                    |
| 912              | 06/22/38 | U    | 0505                  | 05                     | 30                    | 0.00          | õ             | MA                 | +                                    |
| 913              | 05/22/88 | U    | 1002                  | 10                     | 37                    | 0.00          | õ             | MA                 | +                                    |
| 914              | 05/23/88 | U    | 0502                  | 05                     | 373                   | 0.00          | õ             | BO                 | -                                    |
| 915              | 06/23/88 | IJ   | 2109                  | 21                     | 120                   | 0.00          | Ō             | Γ <b>Ρ</b>         | +                                    |
| 315              | 06/23/88 | 9    | 02                    | 02                     | 40                    | 0.00          | Û             | AD                 | +                                    |
| 917              | 06/23/28 | ij   | 0306                  | 03                     | 138                   | 0.00          | 0             | MA                 | -                                    |
| 310<br>010       | NO/23/88 | IJ.  | 0202                  | 02                     | 28                    | 0.00          | 0             | BD                 | -                                    |
| 020              | 00/23/88 | U    | 2102                  | 21                     | 0                     | 0.00          | U             | AD                 | ÷                                    |
| 370              | 00/23/88 | U    | 2102                  | 21                     | 0                     | 0.00          | 0             | МΔ                 |                                      |
1 1 m A

| RECORD<br>NUMBER | DATE     | ΤΥΡΕ     | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE  | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|----------|-----------------------|------------------------|-----------------------|---------------|---------------|------------|--------------------------------------|
| 921              | 06/23/88 | U        | 2102                  | 21                     | 0                     | 0.00          | 0             | AD         | 1                                    |
| 922              | 06/24/88 | IJ       | 2102                  | 21                     | Ō                     | 0.00          | Ō             | MA         | +                                    |
| 923              | 05/25/88 | U        | 0509                  | 05                     | 10                    | 0.00          | Ō             | MA         | +                                    |
| 924              | 06/25/88 | U        | 1008                  | 10                     | 13                    | 0.00          | Ó             | UN         | -                                    |
| 925              | 06/25/88 | U        | 0401                  | 04                     | 2                     | 0.00          | Ō             | UN         | -                                    |
| 926              | 06/26/88 | U        | 2103                  | 21                     | 1                     | 0.00          | 0             | CL         | •                                    |
| 927              | 06/26/88 | U        | 2701                  | 27                     | 180                   | 0.00          | 0             | MA         | +                                    |
| 928              | 06/27/88 | U        | 1002                  | 10                     | 12                    | 0.00          | 0             | MA         | -                                    |
| 929              | 06/27/88 | U        | 2114                  | 21                     | 30                    | 0.00          | 393           | HE         | -                                    |
| 930              | 06/27/88 | U        | 2001                  | 20                     | 9                     | 0.00          | 0             | CL         | -                                    |
| 931              | 06/23/88 | U        | 2103                  | 21                     | 225                   | 0.00          | 0             | MA         | +                                    |
| 932              | 06/28/88 | 0        | 0401                  | 04                     | 4                     | 0.00          | 0             | UN         | -                                    |
| 933              | 05/25/88 | 0        | 0202                  | 02                     | 14                    | 0.00          | 0             | PL         | -                                    |
| 934              | 06/29/82 | 0        | 0301                  | 03                     | 10                    | 0.00          | 0             | UN         | -                                    |
| 936              | 06/29/88 | U<br>Li  | 1002                  | 10                     | 21                    | 0.00          | 0             | MA         | •                                    |
| 937              | 06/29/88 | ŭ        | 01                    | 01                     | 21                    | 0.00          | 0             | MA         | -                                    |
| 938              | 05/29/88 | U U      | 0701                  | 07                     | 20                    | 0.00          | U             | MA         | -                                    |
| 939              | 06/23/88 | ŭ        | 2109                  | 21                     | 15                    | 0.00          | 0             | PL<br>MA   | -                                    |
| 940              | 06/29/88 | ŭ        | 2109                  | 21                     | 15                    | 0,00          | 0             | 171A<br>MA | +                                    |
| 941              | 06/29/88 | ŭ        | 2701                  | 27                     | 120                   | 0.00          | 0             | MA<br>MA   | +                                    |
| 942              | 06/30/88 | Ũ        | 2102                  | 21                     | 120                   | 0.00          | 0             |            | +                                    |
| 943              | 06/30/88 | Ű        | 0602                  | 06                     | 322                   | 0.00          | ň             | MA         | <b>T</b>                             |
| 944              | 07/01/88 | S        |                       | 0                      | 9432                  | 0.00          | ŏ             | MA         | -                                    |
| 945              | 07/01/88 | S        | 16                    | 16                     | 0                     | 1.00          | ō             | MA         | -                                    |
| 946              | 07/01/88 | S        | 1001                  | 10                     | 0                     | 4.00          | Õ             | MA         |                                      |
| 947              | 07/01/88 | S        | 06                    | 06                     | 0                     | 0.00          | 0             | MA         |                                      |
| 948              | 07/01/88 | S        | 08                    | 08                     | 0                     | 8,00          | 0             | MA         |                                      |
| 949              | 07/01/28 | S        | 0407                  | 04                     | 0                     | 2.00          | 160           | MA         |                                      |
| 950              | 07/01/88 | 2        | 0502                  | 05                     | 0                     | 4.00          | 0             | MA         |                                      |
| 221              | 07/01/58 | <u>ې</u> | 0801                  | 80                     | 0                     | 2.00          | 0             | MA         |                                      |
| 352              | 07/01/03 | <u>ک</u> | 0102                  | 01                     | 0                     | 0.00          | 216           | MA         |                                      |
| 953              | 07/01/00 | S<br>C   | 000105                | 00                     | 0                     | 15.00         | 281           | MA         |                                      |
| 955              | 07/01/28 | د<br>۲   | 1009                  | 10                     | U                     | 12.00         | 13872         | MA         |                                      |
| 956              | 07/01/28 | с<br>2   | 1000                  | 10                     | Ŭ                     | 2.00          | 3628          | MA         |                                      |
| 957              | 07/01/28 | د<br>۲   | 050308                | 05                     | 0                     | 0.25          | 0             | MA         |                                      |
| 958              | 07/01/88 | د<br>۲   | 010101                | 03                     | 0                     | 3.00          | 524           | MA         |                                      |
| 959              | 07/01/88 | ŝ        | 040302                | 04                     | 0                     | 0.00          | 500           | MA<br>MA   |                                      |
| 960              | 07/08/88 | Ũ        | 02                    | 02                     | 1                     | 0.00          | 3/3           | МА<br>МА   |                                      |
|                  |          | -        |                       |                        |                       |               |               |            |                                      |

たからたたたというというという

| RECORD<br>NUMBER  | DATE   | TYPE   | SUB-<br>COMP.<br>CODE   | MAJOR<br>COMP.<br>CODE  | TIME<br>DOWN<br>(min)  | LABOR<br>(hr)   | PARTS<br>(\$)   | FAIL MO   | DDE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-)  |
|---|--|--------|---|---|--|---|---|---|-----|---|
| RECORD<br>NUMBER<br>961<br>962<br>963<br>964<br>965<br>966<br>967<br>968<br>969<br>970<br>971<br>972<br>973<br>974<br>975<br>977<br>977<br>978<br>977<br>977<br>978<br>977<br>977<br>978<br>977<br>978<br>979<br>981<br>982<br>983<br>984<br>985<br>987<br>988<br>985<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>988<br>987<br>987 | DATE<br>07/08/88<br>07/10/88<br>07/11/88<br>07/11/88<br>07/11/88<br>07/12/88<br>07/12/88<br>07/12/88<br>07/12/88<br>07/13/88<br>07/13/88<br>07/13/88<br>07/13/88<br>07/15/88<br>07/15/88<br>07/15/88<br>07/15/88<br>07/15/88<br>07/15/88<br>07/15/88<br>07/15/88<br>07/15/88<br>07/15/88<br>07/15/88<br>07/15/88<br>07/15/88<br>07/15/88<br>07/17/88<br>07/17/88<br>07/17/88<br>07/17/88<br>07/17/88<br>07/17/88<br>07/17/88<br>07/17/88<br>07/17/88<br>07/17/88<br>07/17/88<br>07/17/88<br>07/21/88<br>07/22/88<br>07/22/88<br>07/22/88<br>07/23/88<br>07/23/88<br>07/24/88<br>07/24/88<br>07/24/88 |        | COMP.<br>CODE<br>0202<br>2112<br>0509<br>210302<br>0201<br>020304<br>0509<br>1002<br>2112<br>020304<br>0301<br>0306<br>2107<br>0509<br>1606<br>2114<br>0509<br>010101<br>2111<br>2112<br>0202<br>2106<br>2102<br>180105<br>0301<br>2102<br>0301<br>2102<br>0301<br>2102<br>01<br>1603<br>0509 | COMP.<br>CODE<br>02<br>21<br>05<br>21<br>02<br>02<br>02<br>02<br>02<br>02<br>02<br>02<br>02<br>02<br>02<br>02<br>02 | Time<br>DOWN<br>(min)<br>5<br>15<br>15<br>20<br>0<br>40<br>20<br>15<br>65<br>35<br>421<br>0<br>10<br>15<br>90<br>305<br>30<br>15<br>30<br>10<br>17<br>77<br>31<br>13<br>0<br>68<br>0<br>15<br>300<br>15<br>300 | LABOR<br>(hr)<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0. | PARTS<br>(\$)<br>0<br>313<br>0<br>0<br>176<br>189<br>0<br>143<br>0<br>143<br>0<br>143<br>0<br>56<br>0<br>0<br>393<br>0<br>0<br>750<br>0<br>0<br>0<br>750<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | FAIL MO<br>PL<br>MA<br>CL<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA<br>MA | L   | STATUS<br>ON=(+)<br>OFF=(-)<br>-<br>+<br>+<br>+<br>+<br>-<br>-<br>-<br>-<br>+<br>+<br>+<br>+<br>+<br>+<br>+<br>-<br>-<br>-<br>+<br>+<br>+<br>+<br>+<br>+<br>-<br>-<br>-<br>-<br>+<br>+<br>+<br>+<br>+<br>+<br>-<br>-<br>-<br>-<br>-<br>+<br>+<br>+<br>+<br>+<br>+<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- |
| 995   | 07/25/28   | U<br>U | 160105  | 16  | 30   | 0.00  | 0<br>0  | MA<br>PL  |     | +   |
| 990<br>997  | 07/27/88   | U<br>U | 0802<br>2302  | 08<br>23  | 7  | 0.00  | 0   | FÖ  |     | -   |
| 938   | 07/27/98   | Ŭ      | 260304  | 26  | 30   | 0.00  | 0   | MA  |     | +   |
| 999   | 07/28/88   | Ū      | 2106  | 21  | 5  | 0.00  | U   | MA  |     | +   |
| 1000  | 07/29/88   | Ŭ      | 1005  | 10  | 120  | 0.00  | U<br>n  | MA<br>MA  |     | +   |
|   |  |        |   |   |  |   |   | 417.5.8   |     | 1   |

| HUNDER DATE FILE CODE CODE (MIN) (NY) (\$) FAIL MODE OFF  |  |
|---|--|
| 1001 07/29/88 U 2001 20 5 0.00 0 MA -   |  |
| 1002 07/29/88 U 020304 02 37 0.00 0 MA  |  |
| 1003 07/30/88 U 2112 21 5 0.00 0 MA +   |  |
| 1004 07/30/88 U 2112 21 34 0.00 313 MA -  |  |
| 1005 07/31/88 U 0301 03 77 0.00 0 MA -  |  |
| 1006 08/01/88 U 260304 26 60 0.00 O MA +  |  |
| 1007 08/01/88 U 2111 21 15 0.00 50 MA +   |  |
| 1008 08/03/88 U 2302 23 420 0.00 224 MA +   |  |
| 1009 08/03/88 U 2302 23 60 0.00 0 MA +  |  |
| 1010 08/04/88 U 230203 23 30 0.00 0 MA +  |  |
| 1011 08/04/88 0 0509 05 30 0.00 0 MA +  |  |
| 1012 08/04/88 0 06 06 10 0.00 0 BD + 1013 08/04/88 0 060105 06 20 0.00 0 BD + 1013 08/04/89 0 060105 06 20 0.00 0 00 00 00 00 00 00 00 00 00 00 0 |  |
| 1013 $08/05/88$ $11$ $2112$ $21$ $co = 0.00$ $0$ $10$   |  |
| 1014 00/05/88 0 2112 21 60 0.00 0 MA + 1015 08/06/88 0 020304 02 60 0.00 0 MA   |  |
| 1015 08/06/88 0 020334 02 00 0.00 0 MA 1016 08/06/88 0 1002 10 30 0.00 0 MA   |  |
| 1017 08/07/88 U 0 34 0.00 0 FP F  |  |
| 1018 08/07/88 U 1001 10 210 0.00 0 MA   |  |
| 1019 08/09/88 U 030101 03 15 0.00 0 AD  |  |
| 1020 08/10/88 U 0411 04 195 0.00 226 MA   |  |
| 1021 08/10/88 U 0 91 0.00 0 IP  |  |
| 1022 08/11/88 U 0802 08 21 0.00 0 F0  |  |
| 1023 08/11/88 U 0802 08 12 0.00 0 F0  |  |
| 1024 08/11/88 U 0411 04 26 0.00 225 MA .  |  |
| 1025 08/11/88 U 0411 04 82 0.00 226 MA -  |  |
| 1026 08/12/88 U 260304 26 25 0.00 0 MA +  |  |
| 1027 08/12/88 U 0802 08 130 0.00 0 F0   |  |
| 1028 08/13/88 S 0 11551 0.00 0 MA -   |  |
| 1029 08/13/88 S 14 14 0 1.00 0 MA   |  |
| 1030 08/13/88 S 08 08 0 3.50 0 MA   |  |
| 1031 08/13/88 5 16 16 C 1.00 0 MA   |  |
| 1032 08/13/88 5 1/01 1/ 0 0.75 0 MA   |  |
| 1033 03/13/08 5 1001 10 0 8.00 0 MA 1034 09/13/98 5 1405 14 0 1.50  |  |
| 1037 00/13/00 S 1405 14 U I.50 O MA<br>1035 08/13/38 S 050105 05 0 0 0 0 0  |  |
| 1036 08/13/88 S 180103 18 0 4 00 0 MA   |  |
| 1037 08/13/88 S 100501 10 0 0.00 0 MA   |  |
| 1038 08/13/88 S 0603 06 0 0.00 0 MA   |  |
| 1039 08/13/88 S 100501 10 0 0.00 0 MA   |  |
| 1040 08/13/88 S 100501 10 0 2 00 0 MA   |  |

| RECORD<br>NUMBER | DATE     | ΤΥΡΕ     | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|----------|-----------------------|------------------------|-----------------------|---------------|---------------|-----------|--------------------------------------|
| 1041             | 08/13/88 | S        | 1405                  | 14                     | 0                     | 2.00          | n             | MA        |                                      |
| 1042             | 08/13/88 | S        | 0201                  | 02                     | Ō                     | 4.00          | õ             | MA        |                                      |
| 1043             | 08/13/88 | S        | 16                    | 16                     | 0                     | 1.00          | Ō             | MA        |                                      |
| 1044             | 03/13/88 | S        | 1005                  | 10                     | 0                     | 0.50          | ŏ             | MA        |                                      |
| 1045             | 08/13/88 | S        | 140402                | 14                     | 0                     | 1.00          | ŏ             | MA        |                                      |
| 1046             | 08/13/88 | S        | 050606                | 05                     | 0                     | 3.00          | õ             | MA        |                                      |
| 1047             | 08/13/88 | S        | 0401                  | 04                     | 0                     | 6.00          | Ő             | MA        |                                      |
| 1048             | 08/13/88 | S        | 0411                  | 04                     | 0                     | 0.00          | 226           | MA        |                                      |
| 1049             | 08/13/88 | S        | 1603                  | 16                     | 0                     | 6.00          | 0             | MA        |                                      |
| 1050             | 08/13/88 | S        | 0802                  | 80                     | 0                     | 2.50          | Ō             | MA        |                                      |
| 1051             | 08/13/88 | S        |                       | 0                      | 0                     | 120.00        | Ō             | MA        |                                      |
| 1052             | 08/13/88 | S        | 0101                  | 01                     | 0                     | 8.00          | Ō             | MA        |                                      |
| 1053             | 08/13/88 | 5        | 0202                  | 02                     | 0                     | 12.00         | 0             | MA        |                                      |
| 1054             | 08/21/88 | U        | 2114                  | 21                     | 60                    | 0.00          | 0             | MA        | +                                    |
| 1055             | 08/21/88 | U        | 020303                | 02                     | 102                   | 0.00          | 0             | MA        | -                                    |
| 1057             | 00/21/88 | 0        | 0203                  | 02                     | 10                    | 0.00          | 0             | UN        | -                                    |
| 1059             | 08/21/88 | 0        | 0203                  | 02                     | 113                   | 0.00          | 0             | MA        | -                                    |
| 1050             | 08/22/28 | 0        | 2114                  | 02                     | 102                   | 0.00          | 0             | MA        | -                                    |
| 1060             | 08/23/88 |          | 2503                  | 21                     | 20                    | 0.00          | 0             | MA        | +                                    |
| 1061             | 08/27/88 | ŭ        | 0202                  | 02                     | 25                    | 0.00          | 0             | MA        | +                                    |
| 1052             | 08/28/88 | ŭ        | 0202                  | 02                     | 20<br>60              | 0.00          | 0             | PL        | -                                    |
| 1063             | 08/28/88 | Ŭ        | 0202                  | 02                     | 13                    | 0.00          | 0             | PL        | -                                    |
| 1064             | 08/28/88 | Ū        | 2503                  | 25                     | 60                    | 0.00          | 0             | BU        | -                                    |
| 1065             | 08/29/88 | U        | 0203                  | 02                     | 1                     | 0.00          | 0             | MA<br>UN  | +                                    |
| 1066             | 08/29/88 | U        | 0203                  | 02                     | 6                     | 0.00          | 0             |           | -                                    |
| 1057             | 08/29/88 | U        | 0203                  | 02                     | ō                     | 0.00          | n             | tin       | +                                    |
| 1068             | 08/29/88 | U        | 1002                  | 10                     | 59                    | 0.00          | õ             | MΔ        | +                                    |
| 1069             | 08/29/88 | U        | 020303                | 02                     | 19                    | 0.00          | ŏ             | I P       | -                                    |
| 1070             | 08/29/83 | U        | 020302                | 02                     | 4147                  | 0.00          | Ō             | MA        | -                                    |
| 10/1             | 09/01/88 | U        | 100501                | 10                     | 150                   | 0.00          | Ō             | MA        | +                                    |
| 1072             | 09/01/88 | U        | 0203                  | 02                     | 1520                  | 0.00          | 60000         | MA        | -                                    |
| 1073             | 09/02/88 | U        |                       | 0                      | 25                    | 0.00          | 0             | LP        | -                                    |
| 1079             | 09/02/88 | U        | 0802                  | 08                     | 8                     | 0.00          | 0             | FO        | -                                    |
| 1075             | N3/U2/03 | U        | 0802                  | 80                     | 25                    | 0.00          | 0             | FO        | -                                    |
| 1077             | 03/03/20 | U<br>11  | 0202                  | 80                     | 34                    | 0.00          | G             | FO        | -                                    |
| 1078             | 09/03/88 | 0        | 0301                  | 03                     | 0                     | 0.00          | 0             | UN        | +                                    |
| 1079             | 09/05/88 | 11       | 0301                  | 03                     | 30                    | 0.00          | 0             | MA        | -                                    |
| 1080             | 09/05/89 | 1.       |                       | 0                      | 33                    | 0.00          | 0             | LP        | -                                    |
|                  |          | <b>v</b> |                       | U                      | - 37                  | 0 00          | n             | 10        |                                      |

| RECORD<br>NUMBER | DATE     | τγρε   | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL I     | MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|--------|-----------------------|------------------------|-----------------------|---------------|---------------|------------|------|--------------------------------------|
| 1081             | 09/07/88 | U      | 260304                | 26                     | 15                    | 0.00          | 0             | MA         |      | +                                    |
| 1082             | 09/08/88 | U      | 1002                  | 10                     | 30                    | 0.00          | 0             | MA         |      | -                                    |
| 1083             | 09/08/88 | U      | 080201                | 08                     | 60                    | 0.00          | 1224          | MA         |      | -                                    |
| 1084             | 09/08/88 | U      | 0301                  | 03                     | 246                   | 0.00          | 0             | MA         |      | -                                    |
| 1085             | 09/08/88 | S      |                       | 0                      | 507                   | 0.00          | 0             | BT         |      | -                                    |
| 1086             | 09/09/88 | U      |                       | 0                      | 3780                  | 0.00          | 0             | ST I       | E W  | -                                    |
| 1087             | 09/09/88 | S      |                       |                        | 196                   | 0.00          | 0             | BT         |      | -                                    |
| 1088             | 09/10/88 | U      | 0903                  | 09                     | 10                    | 0.00          | 0             | MA         |      | -                                    |
| 1089             | 09/10/88 | U      | 060201                | 06                     | 195                   | 0.00          | 121           | MA         |      | -                                    |
| 1090             | 09/11/88 | U      | 050401                | 05                     | 310                   | 0.00          | 361           | MA         |      | -                                    |
| 1091             | 09/12/88 | 2      |                       |                        | 1440                  | 0.00          | 0             | BT         |      | -                                    |
| 1092             | 09/13/88 | 2      |                       |                        | 1440                  | 0.00          | 0             | BI         |      | -                                    |
| 1093             | 09/14/88 | 2      | 050310                | 0 <b>5</b>             | 1080                  | 0.00          | 0             | BI         |      | -                                    |
| 1094             | 09/14/88 | 0      | 2114                  | 05                     | 10                    | 0.00          | 250           | MA         |      | -                                    |
| 1095             | 09/14/00 |        | 2114                  | 21                     | 110                   | 0.00          | 0             | MA         |      | +                                    |
| 1090             | 09/14/00 | и ·    | 0301                  | 02                     | 150                   | 0.00          | 0             | AU<br>MA   |      | -                                    |
| 1097             | 09/15/88 | 11     | 0501                  | 05                     | 120                   | 0.00          | 0             | MA<br>MA   |      | -                                    |
| 1030             | 09/16/88 | 1      | 010101                | 01                     | 15                    | 0.00          | 0             | רגיי<br>סמ |      | -                                    |
| 1100             | 09/17/88 | и<br>И | 1002                  | 10                     | 10                    | 0.00          | ň             | MΔ         |      | +                                    |
| 1101             | 09/18/88 | ŭ      | 0202                  | 02                     | 11                    | 0.00          | ň             | DI         |      | -                                    |
| 1102             | 09/18/88 | ŭ      | 0202                  | 02                     | 15                    | 0.00          | õ             | PI         |      | -                                    |
| 1103             | 09/18/88 | Ŭ      | 0202                  | 02                     | 5                     | 0.00          | ŏ             | PI         |      | -                                    |
| 1104             | 09/18/88 | Ũ      | 0202                  | 02                     | 9                     | 0.00          | ō             | PL         |      | -                                    |
| 1105             | 09/19/88 | Ŭ      | 0509                  | 05                     | 15                    | 0.00          | Õ             | PL         |      | +                                    |
| 1106             | 09/19/88 | U      | 0701                  | 07                     | 120                   | 0.00          | Ó             | PL         |      | -                                    |
| 1107             | 09/19/88 | S      | 2114                  | 21                     | 123                   | 0.00          | 0             | CL         |      | +                                    |
| 1108             | 09/20/88 | U      | 1002                  | 10                     | 39                    | 0.00          | 0             | MA         |      | -                                    |
| 1109             | 09/20/88 | U      | 1002                  | 10                     | 16                    | 0.00          | 0             | MA         |      | -                                    |
| 1110             | 09/21/88 | U      | 0306                  | 03                     | 30                    | 0.00          | 0             | MA         |      | +                                    |
| 1111             | 09/21/88 | U      | 1002                  | 10                     | 50                    | 0.00          | 0             | MA         |      | -                                    |
| 1112             | 09/21/88 | U      | 0202                  | 02                     | 356                   | 0.00          | 0             | PL         |      | -                                    |
| 1113             | 09/22/88 | U      | 0301                  | 03                     | 277                   | 0.00          | 0             | MA         |      | -                                    |
| 1114             | 09/22/88 | U      | 0307                  | 03                     | 59                    | 0.00          | 48            | MA         |      | -                                    |
| 1115             | 09/23/88 | U      | 1001                  | 10                     | 358                   | 0.00          | Q             | MA         |      | -                                    |
| 1110             | 09/23/88 | U      | 180201                | 18                     | 15                    | 0.00          | 0             | MA         |      | -                                    |
| 111/             | 09/23/88 | U      | 0301                  | 03                     | 9                     | 0.00          | 0             | MA         |      | -                                    |
| 1118             | 09/24/88 | U      | 0508                  | 05                     | 592                   | 0.00          | 0             | PL         |      | -                                    |
| 1119             | V3/24/88 | 0      | 1301                  | 13                     | 10                    | 0.00          | 392           | MA         |      | -                                    |
| 1120             | UJ/24/00 | U      | 0304                  | 03                     | 420                   | 0.00          | U             | MA         |      | -                                    |

| RECORD<br>NUMBER | DATE                             | TYPE        | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL I | MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------------------------------|-------------|-----------------------|------------------------|-----------------------|---------------|---------------|--------|------|--------------------------------------|
| 1121             | 09/25/88                         | U           | 0502                  | 05                     | 1170                  | 0.00          | ٥             | MΔ     |      |                                      |
| 1122             | 09/25/88                         | U           | 1603                  | 16                     | 270                   | 0.00          | õ             | MΔ     |      | -                                    |
| 1123             | 09/25/88                         | U           | 0502                  | 05                     | 480                   | 0.00          | õ             | MΔ     |      | •                                    |
| 1124             | 09/26/88                         | U           | 0705                  | 07                     | 420                   | 0.00          | ů<br>0        | MΔ     |      | -                                    |
| 1125             | 09/26/88                         | U           | 08                    | 08                     | 540                   | 0.00          | 1300          | MΔ     |      | -                                    |
| 1126             | 09/27/88                         | S           | 2114                  | 21                     | 40                    | 0.00          | 120           | CI     |      | -<br>-                               |
| 1127             | 09/27/88                         | S           | 2114                  | 21                     | 55                    | 0.00          | 0             |        |      | +                                    |
| 1128             | 09/27/88                         | S           | 2114                  | 21                     | 15                    | 0.00          | õ             | CL     |      | +<br>+                               |
| 1129             | 09/27/88                         | U           | 0602                  | 06                     | 630                   | 0.00          | Õ             | BD     |      | -                                    |
| 1130             | 09/27/88                         | U           | 02                    | 02                     | 50                    | 0.00          | Õ             | MA     |      | -                                    |
| 1131             | 09/27/88                         | U           | 0802                  | 08                     | 22                    | 0.00          | Ō             | FO     |      | -                                    |
| 1132             | 09/28/88                         | U           | 230203                | 23                     | 60                    | 0.00          | 148           | MA     |      | ÷                                    |
| 1133             | 09/28/88                         | U           | 0802                  | 08                     | 9                     | 0.00          | Ō             | FO     |      | -                                    |
| 1134             | 09/29/88                         | U           | 0802                  | 08                     | 16                    | 0.00          | Ö             | FO     |      | -                                    |
| 1135             | 09/30/88                         | U           | 010101                | 01                     | 120                   | 0.00          | Ó             | UN     |      | -                                    |
| 1136             | 09/30/88                         | U           | 060201                | 06                     | 740                   | 0.00          | 241           | MA     |      | -                                    |
| 1137             | 09/30/88                         | U           | · 02                  | 02                     | 30                    | 0.00          | 0             | MA     |      | -                                    |
| 1138             | 10/02/88                         | U           | 2502                  | 25                     | 15                    | 0.00          | 0             | MA     |      | +                                    |
| 1139             | 10/03/88                         | U           | 0301                  | 03                     | 282                   | 0.00          | 0             | MA     |      | -                                    |
| 1140             | 10/03/88                         | U           | 240302                | 24                     | 240                   | 0.00          | 40            | MA E   |      | +                                    |
| 1141             | 10/04/88                         | U           | 0509                  | 05                     | 30                    | 0.00          | 0             | MA     |      | +                                    |
| 1142             | 10/04/88                         | U           | 01                    | 01                     | 148                   | 0.00          | 0             | MA     |      | -                                    |
| 1145             | 10/04/88                         | 0           |                       | 10                     | 30                    | 0.00          | 0             | MA     |      | -                                    |
| 1144             | 10/04/00                         | U<br>C      | 2108                  | 21                     | 120                   | 0.00          | 0             | MA     |      | +                                    |
| 1145             | 10/04/00                         | 2           | 2114                  | 21                     | 30                    | 0.00          | 393           | CL     |      | +                                    |
| 1140             | 10/05/00                         | 0           | 210201                | 21                     | 30                    | 0.00          | 0             | MA     |      | -                                    |
| 1148             | 10/00/88                         |             | 040302                | 04                     | 464                   | 0.00          | 786           | MA     |      | -                                    |
| 1140             | 10/07/88                         | 1           | 0404                  | 04                     | 90                    | 0.00          | 410           | MA     |      | -                                    |
| 1150             | 10/07/88                         | 1           | 040302                | 04                     | 23                    | 0.00          | 0             | MA     |      | -                                    |
| 1151             | 10/07/88                         | 11          | 210201                | 04                     | 20                    | 0.00          | 0             | MA     |      | -                                    |
| 1152             | 10/07/88                         | 11          | 040302                | 21                     | 10                    | 0.00          | 85            | MA     |      | -                                    |
| 1153             | 10/09/88                         | 11          | 040302                | 03                     | 20                    | 0.00          | 0             | MA     |      | -                                    |
| 1154             | 10/10/88                         | ц<br>Ц      | 1002                  | 10                     | 12                    | 0.00          | 48            | MA     |      | -                                    |
| 1155             | 10/10/88                         | U<br>U      | 0307                  | 10                     | 970                   | 0.00          | U<br>A O      | MA     |      | -                                    |
| 1156             | 10/10/38                         | Ŭ           | 1001                  | 10                     | 300                   | 0.00          | 48            | MA     |      | -                                    |
| 1157             |                                  |             | 1001                  | 10                     | 230                   | 0.00          | U             | MA     |      | -                                    |
| 1100             | 10/13/88                         | 2           | 2114                  | 21                     | 60                    | <u> </u>      | ~             | C 1    |      |                                      |
| 1158             | 10/13/88<br>10/14/88             | S<br>U      | 2114<br>2114          | 21                     | 60<br>45              | 0.00          | 0             | CL     |      | +                                    |
| 1158             | 10/13/88<br>10/14/88<br>10/15/88 | S<br>U<br>U | 2114<br>2114<br>1701  | 21<br>21<br>17         | 60<br>45<br>24        | 0.00          | 0<br>120      |        |      | +<br>+                               |

a post of the particular of the state of the second of the second of the second of

A CAN WE WARD

ころうう とうちょうちょう かいていたい ちょうかい たんしん ちょうちょう ないまた しょうちょう ないない

| RECORD<br>NUMBER | DATE     | TYPE     | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>( <b>\$</b> ) | FAIL MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|----------|-----------------------|------------------------|-----------------------|---------------|------------------------|-----------|--------------------------------------|
| 1161             | 10/15/88 | U        | 2114                  | 21                     | 35                    | 0.00          | 0                      | CL        | +                                    |
| 1162             | 10/17/88 | S        | 2114                  | 21                     | 120                   | 0.00          | 85                     | CL        | +                                    |
| 1163             | 10/17/88 | U        | 220103                | 22                     | 45                    | 0.00          | 601                    | MA        | +                                    |
| 1164             | 10/18/88 | U        | 0406                  | 04                     | 1                     | 0.00          | 0                      | МА        | -                                    |
| 1165             | 10/18/88 | U        | 2106                  | 21                     | 25                    | 0.00          | 0                      | MA        | +                                    |
| 1166             | 10/18/88 | U        | 2111                  | 21                     | 14                    | 0.00          | 0                      | MA        | -                                    |
| 1167             | 10/18/88 | U        | 2114                  | 21                     | 75                    | 0.00          | 66                     | MA        | +                                    |
| 1168             | 10/19/88 | U        | 1002                  | 10                     | 67                    | 0.00          | 0                      | MA        | -                                    |
| 1169             | 10/19/88 | U        | 2110                  | 21                     | 30                    | 0.00          | 0                      | MA        | -                                    |
| 11/0             | 10/21/88 | U        | 0000                  | 0                      | 0                     | 0.00          | 0                      | MA        | +                                    |
| 11/1             | 10/24/88 | 0        | 1002                  | 06                     | 100                   | 0.00          | 0                      | AD        | -                                    |
| 1172             | 10/24/88 | U<br>11  | 2112                  | 10                     | 30                    | 0.00          | 0                      | MA        | -                                    |
| 1173             | 10/24/00 | Š        | 2112                  | 21                     | 25                    | 0.00          | 258                    | MA        | -                                    |
| 1174             | 10/25/88 | 3<br>11  | 0202                  | 02                     | 50                    | 0.00          | 120                    |           | +                                    |
| 1176             | 10/27/88 | 11       | 2109                  | 21                     | 55<br>15              | 0.00          | 0                      |           | -                                    |
| 1177             | 10/27/88 | ŭ        | 0508                  | 05                     | 15                    | 0.00          | 0                      | mA<br>DI  | ÷                                    |
| 1178             | 10/27/88 | ŭ        | 0903                  | ñ9                     | 20                    | 0.00          | 0                      | MA        | -                                    |
| 1179             | 10/30/88 | Ŭ        | 2106                  | 21                     | 30                    | 0.00          | 0                      |           | -                                    |
| 1180             | 10/30/88 | Ũ        | 210301                | 21                     | 15                    | 0.00          | õ                      | MΔ        | +                                    |
| 1181             | 10/31/88 | Ū        | 01                    | 01                     | 6                     | 0.00          | ŏ                      | PI        | -                                    |
| 1182             | 10/31/88 | U        | 0202                  | 02                     | 21                    | 0.00          | ō                      | PI        | -                                    |
| 1183             | 10/31/88 | U        | 2112                  | 21                     | 19                    | 0.00          | Č                      | AD        | -                                    |
| 1184             | 10/31/88 | U        | 2112                  | 21                     | 10                    | 0.00          | 258                    | MA        | -                                    |
| 1185             | 10/31/88 | U        | 01                    | 01                     | 220                   | 0.00          | 0                      | BD        | -                                    |
| 1186             | 11/01/88 | S        |                       | 0                      | 5040                  | 0.00          | 0                      | MA        | -                                    |
| 1187             | 11/01/88 | S        | 1001                  | 10                     | 360                   | 0.00          | 0                      | MA        |                                      |
| 1188             | 11/01/88 | S        | 1601                  | 16                     | 180                   | 0.00          | 0                      | MA        |                                      |
| 1189             | 11/01/88 | S        | 07                    | 07                     | 120                   | 0.00          | 0                      | MA        |                                      |
| 1190             | 11/01/88 | S        | 0301                  | 03                     | 240                   | 0.00          | 0                      | MA        |                                      |
| 1191             | 11/01/88 | S        | 08                    | 08                     | 180                   | 0.00          | 1028                   | MA        |                                      |
| 1192             | 11/01/88 | 2        | 09                    | 09                     | 180                   | 0.00          | 0                      | MA        |                                      |
| 1193             | 11/01/88 | 2        | 1/01                  | 1/                     | 60                    | 0.00          | 30                     | MA        |                                      |
| 1194             | 11/01/88 | 2        | 1802                  | 18                     | 60                    | 0.00          | 0                      | MA        |                                      |
| 1195             | 11/01/88 | 2        | 2115                  | 21                     | 600                   | 0.00          | 771                    | MA        |                                      |
| 1190             | 11/01/88 | <b>)</b> | 1104                  | 19                     | 120                   | 0.00          | 8496                   | MA        |                                      |
| 1102             | 11/04/08 | U<br>c   | 1104                  | 11                     | 15                    | 0.00          | 0                      | MA        | -                                    |
| 1100             | 11/04/00 | 3<br>11  | 2102                  | 21                     | 3030                  | 0.00          | Û                      | BI        | -                                    |
| 1200             | 11/07/00 | 1        | 2103                  | 21                     | 11                    | 0.00          | Ű                      | MA        | -                                    |
| 1400             | 11/0//00 | U        | υz                    | UZ                     | 6                     | 0.00          | 0                      | ΔI]       | -                                    |

| RECORD<br>NUMBER | DATE     | ΤΥΡΕ | SUB-<br>COMP.<br>CODE | MAJOR<br>COMP.<br>CODE | TIME<br>DOWN<br>(min) | LABOR<br>(hr) | PARTS<br>(\$) | FAIL MODE | AUGER<br>STATUS<br>ON=(+)<br>OFF=(-) |
|------------------|----------|------|-----------------------|------------------------|-----------------------|---------------|---------------|-----------|--------------------------------------|
| 1201             | 11/08/88 | U    | 1002                  | 10                     | 7                     | 0.00          | ٥             | МА        |                                      |
| 1202             | 11/10/88 | S    | 2114                  | 21                     | 70                    | 0 00          | ň             | 110       | -                                    |
| 1203             | 11/10/88 | U    | 210301                | 21                     | 45                    | 0.00          | ň             |           | +                                    |
| 1204             | 11/10/88 | U    | 1002                  | 10                     | 30                    | 0.00          | ň             | 51A<br>MA | -                                    |
| 1205             | 11/10/88 | U    |                       | Õ                      | Õ                     | 0.00          | ů č           | FIA<br>UN | -                                    |
| 1206             | 11/11/88 | U    | 0301                  | 03                     | ĥ                     | 0.00          | ő             |           | -                                    |
| 1207             | 11/11/88 | U    | 0201                  | 02                     | 3                     | 0.00          | 0             | 20        | -                                    |
| 1208             | 11/11/88 | U    | 0802                  | 08                     | 10                    | 0.00          | ő             | DU<br>MA  | -                                    |
| 1209             | 11/12/88 | S    |                       |                        | 1440                  | 0.00          | 0             | MA<br>DT  | +                                    |
| 1210             | 11/13/88 | S    |                       |                        | 1380                  | 0.00          | 0             | DI        | -                                    |
| 1211             | 11/13/88 | U    | 0602                  | 06                     | 60                    | 0.00          | 0             |           | -                                    |
| 1212             | 11/14/88 | S    |                       |                        | 720                   | 0.00          | 0             |           | +                                    |
| 1213             | 11/14/88 | U    | 1001                  | 10                     | 690                   | 0.00          | 0             |           | -                                    |
| 1214             | 11/14/88 | U    | 02                    | 02                     | 180                   | 0.00          | 0             | MA<br>MA  | -                                    |
| 1215             | 11/15/88 | U    | 160105                | 16                     | 20                    | 0.00          | ň             | DI        | -                                    |
| 1216             | 11/16/88 | S    | 2114                  | 21                     | 90                    | 0.00          | 0             |           | +                                    |
| 1217             | 11/16/88 | U    | 0602                  | 06                     | 600                   | 0.00          | ů<br>N        |           | +                                    |
| 1218             | 11/17/88 | U    | 0604                  | 06                     | 30                    | 0 00          | ň             | MA        | -                                    |
| 1219             | 11/17/88 | U    | 1701                  | 17                     | 15                    | 0.00          | ň             | DI        | -                                    |
| 1220             | 11/17/88 | U    | 180105                | 18                     | 35                    | 0.00          | ň             |           | -                                    |
| 1221             | 11/17/88 | U    | 0202                  | 02                     | 6                     | 0.00          | ň             | RD        | +                                    |
| 1222             | 11/17/88 | U    | 2116                  | 21                     | 25                    | 0.00          | õ             | MΔ        | -                                    |
| 1223             | 11/19/88 | U    | 230203                | 23                     | 20                    | 0.00          | 640           | MA        | +                                    |

1

and the state of the

「「「「「「「」」」」」

#### NOTES RELATING TO INCINERATOR (MWP-2000) SCHEDULED AND UNSCHEDULED MAINTENANCE DATABASE

- Definition of database fields: Α.
  - 1. RECORD NUMBER
  - DATE (Year, Month, Day) 2.
  - TYPE S=Scheduled, U=Unscheduled 3.
  - 4.
  - SUB- COMP. CODE Code assigned to incinerator component MAJOR COMP. CODE Code assigned to incinerator major components 5. (First two characlers of SUB- COMP. CODE)
  - TIME DOWN (min) Time required to correct problem 6.
  - LABOR (hr) Labor hours required to correct problem 7.
  - PARTS (\$) Cost of replacement parts 8.
  - FAIL MODE Code assigned for cause of component failure 9.
  - 10. AUGER STATUS Code assigned to operating status of auger (Auger OFF=(-) and Auger ON=(+)

B. Definition of failure cause (FAIL MODE) codes:

- 1. AD out of adjustment
- BD failure caused by binding 2.
- 3. BT - burned trash (not actually a failure. This code was used to differentiate between burning of trash and contaminated soils)
- 4. CL - out of calibration
- E cause of failure is from an external source 5.
- FO loss of flame in the kiln or secondary combustion unit 6.
- 7. FR - plugged lines caused by freezing
- 8. HE failure due to human error
- 9. L - loss of room lighting
  - (used in conjunction with E)
- 10. LP - loss of electrical power to component or system
- MA maintenance related activity 11.
- 12. PL failure caused by plugging
- 13. S - loss of water supply to component or system (used in conjunction with E)
- 14. ST - failure due to a storm (e.g., hurricane)
- 15. UN cause of failure unknown
- 16. W failure attributed to adverse weather conditions (used in conjunction with E)

#### APPENDIX D INTERLOCK DATA BASE

1

1

3

185 (The reverse of this page is blank.)

| RECORD  | DATE   | INTERLOCK<br>CODE  | DAILY<br>DOWN<br>TIME<br>(min)   | NUMBER OF<br>INTERLOCKS<br>PER DAY   |
|---|--|--|--|--|
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>11<br>12<br>13<br>14<br>5<br>6<br>7<br>8<br>9<br>0<br>11<br>2<br>12<br>23<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>11<br>2<br>12<br>23<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>11<br>2<br>13<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>11<br>2<br>13<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>11<br>2<br>13<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>11<br>2<br>13<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>11<br>2<br>13<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>11<br>2<br>13<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>11<br>2<br>12<br>23<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>11<br>2<br>12<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>11<br>2<br>12<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>11<br>2<br>12<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>12<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>12<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>3<br>1<br>2<br>3<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>4<br>5<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>4<br>5<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>4<br>5<br>8<br>5<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>4<br>5<br>8<br>5<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>3<br>3<br>3<br>3<br>5<br>8<br>9<br>0<br>1<br>2<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3 | 11/25/87<br>11/26/87<br>11/26/87<br>11/26/87<br>11/27/87<br>11/27/87<br>11/27/87<br>11/27/87<br>11/27/87<br>11/27/87<br>11/29/87<br>11/29/87<br>11/29/87<br>11/29/87<br>11/29/87<br>11/29/87<br>12/01/87<br>12/01/87<br>12/01/87<br>12/02/87<br>12/02/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/03/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/87<br>12/05/ | LRT<br>LRT<br>LKOT<br>CE<br>HCO<br>LKOD<br>LKOT<br>LRT<br>CE<br>HCO<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LRT<br>LKOT<br>LRT<br>LRT<br>LRT<br>LRT<br>LRT<br>LRT<br>LRT<br>LRT<br>LRT<br>LR | $\begin{array}{c}3\\31\\3\\27\\21\\4\\72\\45\\3\\12\\25\\21\\4\\21\\19\\1\\25\\21\\4\\21\\13\\8\\3\\17\\9\\10\\4\\1\\36\\6\\34\\4\\127\\26\\19\\9\\2\\2\\1\\5\\378\\3\\378\\3\\2\end{array}$ | 24<br>3<br>2<br>4<br>25<br>41<br>3<br>2<br>2<br>4<br>25<br>41<br>3<br>2<br>2<br>4<br>1<br>3<br>2<br>2<br>4<br>2<br>4<br>1<br>3<br>2<br>2<br>4<br>2<br>4<br>1<br>3<br>2<br>2<br>4<br>1<br>3<br>2<br>2<br>4<br>1<br>3<br>2<br>2<br>4<br>1<br>3<br>2<br>2<br>4<br>1<br>3<br>2<br>2<br>4<br>1<br>3<br>2<br>2<br>4<br>1<br>3<br>2<br>2<br>4<br>1<br>3<br>2<br>2<br>4<br>1<br>3<br>2<br>2<br>4<br>1<br>3<br>2<br>2<br>4<br>1<br>3<br>2<br>2<br>4<br>1<br>3<br>2<br>2<br>4<br>1<br>3<br>2<br>6<br>5<br>1<br>2<br>6<br>7<br>2<br>4<br>1<br>2<br>5<br>1<br>2<br>6<br>5<br>1<br>2<br>5<br>1<br>2<br>6<br>8<br>1<br>2<br>5<br>1<br>2<br>6<br>8<br>1<br>2<br>5<br>1<br>2<br>6<br>8<br>1<br>2<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>7<br>10<br>10<br>4<br>6<br>3<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>7<br>10<br>10<br>4<br>6<br>3<br>5<br>5<br>5<br>5<br>5<br>7<br>10<br>10<br>4<br>6<br>3<br>5<br>5<br>5<br>5<br>5<br>7<br>10<br>10<br>4<br>6<br>3<br>5<br>5<br>5<br>5<br>5<br>7<br>10<br>10<br>4<br>6<br>3<br>5<br>5<br>5<br>5<br>5<br>7<br>10<br>10<br>4<br>6<br>3<br>5<br>5<br>5<br>5<br>5<br>5<br>7<br>10<br>10<br>4<br>6<br>3<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5 |

187

25 - 5 - 22 -

| RECORD   | DATE     | INTERLOCK<br>CODE | DAILY<br>COWN<br>TIME<br>(min) | NUMBER OF<br>INTERLOCKS<br>PER DAY |
|----------|----------|-------------------|--------------------------------|------------------------------------|
| 46       | 12/12/87 | LKOT              | 131                            | 36                                 |
| 47       | 12/12/87 | КОТВ              | 1                              | 8                                  |
| 48       | 12/12/87 | НСО               | 53                             | 3                                  |
| 49       | 12/12/8/ | LRT               | 6                              | 5                                  |
| 50       | 12/12/8/ |                   | 17                             | 2                                  |
| 52       | 12/12/07 |                   | 5                              | 8                                  |
| 53       | 12/13/87 | CE DARK           | 14                             | 18                                 |
| 54       | 12/13/87 | нсо               | 25                             | 6                                  |
| 55       | 12/13/87 | HARPM             | 5611                           | 03                                 |
| 56       | 12/13/87 | LPTR              | 2                              | 8                                  |
| 57       | 12/13/87 | LSOT              | 21                             | 21                                 |
| 58       | 12/13/87 | LRT               | 18                             | 23                                 |
| 59       | 12/13/87 | КОТВ              | 6                              | 21                                 |
| 60       | 12/13/87 | LKOD              | 1                              | 4                                  |
| 61<br>62 | 12/13/8/ |                   | 55                             | 53                                 |
| 67       | 12/15/8/ |                   | 55                             | 122                                |
| 64       | 12/15/87 | LKOT              | 10                             | 133                                |
| 65       | 12/15/87 | HCO               | 82                             | 5                                  |
| 66       | 12/15/87 | HAFR              | 2                              | 14                                 |
| 67       | 12/16/87 | HAFR              | 1                              | 7                                  |
| 68       | 12/16/87 | L02               | 1                              | 1                                  |
| 69<br>70 | 12/16/87 | CE                | 37                             | 8                                  |
| 70       | 12/16/8/ | LSOT              | 13                             | 5                                  |
| 72       | 12/10/8/ |                   | 45                             | 35                                 |
| 73       | 12/16/87 |                   | 102                            | 23                                 |
| 74       | 12/17/87 | IKOT              | 102                            | 12                                 |
| 75       | 12/17/87 | HAFR              | 2                              | 18                                 |
| 76       | 12/17/87 | LSOT              | 14                             | 5                                  |
| 77       | 12/17/87 | LRT               | 1                              | 15                                 |
| 78       | 12/17/87 | CE                | 8                              | 1                                  |
| 79       | 12/17/87 | НСО               | 70                             | 14                                 |
| 80       | 12/18/8/ | HCO               | 10                             | 1                                  |
| 01<br>82 | 12/18/8/ |                   | 23                             | 25                                 |
| 83       | 12/10/07 | CE CE             | 3                              | 20                                 |
| 84       | 12/18/87 | IRT               | 1 7                            | 1                                  |
| 85       | 12/19/87 | LKOT              | 83                             | 47                                 |
| 86       | 12/19/87 | CE                | 4                              | 2                                  |
| 87       | 12/19/87 | HAFR              | 2                              | 12                                 |
| 88       | 12/19/87 | HCO               | 21                             | 3                                  |
| 89       | 12/20/37 | НСО               | 49                             | 11                                 |
| 30       | 12/20/87 | LKOT              | 129                            | 106                                |

| RECORD  | DATE  | INTERLOCK<br>CODE  | DAILY<br>DOWN<br>TIME<br>(min)   | NUMBER OF<br>INTERLOCKS<br>PER DAY   |
|---|---|--|--|--|
| 91<br>92<br>93<br>94<br>95<br>96<br>97<br>98<br>99<br>100<br>101<br>102<br>103<br>104<br>105<br>106<br>107<br>108<br>109<br>110<br>111<br>112<br>113<br>114<br>115<br>116<br>117<br>118<br>119<br>120<br>121<br>123<br>124<br>125<br>126<br>127<br>128<br>129<br>130<br>131<br>132<br>133<br>134<br>135 | 12/20/87<br>12/27/87<br>12/27/87<br>12/27/87<br>12/27/87<br>12/27/87<br>12/28/87<br>12/28/87<br>12/28/87<br>12/28/87<br>12/28/87<br>12/29/87<br>12/29/87<br>12/29/87<br>12/29/87<br>12/29/87<br>12/29/87<br>12/29/87<br>12/29/87<br>12/29/87<br>12/29/87<br>12/30/87<br>12/30/87<br>12/30/87<br>12/30/87<br>12/30/87<br>12/30/87<br>12/30/87<br>12/30/87<br>12/30/87<br>12/30/87<br>12/30/87<br>12/30/87<br>12/30/87<br>12/30/87<br>12/30/87<br>12/30/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/87<br>12/31/88<br>01/02/88<br>01/03/88<br>01/03/88<br>01/03/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/05/88<br>01/ | LKOD<br>LKOT<br>HCO<br>CE<br>LO2<br>COA<br>LSOT<br>LKOT<br>HAFR<br>CE<br>HCO<br>LRT<br>LSOT<br>HAFR<br>HCO<br>CE<br>LKOT<br>LRT<br>LSOT<br>HAFR<br>HCO<br>SRL<br>LKOT<br>LRT<br>LKOT<br>HAFR<br>HCO<br>HAFR<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LRT<br>LKOT<br>LRT<br>LRT<br>LKOT<br>LRT<br>LKOT<br>LRT<br>LRT<br>LKOT<br>LRT<br>LRT<br>LKOT<br>LRT<br>LRT<br>LKOT<br>LRT<br>LRT<br>LRT<br>LRT<br>LRT<br>LRT<br>LRT<br>LRT<br>LRT<br>LR | 39<br>568<br>70<br>21<br>5<br>7<br>868<br>27<br>2<br>18<br>15<br>17<br>20<br>16<br>66<br>56<br>8<br>7<br>2<br>11<br>0<br>4<br>8<br>12<br>5<br>9<br>71<br>5<br>23<br>33<br>11<br>6<br>13<br>2<br>12<br>17<br>9<br>6<br>6<br>5<br>1<br>0<br>1<br>5<br>7<br>8<br>6<br>8<br>7<br>2<br>1<br>5<br>7<br>8<br>6<br>8<br>7<br>2<br>1<br>5<br>7<br>8<br>6<br>8<br>7<br>2<br>1<br>5<br>7<br>8<br>6<br>8<br>7<br>2<br>1<br>5<br>7<br>8<br>6<br>8<br>7<br>2<br>1<br>5<br>7<br>8<br>6<br>8<br>7<br>2<br>1<br>5<br>7<br>8<br>6<br>8<br>7<br>2<br>1<br>5<br>7<br>8<br>6<br>8<br>7<br>2<br>1<br>5<br>7<br>8<br>6<br>8<br>7<br>2<br>1<br>5<br>7<br>8<br>6<br>8<br>7<br>2<br>1<br>5<br>7<br>8<br>6<br>8<br>7<br>2<br>1<br>8<br>6<br>7<br>2<br>1<br>8<br>6<br>7<br>2<br>1<br>8<br>6<br>7<br>2<br>1<br>8<br>6<br>7<br>2<br>1<br>8<br>6<br>8<br>7<br>2<br>1<br>8<br>6<br>7<br>2<br>1<br>8<br>6<br>7<br>2<br>1<br>8<br>6<br>7<br>2<br>1<br>8<br>6<br>7<br>2<br>1<br>8<br>6<br>7<br>2<br>1<br>8<br>6<br>6<br>6<br>8<br>7<br>2<br>1<br>10<br>6<br>6<br>6<br>5<br>8<br>7<br>2<br>1<br>10<br>6<br>6<br>6<br>5<br>8<br>7<br>2<br>1<br>10<br>6<br>6<br>6<br>5<br>8<br>7<br>2<br>1<br>10<br>6<br>6<br>6<br>5<br>8<br>7<br>2<br>1<br>10<br>4<br>8<br>12<br>5<br>9<br>7<br>1<br>5<br>23<br>3<br>3<br>11<br>6<br>6<br>6<br>5<br>8<br>7<br>2<br>1<br>1<br>10<br>6<br>6<br>6<br>6<br>8<br>7<br>7<br>1<br>1<br>10<br>6<br>6<br>6<br>5<br>8<br>7<br>7<br>1<br>1<br>10<br>6<br>6<br>6<br>6<br>7<br>7<br>1<br>1<br>10<br>6<br>6<br>6<br>7<br>8<br>7<br>7<br>1<br>1<br>10<br>6<br>6<br>6<br>8<br>7<br>7<br>7<br>1<br>5<br>7<br>7<br>1<br>5<br>2<br>3<br>3<br>3<br>11<br>6<br>6<br>5<br>1<br>1<br>9<br>1<br>5<br>7<br>1<br>1<br>9<br>1<br>5<br>3<br>3<br>3<br>1<br>1<br>6<br>6<br>5<br>1<br>1<br>9<br>1<br>1<br>9<br>1<br>1<br>9<br>1<br>1<br>9<br>1<br>1<br>9<br>1<br>1<br>9<br>1<br>1<br>9<br>1<br>1<br>1<br>9<br>1<br>1<br>9<br>1<br>1<br>1<br>1<br>9<br>1<br>1<br>1<br>9<br>1<br>1<br>1<br>1<br>1<br>1<br>9<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | $\begin{array}{c} 42\\ 53\\ 10\\ 16\\ 2\\ 3\\ 8\\ 15\\ 11\\ 2\\ 2\\ 106\\ 1\\ 121\\ 8\\ 5\\ 29\\ 47\\ 4\\ 74\\ 1\\ 6\\ 77\\ 57\\ 14\\ 9\\ 1\\ 1\\ 6\\ 209\\ 44\\ 62\\ 7\\ 6\\ 27\\ 9\\ 9\\ 20\\ 2\\ 31\\ 6\\ 6\\ 76\\ 26\end{array}$ |

うち、ちろうないないない、あっていたないないないないないです。

19 A.

いたとうないです。などのないでは、「ないないない」ので、「ないないない」で、

| RECORD | DATE               | INTERLOCK<br>CODE | DAILY<br>DOWN<br>TIME<br>(min) | NUMBER OF<br>INTERLOCKS<br>PER DAY |
|--------|--------------------|-------------------|--------------------------------|------------------------------------|
| 136    | 01/06/88           | HCO               | 29                             | 5                                  |
| 137    | 01/13/88           |                   | 10                             | 13                                 |
| 139    | 01/13/88           | LRT               | 21                             | 4<br>21                            |
| 140    | 01/13/88           | LKOT              | 18                             | 12                                 |
| 141    | 01/13/88           | HAFR              | 8                              | 52                                 |
| 142    | 01/13/88           | HCO               | 38                             | 4                                  |
| 143    | 01/14/88           |                   | 5                              | 11                                 |
| 145    | 01/14/88           | HAFK<br>IDT       | 40                             | 15                                 |
| 146    | 01/14/88           | HCO               | 3                              | 27                                 |
| 147    | 01/15/88           | HAFR              | 7                              | 67                                 |
| 148    | 01/15/88           | LRT               | 5                              | 4                                  |
| 149    | 01/16/88           | LKOT              | 16                             | 11                                 |
| 150    | 01/17/83           | HCO               | 7                              | 2                                  |
| 152    | 01/17/88           |                   | 49                             | 40                                 |
| 153    | 01/18/88           | 102               | 21                             | 29                                 |
| 154    | 01/18/88           | LRT               | 14                             | 5                                  |
| 155    | 01/18/88           | НСО               | 21                             | 10                                 |
| 156    | 01/19/88           | HCO               | 8                              | 4                                  |
| 15/    | 01/19/88           | HAFR              | 12                             | 52                                 |
| 150    | 01/19/88           | LUZ               | 6<br>15                        | 7                                  |
| 160    | 01/20/88           | IPTR              | 15                             | 38<br>1                            |
| 161    | 01/20/88           | LKOT              | 48                             | 33                                 |
| 162    | 01/20/88           | CE                | 7                              | 3                                  |
| 163    | 01/20/88           | LRT               | 26                             | 7                                  |
| 164    | 01/21/88           | LSOT              | 2                              | 3                                  |
| 165    | 01/21/88           |                   | 20                             | 35                                 |
| 167    | 01/22/88           | HAER              | 23                             | 4                                  |
| 168    | 01/23/88           | LKOT              | 3                              | 5                                  |
| 169    | 01/23/88           | HCO               | 14                             | 5                                  |
| 170    | 01/23/88           | HAFR              | 2                              | 15                                 |
| 1/1    | 01/24/88           | SRL               | 2                              | 6                                  |
| 172    | 01/25/88           | HAFK              | 15                             | 19                                 |
| 174    | 01/25/88           | HCO               | 40                             | 14                                 |
| 175    | 01/27/88           | HAFR              | 28                             | 157                                |
| 176    | 01/28/88           | LKOT              | 2                              | 5                                  |
| 177    | 01/28/88           | HAFR              | 21                             | 136                                |
| 178    | 01/30/88           | KOTB              | 5                              | 21                                 |
| 179    | 02/01/88           |                   | 2                              | 2                                  |
|        | 146 6 14 1 7 7 161 | 1 5 1 4 1         |                                |                                    |

| RECORD  | DATE   | INTERLOCK<br>CODE   | DAILY<br>DOWN<br>TIME<br>(min)  | NUMBER OF<br>INTERLOCKS<br>PER DAY  |
|---|--|---|---|---|
| 181<br>182<br>183<br>184<br>185<br>186<br>187<br>188<br>189<br>190<br>191<br>192<br>193<br>194<br>195<br>196<br>197<br>198<br>199<br>200<br>201<br>202<br>203<br>204<br>205<br>206<br>207<br>208<br>209<br>210<br>211<br>212<br>213<br>214<br>215<br>216<br>217<br>218<br>219<br>220<br>221<br>222<br>223<br>224<br>225 | 02/01/88<br>02/01/88<br>02/02/88<br>02/02/88<br>02/02/88<br>02/03/88<br>02/03/88<br>02/03/88<br>02/03/88<br>02/03/88<br>02/04/88<br>02/04/88<br>02/05/88<br>02/05/88<br>02/06/88<br>02/06/88<br>02/06/88<br>02/06/88<br>02/06/88<br>02/06/88<br>02/06/88<br>02/06/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/07/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88<br>02/08/88 | LO2<br>HCO<br>LKOT<br>HCO<br>LO2<br>HAFR<br>SRL<br>LSOT<br>HCO<br>LKOT<br>LRT<br>HAFR<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKO | $1 \\ 16 \\ 1 \\ 14 \\ 13 \\ 22 \\ 5 \\ 5 \\ 4 \\ 1 \\ 4 \\ 26 \\ 3 \\ 22 \\ 30 \\ 1 \\ 9 \\ 22 \\ 20 \\ 13 \\ 5 \\ 1 \\ 5 \\ 20 \\ 13 \\ 5 \\ 1 \\ 5 \\ 30 \\ 10 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 9 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 39 \\ 31 \\ 20 \\ 5 \\ 30 \\ 10 \\ 5 \\ 39 \\ 31 \\ 20 \\ 31 \\ 31 \\ 20 \\ 31 \\ 31 \\ 31 \\ 31 \\ 31 \\ 31 \\ 31 \\ 3$ | $ \begin{array}{c} 1\\ 2\\ 2\\ 3\\ 4\\ 180\\ 28\\ 3\\ 1\\ 2\\ 25\\ 30\\ 160\\ 1\\ 163\\ 5\\ 2\\ 49\\ 15\\ 1\\ 54\\ 2\\ 5\\ 2\\ 5\\ 5\\ 4\\ 4\\ 7\\ 2\\ 15\\ 1\\ 54\\ 2\\ 5\\ 2\\ 5\\ 5\\ 4\\ 4\\ 7\\ 2\\ 14\\ 50\\ 30\\ 4\\ \end{array} $ |

to be a light of the state

| RECORD  | DATE   | INTERLOCK<br>CODE  | DAILY<br>DOWN<br>TIME<br>(min)   | NUMBER OF<br>INTERLOCKS<br>PER DAY   |
|---|--|--|--|--|
| 226<br>227<br>228<br>229<br>230<br>231<br>232<br>233<br>235<br>237<br>238<br>239<br>240<br>241<br>242<br>243<br>245<br>246<br>251<br>252<br>253<br>256<br>257<br>258<br>260<br>261<br>262<br>263<br>265<br>266<br>266<br>266<br>266 | 02/18/88<br>02/18/88<br>02/18/88<br>02/19/88<br>02/19/88<br>02/19/88<br>02/19/88<br>02/19/88<br>02/19/88<br>02/19/88<br>02/19/88<br>02/20/88<br>02/20/88<br>02/20/88<br>02/20/88<br>02/20/88<br>02/20/88<br>02/20/88<br>02/20/88<br>02/20/88<br>02/20/88<br>02/20/88<br>02/20/88<br>02/20/88<br>02/20/88<br>02/21/88<br>02/21/88<br>02/21/88<br>02/21/88<br>02/21/88<br>02/21/88<br>02/22/88<br>02/22/88<br>02/22/88<br>02/22/88<br>02/22/88<br>02/22/88<br>02/22/88<br>02/22/88<br>02/22/88<br>02/22/88<br>02/22/88<br>02/22/88<br>02/22/88<br>02/22/88<br>02/23/88<br>02/23/88<br>02/23/88<br>02/23/88<br>02/23/88<br>02/23/88<br>02/23/88<br>02/23/88<br>02/23/88<br>02/23/88<br>02/23/88<br>02/23/88<br>02/23/88<br>02/23/88<br>02/23/88<br>02/23/88<br>02/23/88 | CE<br>LPTR<br>HAFR<br>HCO<br>LO2<br>HCO<br>LSOT<br>HAFR<br>LKOT<br>LRT<br>CE<br>LO2<br>CE<br>LSOT<br>HCO<br>HAFR<br>LKOT<br>HCO<br>LRT<br>HAFR<br>LKOT<br>LPTR<br>LKOT<br>LPTR<br>LKOT<br>LPTR<br>LKOT<br>LPTR<br>LKOT<br>LPTR<br>LKOT<br>LC2<br>LRT<br>HAFR<br>LKOT<br>LC2<br>LRT<br>LC0<br>LRT<br>LC0<br>LRT<br>LC0<br>LC2<br>LRT<br>LC0<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2 | 2<br>1<br>5<br>13<br>27<br>30<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>1<br>16<br>8<br>42<br>21<br>16<br>8<br>42<br>21<br>16<br>8<br>42<br>21<br>16<br>8<br>42<br>21<br>16<br>8<br>42<br>21<br>16<br>8<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>9<br>275<br>38<br>42<br>21<br>10<br>3<br>4<br>2<br>14<br>9<br>14<br>12<br>5<br>3<br>10<br>2<br>7<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>9<br>10<br>2<br>4<br>5<br>5<br>9<br>10<br>2<br>4<br>5<br>5<br>9<br>10<br>2<br>4<br>5<br>5<br>9<br>10<br>2<br>4<br>5<br>5<br>9<br>10<br>2<br>12<br>4<br>5<br>5<br>9<br>10<br>2<br>12<br>4<br>5<br>5<br>9<br>10<br>2<br>12<br>4<br>5<br>5<br>9<br>10<br>2<br>12<br>12<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10 | $ \begin{array}{c} 1\\3\\33\\4\\20\\10\\17\\1\\9\\22\\11\\11\\21\\3\\4\\3\\1\\24\\2\\12\\4\\4\\18\\5\\10\\4\\3\\46\\10\\6\\10\\1\\9\\3\\1\\2\\3\\2\\37\\7\\15\\1\\18\\7\end{array} $ |
| 270   | 02/24/88   | CE   | 3  | 1  |

| RECORD  | DATE   | INTERLOCK<br>CODE  | DAILY<br>DOWN<br>TIME<br>(min)   | NUMBER OF<br>INTERLOCKS<br>PER DAY  |
|---|--|--|--|---|
| 272<br>273<br>274<br>275<br>276<br>277<br>278<br>280<br>281<br>282<br>283<br>284<br>285<br>286<br>287<br>288<br>289<br>290<br>291<br>292<br>293<br>294<br>295<br>296<br>297<br>298<br>299<br>300<br>301<br>302<br>303<br>304<br>305<br>306<br>307<br>308<br>309<br>310<br>311<br>312<br>313<br>314<br>315 | 02/25/88<br>02/25/88<br>02/25/88<br>02/25/88<br>02/25/88<br>02/25/88<br>02/25/88<br>02/26/88<br>02/26/88<br>02/26/88<br>02/26/88<br>02/26/88<br>02/26/88<br>02/26/88<br>02/26/88<br>02/26/88<br>02/27/88<br>02/27/88<br>02/27/88<br>02/27/88<br>02/27/88<br>02/28/88<br>02/28/88<br>02/28/88<br>02/28/88<br>02/29/88<br>02/29/88<br>02/29/88<br>02/29/88<br>02/29/88<br>02/29/88<br>03/01/88<br>03/01/88<br>03/01/88<br>03/01/88<br>03/01/88<br>03/01/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/02/88<br>03/03/88<br>03/03/88<br>03/03/88<br>03/03/88 | LPTR<br>LKOD<br>LKOT<br>HAFR<br>HCO<br>CE<br>LO2<br>LRT<br>LKOD<br>HAFR<br>LO2<br>LKOT<br>LSOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LSOT<br>LC2<br>HAFR<br>LC2<br>LKOT<br>LKOT<br>LKOT<br>LSOT<br>LC2<br>KOTB<br>LKOT<br>LSOT<br>LC2<br>KOTB<br>LKOT<br>LSOT<br>LC2<br>LRT<br>HCO<br>LSOT<br>LC2<br>LRT<br>LSOT<br>LC2<br>LRT<br>LSOT<br>LC2<br>LRT<br>LSOT<br>LC2<br>LRT<br>LC2<br>LRT<br>LC2<br>LC2<br>LRT<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2 | 1<br>36<br>45<br>33<br>6<br>38<br>4<br>3<br>9<br>4<br>0<br>2<br>7<br>2<br>9<br>7<br>6<br>8<br>5<br>7<br>3<br>1<br>2<br>6<br>2<br>3<br>1<br>9<br>4<br>0<br>2<br>7<br>2<br>9<br>7<br>6<br>8<br>5<br>7<br>3<br>1<br>2<br>6<br>2<br>3<br>1<br>9<br>5<br>4<br>2<br>1<br>9<br>7<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>8<br>1<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>6<br>8<br>5<br>7<br>8<br>2<br>8<br>5<br>7<br>8<br>1<br>2<br>6<br>8<br>5<br>7<br>8<br>5<br>7<br>8<br>2<br>8<br>7<br>8<br>2<br>8<br>2<br>7<br>8<br>2<br>8<br>2<br>8<br>7<br>7<br>8<br>2<br>8<br>7<br>8<br>2<br>8<br>1<br>2<br>8<br>2<br>8<br>1<br>9<br>5<br>8<br>8<br>9<br>7<br>8<br>7<br>8<br>8<br>8<br>8<br>9<br>7<br>8<br>8<br>9<br>7<br>8<br>7<br>8<br>8<br>8<br>8 | 2<br>19<br>35<br>5<br>2<br>7<br>11<br>38<br>9<br>13<br>7<br>6<br>12<br>5<br>6<br>7<br>9<br>6<br>4<br>2<br>1<br>9<br>5<br>2<br>5<br>2<br>15<br>9<br>4<br>7<br>11<br>1<br>4<br>2<br>8 |

...!

| RECORD  | DATE   | INTERLOCK<br>CODE   | DAILY<br>DOWN<br>TIME<br>(min)   | NUMBER OF<br>INTERLOCKS<br>PER DAY  |
|---|--|---|--|---|
| 316<br>317<br>318<br>319<br>320<br>321<br>322<br>323<br>324<br>325<br>326<br>327<br>328<br>329<br>330<br>331<br>332<br>333<br>334<br>335<br>336<br>337<br>338<br>339<br>340<br>341<br>342<br>343<br>344<br>345<br>346<br>347<br>348<br>349<br>351<br>352<br>354<br>355<br>356<br>357<br>358 | 03/04/88<br>03/04/88<br>03/04/88<br>03/04/88<br>03/04/88<br>03/04/88<br>03/04/88<br>03/04/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/05/88<br>03/10/88<br>03/10/88<br>03/10/88<br>03/10/88<br>03/10/88<br>03/11/88<br>03/11/88<br>03/11/88<br>03/11/88<br>03/11/88<br>03/11/88<br>03/11/88<br>03/11/88<br>03/12/88<br>03/12/88<br>03/12/88<br>03/12/88<br>03/12/88<br>03/12/88<br>03/12/88<br>03/12/88<br>03/12/88<br>03/12/88<br>03/12/88<br>03/12/88<br>03/12/88<br>03/12/88<br>03/13/88<br>03/13/88<br>03/13/88<br>03/13/88<br>03/13/88<br>03/13/88<br>03/13/88<br>03/13/88<br>03/14/88<br>03/14/88<br>03/14/88 | LKOD<br>LSOT<br>HCO<br>LO2<br>CE<br>'KOT<br>RT<br>HAFR<br>HAFR<br>LKOD<br>LRT<br>LKOD<br>HAFR<br>LRT<br>LKOD<br>HAFR<br>LRT<br>LCO<br>LKOT<br>CE<br>LKOT<br>CE<br>LKOT<br>LKOD<br>HAFR<br>LRT<br>HCO<br>CE<br>LKOT<br>LKOD<br>HAFR<br>LRT<br>LCO<br>LKOT<br>CE<br>LKOT<br>LKOD<br>HAFR<br>LRT<br>LCO<br>LKOT<br>CE<br>LKOT<br>LKOD<br>HAFR<br>LRT<br>LCO<br>LKOT<br>CE<br>LKOT<br>LKOD<br>HAFR<br>LRT<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO | 23<br>10<br>33<br>23<br>17<br>6<br>13<br>20<br>9<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>43<br>29<br>47<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>16<br>20<br>947<br>17<br>20<br>947<br>17<br>20<br>947<br>17<br>20<br>947<br>17<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>11<br>20<br>947<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10 | 26<br>9<br>5<br>5<br>10<br>17<br>5<br>3<br>20<br>15<br>18<br>1<br>1<br>2<br>20<br>15<br>18<br>1<br>1<br>2<br>2<br>10<br>23<br>7<br>7<br>4<br>21<br>3<br>19<br>14<br>14<br>9<br>1<br>9<br>8<br>13<br>1<br>5<br>5<br>8<br>1<br>40<br>8<br>2<br>2<br>3<br>6<br>2 |
| 359<br>360  | 03/15/88   | HAFR  | 44<br>4  | 11  |

and the startes and a set a start was

| RECORD   | DATE   | INTERLOCK<br>CODE  | DAILY<br>DOWN<br>TIME<br>(min)   | NUMBER OF<br>INTERLOCKS<br>PER DAY   |
|--|--|--|--|--|
| 361<br>362<br>363<br>364<br>365<br>367<br>370<br>371<br>372<br>373<br>374<br>375<br>377<br>378<br>381<br>382<br>383<br>384<br>385<br>387<br>389<br>391<br>392<br>394<br>395<br>397<br>398<br>397<br>395<br>397<br>398<br>397<br>397<br>398<br>397<br>397<br>397<br>397<br>397<br>397<br>397<br>397<br>397<br>397 | 03/15/88<br>03/15/88<br>03/16/88<br>03/16/88<br>03/16/88<br>03/16/88<br>03/18/88<br>03/18/88<br>03/18/88<br>03/18/88<br>03/19/88<br>03/19/88<br>03/19/88<br>03/19/88<br>03/19/88<br>03/19/88<br>03/19/88<br>03/20/88<br>03/20/88<br>03/20/88<br>03/20/88<br>03/20/88<br>03/20/88<br>03/20/88<br>03/20/88<br>03/20/88<br>03/21/88<br>03/21/88<br>03/21/88<br>03/21/88<br>03/21/88<br>03/21/88<br>03/21/88<br>03/22/88<br>03/22/88<br>03/22/88<br>03/22/88<br>03/22/88<br>03/22/88<br>03/22/88<br>03/22/88<br>03/22/88<br>03/22/88<br>03/22/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/23/88<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/83<br>03/24/ | HCO<br>LRT<br>LKOT<br>HCO<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LCO<br>LO2<br>COA<br>HACO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>L | 9<br>19<br>3<br>18<br>10<br>6<br>33<br>3<br>4<br>9<br>1<br>3<br>3<br>17<br>13<br>15<br>7<br>9<br>47<br>10<br>73<br>6<br>11<br>3<br>7<br>6<br>2<br>3<br>5<br>3<br>10<br>12<br>7<br>3<br>2<br>4<br>7<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10 | $\begin{array}{c} 4\\ 14\\ 1\\ 1\\ 1\\ 3\\ 1\\ 6\\ 31\\ 35\\ 1\\ 2\\ 7\\ 4\\ 21\\ 1\\ 76\\ 3\\ 6\\ 7\\ 1\\ 11\\ 37\\ 109\\ 1\\ 3\\ 8\\ 1\\ 38\\ 1\\ 38\\ 1\\ 38\\ 1\\ 38\\ 1\\ 1\\ 9\\ 3\\ 2\\ 2\\ 2\\ 2\\ 2\\ 1\\ 4\\ 1\\ 1\\ 1\end{array}$ |

 $\mathbf{C}_{\mathbf{r}}$ 

#### INCINERATOR (MWP-2000) INSTRUMENTATION INTERLOCK DATABASE - Cont'd

| RECORD   | DATE   | INTERLOCK<br>CODE  | DAILY<br>DOWN<br>TIME<br>(min) | NUMBER OF<br>INTERLOCKS<br>PER DAY  |
|--|--|--|--------------------------------|---|
| 406<br>407<br>408<br>409<br>410<br>411<br>412<br>413<br>414<br>415<br>416<br>417<br>418<br>419<br>420<br>421<br>422<br>423<br>424<br>425<br>426<br>427<br>428<br>429<br>430<br>431<br>432<br>433<br>434<br>435<br>436<br>437<br>438<br>439<br>440<br>441<br>442<br>443<br>444<br>445 | 03/24/88<br>03/25/88<br>03/25/88<br>03/25/88<br>03/25/88<br>03/25/88<br>03/25/88<br>03/25/88<br>03/26/88<br>03/26/88<br>03/26/88<br>03/26/88<br>03/26/88<br>03/26/88<br>03/26/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/27/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/29/88<br>03/31/88<br>03/31/88<br>03/31/88<br>03/31/88<br>03/31/88<br>03/31/88<br>03/31/88 | HAFR<br>LO2<br>HCO<br>CE<br>LKOD<br>HAFR<br>LSOT<br>HAFR<br>LO2<br>LRT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LC2<br>LRT<br>SRL<br>HAFR<br>LO2<br>LSOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LC2<br>LKOT<br>LKOT<br>LC2<br>LKOT<br>LKOT<br>LC2<br>LKOT<br>LC2<br>LKOT<br>LC2<br>LKOT<br>LC2<br>LKOT<br>LC2<br>LKOT<br>LC2<br>LKOT<br>LC2<br>LKOT<br>LC2<br>LKOT<br>LC2<br>LKOT<br>LC2<br>LKOT<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2 |                                | 22<br>3<br>1<br>1<br>8<br>5<br>2<br>13<br>15<br>1<br>10<br>20<br>11<br>28<br>2<br>8<br>1<br>9<br>18<br>21<br>12<br>13<br>3<br>14<br>14<br>2<br>3<br>10<br>39<br>5<br>26<br>5<br>18<br>7 |
| 447<br>448<br>449  | 04/01/88<br>04/01/88<br>04/01/88   | HAFR<br>LKOT<br>LKOD   | 114<br>33<br>8                 | 36<br>37<br>46  |
| 450  | 04/01/88   | L02  | 22                             | 15  |

a the state of the state of the

196

where an an arrange

| RECORD  | DATE   | INTERLOCK<br>CODE   | DAILY<br>DOWN<br>TIME<br>(min)   | NUMBER OF<br>INTERLOCKS<br>PER DAY  |
|---|--|---|--|---|
| 451<br>452<br>453<br>454<br>455<br>456<br>457<br>458<br>459<br>460<br>461<br>462<br>463<br>464<br>465<br>466<br>467<br>468<br>469<br>471<br>472<br>473<br>474<br>475<br>477<br>478<br>479<br>480<br>481<br>482<br>483<br>485<br>486<br>487<br>489<br>490<br>491<br>492<br>493 | 04/02/88<br>04/02/88<br>04/02/88<br>04/02/88<br>04/02/88<br>04/02/88<br>04/02/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/03/88<br>04/04/88<br>04/04/88<br>04/05/88<br>04/05/88<br>04/05/88<br>04/05/88<br>04/05/88<br>04/05/88<br>04/05/88<br>04/05/88<br>04/05/88<br>04/05/88<br>04/05/88<br>04/05/88<br>04/05/88<br>04/05/88<br>04/05/88<br>04/05/88<br>04/06/88<br>04/06/88<br>04/06/88<br>04/08/88<br>04/08/88<br>04/08/88<br>04/08/88<br>04/08/88<br>04/08/88<br>04/08/88<br>04/09/88<br>04/09/88<br>04/09/88<br>04/09/88<br>04/09/88<br>04/09/88<br>04/09/88<br>04/09/88<br>04/11/88<br>04/11/88<br>04/13/88<br>04/13/88<br>04/13/88<br>04/13/88<br>04/14/88<br>04/14/88 | LRT<br>HAFR<br>CE<br>LO2<br>LKOT<br>HC0<br>HAFR<br>LO2<br>LKOT<br>HAFR<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>HAFR<br>HCO<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT | $\begin{array}{c}1\\7\\2\\11\\6\\16\\3\\20\\1\\9\\17\\23\\1\\2\\23\\1\\7\\23\\265\\10\\2\\4\\267\\2\\1\\60\\85\\28\\8\\9\\4\\1\\1\\73\\52\\2\end{array}$ | $ \begin{array}{c} 1\\7\\1\\9\\11\\22\\1\\8\\3\\24\\3\\13\\10\\1\\1\\6\\8\\13\\2\\9\\13\\14\\18\\1\\1\\1\\39\\1\\1\\15\\11\\13\\7\\3\\21\\26\\4\\1\\29\\1\\15\\15\\15\\15\\15\\15\\15\\15\\15\\15\\15\\15\\1$ |
| 494<br>495  | 04/14/88<br>04/14/88   | LKOT<br>LKOD  | 3  | 2   |

and the second second

1. T. T. S.

| 496         04/14/88         HAFR           497         04/14/88         LRT           498         04/15/88         HCO           499         04/15/88         CE           500         04/15/88         LKOT  | CK TIME INTERLOCK<br>(min) PER DAY  |
|--|---|
| 501         04/15/88         HAFR           502         04/15/88         LKOD           503         04/16/88         LSOT           504         04/16/88         LSOT           504         04/16/88         HAFR           505         04/16/88         HAFR           506         04/16/88         LKOT           507         04/17/88         LKOT           508         04/17/88         LKOT           509         04/17/88         LKOT           501         04/17/88         LKOT           503         04/17/88         LKOT           506         04/17/88         LKOT           507         04/17/88         LKOT           508         04/17/88         LKOT           510         04/17/88         LKOT           511         04/18/88         LKOT           512         04/18/88         LKOT           514         04/18/88         LKOD           517         04/18/88         LKOD           519         04/19/88         LQ2           520         04/19/88         LKOD           521         04/19/88         LKOT | $\begin{array}{c} 120 & 64 \\ 1 & 1 \\ 9 & 5 \\ 5 & 2 \\ 33 & 27 \\ 19 & 16 \\ 6 & 10 \\ 22 & 1 \\ 11 & 2 \\ 46 & 7 \\ 7 & 9 \\ 16 & 14 \\ 1 & 1 \\ 2 & 2 \\ 7 & 3 \\ 3 & 12 \\ 50 & 30 \\ 18 & 11 \\ 89 & 35 \\ 16 & 7 \\ 3 & 10 \\ 7 & 1 \\ 8 & 7 \\ 2 & 1 \\ 24 & 14 \\ 179 & 59 \\ 16 & 11 \\ 7 & 35 \\ 21 & 2 \\ 34 & 27 \\ 3 & 2 \\ 63 & 50 \\ 63 & 34 \\ 5 & 2 \\ 1 & 2 \\ 20 & 8 \\ 27 & 2 \\ 72 & 40 \\ 1 & 3 \\ 55 & 26 \\ \end{array}$ |
| 536         04/21/88         LRT           537         04/21/88         CE           538         04/22/88         COA           539         04/22/88         HCO   | 3 1<br>7 6<br>3 11<br>9 7   |

| 541       04/22/88       KTS0       1       1         542       04/22/88       HAFR       132       44         543       04/23/88       HCO       8       5         544       04/23/88       HCO       8       5         545       04/23/88       CE       3       3         546       04/24/88       LKOT       5       10         547       04/24/88       CE       3       4         548       04/24/88       HCO       14       8         549       04/24/88       HAFR       100       12         551       04/25/88       HAFR       100       12         551       04/26/88       LKUT       9       13         552       04/26/88       LKUD       1       3         554       04/26/88       LKUD       1       3         555       04/26/88       LKUT       14       5         556       04/26/88       LKUT       14       5         557       04/26/88       LKUT       1       1         559       04/27/88       LKOT       6       5         561       04/27/88 | RECORD   | DATE   | INTERLOCK<br>CODE  | DAILY<br>DOWN<br>TIME<br>(min)   | NUMBER OF<br>INTERLOCKS<br>PER DAY   |
|---|--|--|--|--|--|
| 583       05/07/88       HAFR       112       18         584       05/07/88       LKOT       14       15         585       05/07/88       LPTR       14       14  | 541<br>542<br>543<br>545<br>545<br>545<br>545<br>555<br>555<br>555<br>555<br>555 | 04/22/88<br>04/23/88<br>04/23/88<br>04/23/88<br>04/23/88<br>04/23/88<br>04/24/88<br>04/24/88<br>04/24/88<br>04/25/88<br>04/25/88<br>04/25/88<br>04/26/88<br>04/26/88<br>04/26/88<br>04/26/88<br>04/26/88<br>04/26/88<br>04/26/88<br>04/26/88<br>04/27/88<br>04/27/88<br>04/27/88<br>04/27/88<br>04/27/88<br>04/27/88<br>04/28/88<br>04/28/88<br>04/28/88<br>04/28/88<br>04/28/88<br>04/28/88<br>04/28/88<br>04/29/88<br>04/29/88<br>04/29/88<br>04/29/88<br>04/29/88<br>04/29/88<br>04/29/88<br>04/30/88<br>04/30/88<br>04/30/88<br>05/04/88<br>05/06/88<br>05/06/88<br>05/06/88<br>05/07/88<br>05/07/88<br>05/07/88 | KTSO<br>HAFR<br>HCO<br>HAFR<br>CE<br>LKOT<br>CE<br>HCO<br>HAFR<br>LKOT<br>HCO<br>LKOT<br>HCO<br>LKOT<br>HCO<br>LKOT<br>HCO<br>LKOT<br>HAFR<br>LKOT<br>HCO<br>LKOT<br>CE<br>LSOT<br>HCO<br>CE<br>LKOT<br>HAFR<br>LKOT<br>HCO<br>LKOT<br>LSOT<br>HAFR<br>LKOT<br>HCO<br>LKOT<br>LSOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>LSOT<br>HAFR<br>LKOT<br>LSOT<br>HAFR<br>LKOT<br>LSOT<br>HAFR<br>LKOT<br>LSOT<br>LSOT<br>HAFR<br>LKOT<br>LSOT<br>LSOT<br>LSOT<br>LSOT<br>LSOT<br>LSOT<br>LSOT<br>LS | $     \begin{array}{r}       1 \\       132 \\       8 \\       91 \\       3 \\       5 \\       3 \\       14 \\       104 \\       100 \\       9 \\       9 \\       1 \\       14 \\       121 \\       8 \\       1 \\       14 \\       121 \\       8 \\       1 \\       7 \\       5 \\       6 \\       22 \\       6 \\       3 \\       4 \\       108 \\       128 \\       19 \\       52 \\       32 \\       47 \\       1 \\       7 \\       10 \\       8 \\       27 \\       13 \\       2 \\       39 \\       19 \\       3 \\       12 \\       13 \\       2 \\       39 \\       19 \\       3 \\       112 \\       14 \\       14 \\       14     \end{array} $ | $ \begin{array}{c} 1 \\ 44 \\ 5 \\ 18 \\ 3 \\ 10 \\ 4 \\ 8 \\ 15 \\ 12 \\ 13 \\ 6 \\ 3 \\ 6 \\ 5 \\ 14 \\ 5 \\ 14 \\ 5 \\ 14 \\ 5 \\ 16 \\ 17 \\ 13 \\ 6 \\ 11 \\ 31 \\ 25 \\ 28 \\ 17 \\ 1 \\ 25 \\ 19 \\ 1 \\ 4 \\ 18 \\ 15 \\ 14 \\ 15 \\ 15 \\ 15 \\ 15 \\ 15 \\ 15 \\ 15 \\ 15$ |

and the state of a prest to be the the the the band to be an an and a sector of the state of the

"water and a state

| RECORD  | DATE   | INTERLOCK<br>CODE   | DAILY<br>DOWN<br>TIME<br>(min)  | NUMBER DE<br>INTERLOCKS<br>PER DAY  |
|---|--|---|---|---|
| 586<br>587<br>588<br>589<br>590<br>591<br>592<br>593<br>595<br>595<br>596<br>597<br>598<br>599<br>600<br>601<br>602<br>597<br>598<br>599<br>600<br>601<br>602<br>603<br>604<br>605<br>606<br>607<br>612<br>613<br>614<br>615<br>616<br>617<br>618<br>620<br>621<br>622<br>623<br>625<br>626 | 05/08/88<br>05/08/88<br>05/08/88<br>05/08/88<br>05/08/88<br>05/08/88<br>05/09/88<br>05/09/88<br>05/09/88<br>05/09/88<br>05/09/88<br>05/10/88<br>05/10/88<br>05/10/88<br>05/10/88<br>05/11/88<br>05/11/88<br>05/11/88<br>05/11/88<br>05/12/88<br>05/12/88<br>05/12/88<br>05/12/88<br>05/12/88<br>05/12/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/13/88<br>05/14/88<br>05/15/88<br>05/15/88<br>05/16/88<br>05/16/88 | LKOD<br>HCO<br>CE<br>LSOT<br>HAFR<br>LRT<br>LKOD<br>LRT<br>LKOD<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>HAFR<br>LRT<br>LKOT<br>LKOD<br>HAFR<br>LRT<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>LKOT<br>LCO<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LCO<br>LKOD<br>HAFR<br>LKOT<br>LCO<br>LKOD<br>HAFR<br>LKOT<br>LCO<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LKOD<br>HCO<br>LCO<br>LKOD<br>HCO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>LCO<br>L | (m:n)<br>2<br>3<br>1<br>2<br>5<br>1<br>9<br>14<br>1<br>17<br>3<br>4<br>1<br>5<br>4<br>1<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>5<br>4<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>4<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>6<br>3<br>4<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>2<br>4<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>5<br>4<br>2<br>4<br>2<br>7<br>2<br>2<br>2<br>3<br>7<br>1<br>2<br>4<br>2<br>7<br>2<br>4<br>2<br>7<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>5<br>4<br>2<br>4<br>2<br>7<br>2<br>4<br>2<br>7<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>2<br>5<br>4<br>2<br>1<br>2<br>7<br>2<br>1<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>2<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>2<br>2<br>2<br>2<br>2<br>3<br>7<br>1<br>2<br>3<br>1<br>2<br>2<br>2<br>2<br>2<br>3<br>1<br>2<br>3<br>1<br>2<br>2<br>2<br>2<br>2<br>3<br>1<br>2<br>2<br>2<br>2<br>2<br>3<br>2<br>3<br>1<br>2<br>2<br>2<br>2<br>2<br>2<br>3<br>2<br>3<br>1<br>2<br>2<br>2<br>2<br>3<br>2<br>2<br>2<br>2<br>3<br>2<br>3<br>2<br>3<br>2<br>2<br>2<br>2<br>2<br>3<br>2<br>3<br>2<br>3<br>2<br>2<br>2<br>2<br>2<br>3<br>2<br>3<br>2<br>3<br>2<br>2<br>2<br>2<br>3<br>2<br>2<br>2<br>3<br>2<br>2<br>2<br>2<br>2<br>3<br>2<br>3<br>2<br>2<br>2<br>2<br>2<br>2<br>3<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>3<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2 | 7         1         2         1         2         1         2         1         2         1         3         1         2         1         3         1         2         1         1         1         1         1         1         1         1         1         1         1         1 <td< td=""></td<> |
| 627<br>628<br>629<br>630  | 05/16/88<br>05/16/88<br>05/16/88<br>05/17/88   | LSOT<br>LKOT<br>HAFR<br>LO2   | 2<br>6<br>34  | 6<br>12<br>6<br>2   |

| RECORD   | DATE   | INTERLOCK<br>CODE  | DAILY<br>DOWN<br>TIME<br>(min)   | NUMBER OF<br>INTERLOCKS<br>PER DAY   |
|--|--|--|--|--|
| 631<br>6?2<br>6334<br>6356<br>6389<br>64412<br>6445<br>6447<br>6449<br>65512<br>65567<br>890<br>6662<br>6667<br>890<br>6712<br>734<br>56758<br>90123<br>66567<br>890<br>6667<br>890<br>67123<br>45<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>67345<br>6735677<br>67345<br>6735677<br>67345<br>67356778<br>67356778<br>67377777777777777777777777777777777 | 05/17/88<br>05/17/88<br>05/17/88<br>05/17/88<br>05/17/88<br>05/18/88<br>05/18/88<br>05/18/88<br>05/18/88<br>05/18/88<br>05/18/88<br>05/18/88<br>05/19/88<br>05/19/88<br>05/19/88<br>05/19/88<br>05/19/88<br>05/20/88<br>05/20/88<br>05/20/88<br>05/20/88<br>05/20/88<br>05/20/88<br>05/20/88<br>05/20/88<br>05/20/88<br>05/21/88<br>05/21/88<br>05/21/88<br>05/21/88<br>05/21/88<br>05/21/88<br>05/21/88<br>05/21/88<br>05/21/88<br>05/22/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88<br>05/23/88 | HCO<br>LSOT<br>HAFR<br>LKOD<br>LKOT<br>LFTR<br>LKOD<br>HAFR<br>HCO<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>LKOT<br>HAFR<br>LKOD<br>LKOT<br>HAFR<br>LKOD<br>LKOT<br>HAFR<br>LKOD<br>LKOT<br>HAFR<br>LKOD<br>LKOT<br>HAFR<br>LKOD<br>LKOT<br>HAFR<br>LKOD<br>LKOT<br>HAFR<br>LKOD<br>LKOT<br>HAFR<br>LKOD<br>LKOT<br>HAFR<br>LKOD<br>LKOT<br>HAFR<br>LKOD<br>LKOT<br>LKOT<br>LKOD<br>LKOT<br>LKOT<br>LKOD<br>LKOT<br>LKOD<br>LKOT<br>LKOD<br>LKOT<br>LKOD<br>LKOT<br>LKOD<br>LKOT<br>LKOD<br>LKOT<br>LKOD<br>LKOT<br>LKOD<br>LKOT<br>LKOT<br>LKOD<br>LKOT<br>LKOT<br>LKOD<br>LKOT<br>LKOT<br>LKOD<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT | $\begin{array}{c} 7 \\ 5 \\ 59 \\ 10 \\ 6 \\ 2 \\ 15 \\ 19 \\ 6 \\ 2 \\ 127 \\ 1 \\ 9 \\ 32 \\ 27 \\ 12 \\ 127 \\ 123 \\ 14 \\ 9 \\ 32 \\ 22 \\ 12 \\ 3 \\ 1 \\ 5 \\ 1 \\ 1 \\ 5 \\ 1 \\ 1 \\ 5 \\ 1 \\ 1$ | 3<br>11<br>17<br>54<br>21<br>2<br>84<br>12<br>5<br>31<br>1<br>1<br>57<br>1<br>29<br>61<br>4<br>78<br>135<br>8<br>16<br>12<br>1<br>47<br>11<br>18<br>7<br>8<br>1<br>5<br>9<br>1<br>8<br>8<br>25<br>8<br>6<br>15<br>9<br>1<br>10<br>7<br>7<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10 |

| RECORD   | DATE   | INTERLOCK<br>CODE  | DAILY<br>DOWN<br>TIME<br>(min)  | NUMBER OF<br>INTERLOCKS<br>PER DAY  |
|--|--|--|---|---|
| 676<br>677<br>678<br>679<br>680<br>681<br>682<br>683<br>684<br>685<br>687<br>693<br>694<br>695<br>697<br>698<br>700<br>701<br>702<br>703<br>704<br>705<br>707<br>708<br>709<br>710<br>711<br>712<br>713<br>714<br>715<br>717<br>718<br>720 | 05/28/88<br>05/29/88<br>05/29/88<br>05/30/88<br>05/30/88<br>05/31/88<br>05/31/88<br>06/01/88<br>06/01/88<br>06/01/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/05/88<br>06/05/88<br>06/05/88<br>06/05/88<br>06/05/88<br>06/05/88<br>06/05/88<br>06/06/88<br>06/06/88<br>06/06/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/09/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/02/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88<br>06/03/88 | LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOD<br>LKOT<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT<br>LKOT | 20<br>35<br>6<br>31<br>16<br>3<br>2<br>58<br>7<br>12<br>13<br>76<br>16<br>16<br>16<br>16<br>16<br>16<br>12<br>11<br>12<br>2<br>4<br>8<br>4<br>1<br>3<br>29<br>4<br>3<br>20<br>3<br>1<br>6<br>12<br>16<br>16<br>16<br>16<br>16<br>16<br>16<br>16<br>16<br>16<br>16<br>16<br>16 | 10<br>8<br>2<br>4<br>7<br>5<br>14<br>3<br>9<br>38<br>6<br>15<br>21<br>63<br>5<br>7<br>7<br>18<br>35<br>9<br>1<br>5<br>9<br>9<br>1<br>2<br>1<br>2<br>1<br>5<br>9<br>7<br>5<br>9<br>1<br>2<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>1<br>2<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>1<br>2<br>5<br>1<br>5<br>9<br>1<br>5<br>9<br>1<br>1<br>2<br>2<br>1<br>5<br>5<br>7<br>7<br>5<br>1<br>5<br>9<br>1<br>1<br>2<br>2<br>1<br>5<br>9<br>1<br>1<br>5<br>9<br>1<br>1<br>5<br>9<br>1<br>1<br>5<br>9<br>1<br>1<br>5<br>9<br>1<br>1<br>5<br>9<br>1<br>1<br>5<br>9<br>1<br>1<br>5<br>5<br>7<br>5<br>7<br>5<br>9<br>1<br>5<br>9<br>1<br>1<br>5<br>9<br>1<br>1<br>5<br>5<br>7<br>5<br>7<br>5<br>9<br>1<br>1<br>5<br>9<br>9<br>1<br>1<br>5<br>5<br>9<br>1<br>5<br>9<br>9<br>1<br>1<br>5<br>5<br>9<br>1<br>5<br>9<br>9<br>1<br>5<br>5<br>9<br>9<br>1<br>1<br>5<br>9<br>9<br>1<br>1<br>5<br>9<br>9<br>1<br>5<br>1<br>5 |

| RECORD   | DATE  | INTERLOCK<br>CODE   | DAILY<br>DOWN<br>TIME<br>(min)  | NUMBER OF<br>INTERLOCKS<br>PER DAY   |
|--|---|---|---|--|
| 721<br>722<br>723<br>725<br>726<br>727<br>728<br>730<br>731<br>733<br>736<br>737<br>738<br>739<br>740<br>741<br>743<br>745<br>747<br>748<br>750<br>751<br>753<br>756<br>757<br>758<br>759<br>760<br>761<br>763<br>763<br>763 | 06/13/88<br>06/14/88<br>06/15/88<br>06/15/88<br>06/15/88<br>06/15/88<br>06/15/88<br>06/17/88<br>06/17/88<br>06/18/88<br>06/18/88<br>06/20/88<br>06/20/88<br>06/20/88<br>06/20/88<br>06/21/88<br>06/21/88<br>06/21/88<br>06/21/88<br>06/21/88<br>06/21/88<br>06/22/88<br>06/22/88<br>06/23/88<br>06/23/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/25/88<br>06/27/88<br>06/27/88<br>06/27/88<br>06/27/88<br>06/27/88<br>06/27/88<br>06/27/88<br>06/27/88<br>06/27/88<br>06/27/88<br>06/27/88<br>06/27/88<br>06/27/88<br>06/27/88<br>06/27/88<br>06/2888<br>06/28/88<br>06/28/88<br>06/28/88<br>06/28/88 | LSOT<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LO2<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>LKOD<br>LKOD<br>LKOD<br>LKOD<br>LKOD<br>LKOD<br>LKOD | $ \begin{array}{c} 1\\1\\1\\1\\1\\1\\3\\9\\1\\3\\1\\9\\1\\3\\4\\1\\3\\1\\2\\1\\2\\1\\2\\1\\2\\1\\3\\2\\1\\4\\2\\3\\2\\1\\10\\1\\4\\1\\2\\3\\2\\1\\7\\8\\9\\9\\5\\1\end{array} $ | 3<br>8<br>2<br>5<br>2<br>1<br>8<br>2<br>2<br>8<br>2<br>2<br>8<br>2<br>2<br>8<br>2<br>2<br>8<br>2<br>2<br>8<br>2<br>2<br>8<br>2<br>2<br>8<br>2<br>2<br>8<br>2<br>2<br>8<br>2<br>2<br>8<br>2<br>2<br>8<br>2<br>2<br>8<br>2<br>7<br>5<br>5<br>1<br>7<br>5<br>5<br>2<br>7<br>5<br>3<br>1<br>1<br>9<br>9<br>1<br>2<br>1<br>3<br>1<br>1<br>9<br>9<br>1<br>2<br>1<br>3<br>1<br>1<br>1<br>4<br>2<br>1<br>3<br>1<br>1<br>1<br>4<br>2<br>1<br>3<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 |

| RECORD     | DATE     | INTERLOCK<br>CODE | DAILY<br>DOWN<br>TIME<br>(min) | NUMBER OF<br>INTERLOCKS<br>PER DAY |
|------------|----------|-------------------|--------------------------------|------------------------------------|
| 766        | 06/29/88 | LKOT              | 2                              | 10                                 |
| /6/        | 06/30/88 | HAFR              | 25                             | 4                                  |
| 760        | 06/30/88 | LKOD              | 3                              | 18                                 |
| 709        | 00/30/88 | LSOT              | 2                              | 12                                 |
| 771        | 06/27/89 | HAFK              | 24                             | 3                                  |
| 772        | 07/07/88 |                   | 9                              | 18                                 |
| 773        | 07/07/88 |                   | 12                             | 17                                 |
| 774        | 07/07/88 | HCO               | 15                             | 1                                  |
| 775        | 07/08/88 | HAFR              | 27                             | 8                                  |
| 776        | 07/08/88 | НСО               | 8                              | 7                                  |
| 777        | 07/08/88 | LKOT              | 15                             | 21                                 |
| 778        | 07/09/88 | LKOT              | 7                              | 7                                  |
| 779        | 07/09/88 | нсо               | 3                              | 2                                  |
| 780        | 07/09/88 | HAFR              | 15                             | 4                                  |
| 781        | 07/10/88 | HAFR              | 41                             | 4                                  |
| /82        | 07/10/88 | LKOT              | 4                              | 1                                  |
| /83<br>794 | 07/11/88 | HAFK              | 5                              | 1                                  |
| 785        | 07/11/88 | LKUT              | 15                             | 22                                 |
| 786        | 07/11/88 | HCU               | 4/                             | 8                                  |
| 787        | 07/11/88 | CF                | 10                             | 12                                 |
| 788        | 07/11/88 | LPTR              | 2                              | 1                                  |
| 789        | 07/11/88 | COA               | 11                             | 30                                 |
| 790        | 07/12/88 | нсо               | 14                             | 9                                  |
| 791        | 07/12/88 | LSOT              | 11                             | 7                                  |
| 792        | 07/12/88 | LKOT              | 67                             | 17                                 |
| /93        | 07/13/88 | HCO               | 1                              | 2                                  |
| /94        | 07/13/88 | HAFR -            | 8                              | 3                                  |
| 795        | 07/13/88 | KUIB              | 2                              | 2                                  |
| 797        | 07/13/00 |                   | 64                             | 22                                 |
| 798        | 07/14/88 |                   | 4                              | 2                                  |
| 799        | 07/14/88 | HCO               | 2                              | 2                                  |
| 800        | 07/15/88 | LKOT              | 1                              | 8                                  |
| 801        | 07/15/88 | HAFR              | 23                             | 4                                  |
| 802        | 07/16/88 | HAFR              | 18                             | 3                                  |
| 803        | 07/16/88 | LKOT              | 9                              | 13                                 |
| 804        | 07/17/88 | HAFR              | 19                             | 2                                  |
| 805        | 07/17/88 | LKOT              | 15                             | 12                                 |
| 805        | 07/17/88 | LPTR              | .3                             | 3                                  |
| 007<br>007 | 07/17/88 | L201              | 17                             | 5                                  |
| 808        | 07/18/88 |                   | 5                              | 4                                  |
| 810        | 07/18/88 |                   | 1                              | 5<br>E                             |
|            | ···      | LINUU             | 1                              | a                                  |

1.12

1 1 1

......

a sea the second s

| RECORD  | DATE   | INTERLOCK<br>CODE  | DAILY<br>DOWN<br>TIME<br>(min)  | NUMBER OF<br>INTERLOCKS<br>PER DAY  |
|---|--|--|---|---|
| 811<br>812<br>813<br>814<br>815<br>816<br>817<br>818<br>820<br>821<br>822<br>822<br>822<br>822<br>822<br>822<br>822<br>822<br>822 | 07/18/88<br>07/18/88<br>07/19/88<br>07/19/88<br>07/20/88<br>07/20/88<br>07/20/88<br>07/20/88<br>07/21/88<br>07/21/88<br>07/21/88<br>07/21/88<br>07/22/88<br>07/22/88<br>07/23/88<br>07/23/88<br>07/23/88<br>07/23/88<br>07/24/88<br>07/24/88<br>07/24/88<br>07/24/88<br>07/24/88<br>07/25/88<br>07/25/88<br>07/25/88<br>07/25/88<br>07/26/88<br>07/26/88<br>07/26/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/27/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/88<br>07/29/89<br>07/29/89<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80<br>07/29/80 | HAFR<br>HCO<br>HAFR<br>HCO<br>HAFR<br>LKOT<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>HAFR<br>LKOD<br>LKOT<br>HAFR<br>LKOD<br>LKOT<br>HAFR<br>LKOD<br>LKOT<br>HAFR<br>LKOD<br>LSOT<br>HAFR<br>LKOD<br>HAFR<br>LSOT<br>HAFR<br>LKOD<br>HAFR<br>LSOT<br>HAFR<br>LKOD<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LSOT<br>LSOT<br>LSOT<br>LSOT<br>LSOT<br>LSOT<br>LSOT<br>LSOT | $\begin{array}{c} 13\\ 3\\ 74\\ 1\\ 4\\ 6\\ 1\\ 3\\ 12\\ 1\\ 28\\ 1\\ 5\\ 28\\ 1\\ 7\\ 41\\ 1\\ 1\\ 2\\ 14\\ 7\\ 11\\ 2\\ 2\\ 34\\ 3\\ 8\\ 4\\ 7\\ 14\\ 5\\ 4\\ 4\\ 5\\ 1\\ 1\\ 2\\ 12\\ 7\\ 4\\ 8\\ 1\\ 8\\ 1\\ 2\\ 1\\ 2\\ 7\\ 4\\ 8\\ 1\\ 1\\ 2\\ 1\\ 2\\ 7\\ 4\\ 8\\ 1\\ 1\\ 2\\ 2\\ 1\\ 2\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 2\\ 1\\ 1\\ 2\\ 2\\ 1\\ 2\\ 2\\ 2\\ 2\\ 2\\ 2\\ 2\\ 2\\ 2\\ 2\\ 2\\ 2\\ 2\\$ | 2<br>2<br>10<br>3<br>1<br>3<br>1<br>6<br>8<br>2<br>5<br>8<br>6<br>4<br>13<br>16<br>9<br>2<br>1<br>3<br>9<br>4<br>5<br>7<br>2<br>5<br>5<br>4<br>9<br>1<br>6<br>1<br>5<br>8<br>5<br>15<br>2<br>9<br>3<br>9<br>4<br>5<br>7<br>2<br>5<br>5<br>5<br>4<br>9<br>1<br>6<br>1<br>5<br>8<br>5<br>1<br>5<br>1<br>5<br>1<br>5<br>1<br>5<br>5<br>5<br>5<br>1<br>5<br>5<br>5<br>5 |
| 000   | U//3U/88   | HAFW   | 78  | 17  |

e of the Advertised of the second

| RECORD   | DATE   | INTERLOCK<br>CODE   | DAILY<br>DOWN<br>TIME<br>(min)   | NUMBER OF<br>INTERLOCKS<br>PER DAY  |
|--|--|---|--|---|
| 856<br>857<br>858<br>859<br>860<br>861<br>862<br>863<br>864<br>865<br>866<br>865<br>866<br>867<br>870<br>871<br>872<br>873<br>874<br>875<br>877<br>878<br>879<br>881<br>882<br>883<br>884<br>885<br>885<br>885<br>885<br>885<br>885<br>885<br>885<br>885 | 07/30/88<br>07/30/88<br>07/31/88<br>07/31/88<br>08/01/88<br>08/01/88<br>08/01/88<br>08/02/88<br>08/02/88<br>08/02/88<br>08/03/88<br>08/03/88<br>08/03/88<br>08/03/88<br>08/04/88<br>08/04/88<br>08/04/88<br>08/04/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/05/88<br>08/10/88<br>08/11/88<br>08/11/88<br>08/11/88<br>08/11/88<br>08/11/88 | LODE<br>HCO<br>LSOT<br>LKOT<br>HCO<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>LRT<br>LKOT<br>HAFR<br>LKOT<br>LSOT<br>SRL<br>LC2<br>LRT<br>LKOT<br>HAFR<br>LKOT<br>LSOT<br>SRL<br>LO2<br>LRT<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>LSOT<br>LC2<br>LRT<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2<br>LC2 | (min)<br>3<br>1<br>3<br>6<br>1<br>1<br>6<br>7<br>44<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>40<br>2<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>5<br>8<br>8<br>1<br>1<br>5<br>8<br>8<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>1<br>1<br>1<br>5<br>8<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | PER DAY<br>1<br>2<br>17<br>3<br>13<br>5<br>1<br>8<br>7<br>9<br>6<br>1<br>6<br>3<br>1<br>5<br>11<br>1<br>3<br>16<br>10<br>1<br>1<br>1<br>3<br>16<br>10<br>1<br>1<br>3<br>12<br>1<br>7<br>2<br>11<br>4<br>4<br>15<br>8<br>4 |
| 897<br>898<br>899<br>900   | 08/13/88<br>08/21/88<br>08/21/88   | HAFR<br>HAFR<br>HCO   | 3<br>55<br>12  | 1<br>7<br>4   |

| RECORD  | DATE   | INTERLOCK<br>CODE  | DAILY<br>DOWN<br>TIME<br>(min)  | NUMBER OF<br>INTERLOCKS<br>PER DAY  |
|---|--|--|---|---|
| 901<br>902<br>903<br>904<br>905<br>906<br>907<br>910<br>912<br>913<br>914<br>915<br>917<br>918<br>919<br>921<br>923<br>924<br>925<br>927<br>928<br>929<br>921<br>922<br>925<br>926<br>927<br>928<br>929<br>931<br>933<br>934<br>935<br>937<br>938<br>937<br>938<br>937<br>938<br>937<br>938<br>937<br>938<br>937<br>938<br>937<br>938<br>937<br>938<br>937<br>938<br>937<br>938<br>937<br>938<br>937<br>938<br>937<br>938<br>937<br>938<br>937<br>938<br>937<br>938<br>937<br>937<br>938<br>937<br>937<br>938<br>937<br>937<br>938<br>937<br>937<br>938<br>937<br>937<br>937<br>937<br>937<br>937<br>937<br>937<br>937<br>937 | 08/21/88<br>08/22/88<br>08/22/88<br>08/22/88<br>08/22/88<br>08/23/88<br>08/23/88<br>08/23/88<br>08/23/88<br>08/23/88<br>08/23/88<br>08/23/88<br>08/24/88<br>08/24/88<br>08/24/88<br>08/25/88<br>08/25/88<br>08/25/88<br>08/25/88<br>08/25/88<br>08/25/88<br>08/25/88<br>08/25/88<br>08/25/88<br>08/26/88<br>08/26/88<br>08/26/88<br>08/26/88<br>08/26/88<br>08/26/88<br>08/27/88<br>08/27/88<br>08/27/88<br>08/27/88<br>08/27/88<br>08/27/88<br>08/27/88<br>08/27/88<br>08/27/88<br>08/27/88<br>08/27/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>08/28/88<br>09/02/88<br>09/03/88<br>09/03/88 | LKOT<br>LSOT<br>HAFR<br>HCO<br>LSOT<br>LKOT<br>HCO<br>HAFR<br>LKOT<br>LSOT<br>HAFR<br>LSOT<br>HAFR<br>LKOD<br>HCO<br>HCO<br>HCO<br>HCO<br>HCO<br>HCO<br>HCO<br>HCO<br>HCO<br>HCO | 9<br>1<br>43<br>19<br>4<br>91<br>11<br>68<br>8<br>1<br>143<br>23<br>12<br>39<br>4<br>4<br>26<br>11<br>1<br>23<br>40<br>21<br>4<br>9<br>10<br>11<br>23<br>30<br>4<br>4<br>26<br>11<br>1<br>23<br>30<br>4<br>4<br>26<br>11<br>1<br>23<br>12<br>39<br>4<br>4<br>26<br>11<br>1<br>23<br>12<br>39<br>4<br>4<br>26<br>11<br>1<br>23<br>12<br>39<br>4<br>4<br>26<br>11<br>1<br>23<br>12<br>39<br>4<br>4<br>26<br>11<br>1<br>23<br>12<br>39<br>4<br>4<br>26<br>11<br>1<br>23<br>12<br>39<br>4<br>4<br>26<br>11<br>1<br>23<br>12<br>39<br>4<br>4<br>26<br>11<br>1<br>23<br>10<br>11<br>23<br>12<br>39<br>4<br>4<br>26<br>11<br>1<br>23<br>10<br>11<br>1<br>23<br>10<br>11<br>1<br>23<br>12<br>39<br>4<br>4<br>26<br>11<br>1<br>23<br>30<br>4<br>4<br>26<br>11<br>1<br>23<br>30<br>10<br>11<br>1<br>23<br>30<br>10<br>11<br>1<br>23<br>30<br>10<br>11<br>1<br>23<br>30<br>10<br>11<br>1<br>23<br>30<br>11<br>1<br>23<br>30<br>10<br>11<br>1<br>23<br>30<br>21<br>2<br>3<br>4<br>2<br>3<br>4<br>2<br>3<br>4<br>2<br>3<br>4<br>2<br>11<br>1<br>2<br>3<br>4<br>2<br>3<br>4<br>2<br>11<br>1<br>2<br>3<br>4<br>2<br>11<br>2<br>3<br>10<br>2<br>11<br>2<br>3<br>10<br>27<br>9<br>10<br>11<br>27<br>9<br>13<br>27<br>9<br>13<br>27<br>9<br>13<br>26<br>11<br>27<br>9<br>13<br>26<br>12<br>27<br>9<br>13<br>26<br>12<br>27<br>9<br>13<br>26<br>12<br>27<br>9<br>1<br>36<br>12<br>27<br>9<br>1<br>36<br>12<br>27<br>9<br>1<br>36<br>12<br>27<br>9<br>1<br>36<br>12<br>27<br>9<br>1<br>36<br>12<br>12<br>12<br>12<br>12<br>12<br>12<br>12<br>12<br>12 | $\begin{array}{c} 7\\ 7\\ 7\\ 9\\ 17\\ 25\\ 5\\ 17\\ 9\\ 9\\ 9\\ 1\\ 20\\ 15\\ 11\\ 6\\ 8\\ 7\\ 3\\ 5\\ 5\\ 20\\ 7\\ 1\\ 3\\ 5\\ 5\\ 20\\ 7\\ 1\\ 3\\ 4\\ 14\\ 10\\ 16\\ 15\\ 9\\ 6\\ 5\\ 6\\ 2\\ 7\\ 11\\ 37\\ 24\\ 3\\ 6\\ 2\\ 4\\ 3\\ 4\\ 3\\ 6\\ 2\\ 4\\ 4\\ 3\\ 6\\ 2\\ 4\\ 4\\ 3\\ 6\\ 2\\ 4\\ 4\\ 3\\ 6\\ 2\\ 4\\ 4\\ 3\\ 6\\ 2\\ 4\\ 4\\ 3\\ 4\\ 4\\ 3\\ 6\\ 2\\ 4\\ 4\\ 3\\ 6\\ 2\\ 4\\ 4\\ 3\\ 6\\ 2\\ 4\\ 4\\ 4\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\$ |
| 943<br>944<br>945   | 09/05/88<br>09/05/88<br>09/05/88   | HAFR<br>LKOT   | 42<br>18  | 12<br>24  |

Sec. 40 Army Constant of State 7

Carlow Strate

No. of the second se

a states

のであったので

14.14 M

. الايام الم الم الم الم

| RECORD     | DATE     | INTERLOCK<br>CODE | DAILY<br>DOWN<br>TIME<br>(min) | NUMBER OF<br>INTERLOCKS<br>PER DAY |
|------------|----------|-------------------|--------------------------------|------------------------------------|
| 946        | 09/06/88 | LSOT              | 29                             | 5                                  |
| 947        | 09/06/88 | LKOT              | 4                              | 8                                  |
| 348<br>040 | 09/06/88 |                   | 27                             | 23                                 |
| 950        | 09/14/88 | HAFR              | 38                             | 1                                  |
| 951        | 09/15/88 | HAFR              | 81                             | 16                                 |
| 952        | 09/15/88 | LKOT              | 3                              | 6                                  |
| 953        | 09/16/88 | LKOT              | 44                             | 24                                 |
| 954        | 09/16/88 | HAFR              | 35                             | 6                                  |
| 955        | 09/17/88 | LKOD              | 12                             | 29                                 |
| 956        | 09/1//88 | HAFR              | 60                             | 14                                 |
| 95/        | 09/1//88 |                   | 25                             | 26                                 |
| 950        | 09/17/00 |                   | 15                             | 1                                  |
| 960        | 09/18/88 | 102               | 2                              | 4                                  |
| 961        | 09/18/88 | HAFR              | 57                             | 6                                  |
| 962        | 09/19/88 | HAFR              | 73                             | 15                                 |
| 963        | 09/19/88 | LKOT              | 27                             | 16                                 |
| 964        | 09/19/88 | LKOD              | 1                              | 9                                  |
| 965        | 09/19/88 | LOZ               | 4                              | 8                                  |
| 900        | 09/20/88 | HAFR              | 121                            | 5/                                 |
| 968        | 09/20/88 | 102               | 30<br>2                        | 12                                 |
| 969        | 09/21/88 | HAFR              | 28                             | 17                                 |
| 970        | 09/21/88 | LKOT              | 33                             | 9                                  |
| 971        | 09/21/88 | НСО               | 7                              | 5                                  |
| 972        | 09/22/88 | LKOT              | 35                             | 14                                 |
| 9/3        | 09/22/88 | HAFR              | 54                             | 9                                  |
| 9/4        | 09/22/88 | HLU               | 5                              | 1                                  |
| 976        | 09/22/88 |                   | 1 7                            | 8                                  |
| 977        | 09/23/88 | LSOT              | 1                              | 5                                  |
| 978        | 09/23/88 | LRT               | i                              | ĩ                                  |
| 979        | 09/23/88 | HAFR              | 78                             | 9                                  |
| 980        | 09/23/88 | LKOT              | 8                              | 2                                  |
| 981        | 09/24/88 | LKOD              | 1                              | 7                                  |
| 982        | 09/24/88 | LKOT              | 5                              | 3                                  |
| 903        | 09/2//88 |                   | 25                             | 3                                  |
| 985        | 09/28/88 | CE                | 10                             | 12                                 |
| 986        | 09/28/88 | HAFR              | 68                             | 16                                 |
| 987        | 09/28/88 | HCO               | 4                              | ĩ                                  |
| 988        | 09/29/88 | HAFR              | 142                            | 27                                 |
| 989        | 09/30/88 | LSOT              | 11                             | 6                                  |
| 990        | 09/30/88 | HAFR              | 64                             | ς .                                |

208

/

| RECORD  | DATE   | INTERLOCK<br>CODE   | DAILY<br>DOWN<br>TIME<br>(min)  | NUMBER OF<br>INTERLOCKS<br>PER DAY  |
|---|--|---|---|---|
| 991<br>992<br>993<br>994<br>995<br>996<br>997<br>998<br>999<br>1000<br>1001<br>1002<br>1003<br>1004<br>1005<br>1006<br>1007<br>1008<br>1009<br>1010<br>1011<br>1012<br>1013<br>1014<br>1015<br>1016<br>1017<br>1018<br>1019<br>1020<br>1021<br>1022<br>1023<br>1024<br>1025<br>1026<br>1027<br>1028<br>1029<br>1030 | 10/01/83<br>10/02/88<br>10/02/88<br>10/03/88<br>10/03/88<br>10/05/88<br>10/05/88<br>10/05/88<br>10/07/88<br>10/07/88<br>10/08/88<br>10/08/88<br>10/08/88<br>10/08/88<br>10/08/88<br>10/08/88<br>10/08/88<br>10/08/88<br>10/10/88<br>10/10/88<br>10/10/88<br>10/10/88<br>10/11/88<br>10/11/88<br>10/12/88<br>10/12/88<br>10/12/88<br>10/13/88<br>10/13/88<br>10/15/88<br>10/15/88<br>10/15/88<br>10/15/88<br>10/15/88<br>10/15/88<br>10/17/88<br>10/17/88<br>10/17/88<br>10/17/88<br>10/17/88<br>10/17/88<br>10/17/88<br>10/17/88<br>10/17/88<br>10/17/88<br>10/17/88<br>10/17/88<br>10/17/88<br>10/17/88<br>10/17/88<br>10/17/88 | CODE<br>HAFR<br>LSOT<br>HAFR<br>HAFR<br>HAFR<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LKOT<br>HAFR<br>LRT<br>HAFR<br>SRL<br>RAFR<br>SRL<br>RAFR<br>SRL<br>RAFR<br>SRL<br>RAFR<br>SRL<br>RAFR<br>SRL<br>RAFR<br>SRL<br>RAFR<br>SRL<br>SRL<br>SRL<br>SRL<br>SRL<br>SRL<br>SRL<br>SRL<br>SRL<br>SR | (min)<br>118<br>5<br>38<br>22<br>131<br>4<br>108<br>21<br>142<br>142<br>142<br>142<br>142<br>142<br>142 | PER DAY<br>9<br>1<br>5<br>11<br>4<br>5<br>1<br>11<br>7<br>51<br>4<br>3<br>1<br>21<br>47<br>22<br>1<br>10<br>2<br>6<br>2<br>4<br>3<br>25<br>1<br>12<br>17<br>11<br>24<br>11<br>10<br>2<br>6<br>2<br>4<br>3<br>25<br>1<br>12<br>17<br>11<br>27<br>9<br>5<br>12<br>17<br>11<br>24<br>11<br>25<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 |
| 1032<br>1033<br>1034  | 10/24/88<br>10/24/88<br>10/25/88   | HAFR<br>LKOD<br>HAFR  | 80<br>4<br>64   | 44<br>4<br>12   |
| 1023  | 10/20/88   | HAFR  | 74  | 72  |

| RECORD   | DATE   | INTERLOCK<br>CODE   | DAILY<br>DOWN<br>TIME<br>(min)  | NUMBER OF<br>INTERLOCKS<br>PER DAY   |
|--|--|---|---|--|
| 1036<br>1037<br>1038<br>1039<br>1040<br>1041<br>1042<br>1043<br>1044<br>1045<br>1046<br>1047<br>1048<br>1049<br>1050<br>1051<br>1055<br>1055<br>1055<br>1056<br>1057<br>1058 | 10/27/88<br>10/27/88<br>10/27/88<br>10/27/88<br>10/27/88<br>10/27/88<br>10/28/88<br>10/28/88<br>10/28/88<br>10/28/88<br>10/31/88<br>10/31/88<br>10/31/88<br>11/06/88<br>11/06/88<br>11/06/88<br>11/07/88<br>11/07/88<br>11/07/88<br>11/07/88<br>11/07/88<br>11/07/88                                     | HAFR<br>LKOD<br>LSOT<br>LO2<br>LPTR<br>HAFR<br>LKOD<br>LPTR<br>HAFR<br>HAFR<br>HAFR<br>LKOD<br>LO2<br>LRT<br>HAFR<br>LKOD<br>LAFR<br>LKOD<br>LRT<br>HAFR<br>LKOD<br>LRT<br>HCO<br>LO2<br>LKOD<br>HAFR | (min)<br>60<br>11<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>6<br>5<br>78<br>1<br>2<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7 | 24<br>12<br>4<br>4<br>3<br>12<br>2<br>6<br>10<br>1<br>10<br>5<br>1<br>10<br>5<br>1<br>10<br>7<br>34<br>18<br>2<br>11<br>7<br>7 |
| 1059<br>1060<br>1061<br>1063<br>1064<br>1065<br>1066<br>1067<br>1068<br>1069<br>1070<br>1071<br>1072<br>1073<br>1074<br>1075<br>1076<br>1077<br>1078<br>1079<br>1080         | 11/08/88<br>11/09/88<br>11/09/88<br>11/10/88<br>11/10/88<br>11/10/88<br>11/11/88<br>11/11/88<br>11/11/88<br>11/11/88<br>11/11/88<br>11/12/88<br>11/12/88<br>11/15/88<br>11/15/88<br>11/15/88<br>11/15/88<br>11/15/88<br>11/16/88<br>11/16/88<br>11/17/88<br>11/18/88<br>11/18/88<br>11/19/88<br>11/19/88 | HCO<br>HAFR<br>LRT<br>LO2<br>LKOD<br>HAFR<br>LRT<br>HAFR<br>LKOT<br>HCG<br>LKOT<br>HCG<br>LKOT<br>HCO<br>LPTR<br>HAFR<br>HAFR<br>SRL<br>HAFR<br>HAFR<br>LO2<br>HAFR<br>LO2                            | 10<br>28<br>28<br>1<br>2<br>53<br>13<br>50<br>1<br>3<br>1<br>1<br>2<br>7<br>30<br>2<br>78<br>22<br>1<br>26<br>8   | 3<br>4<br>22<br>3<br>16<br>12<br>4<br>14<br>12<br>1<br>10<br>3<br>3<br>4<br>1<br>8<br>12<br>18<br>2<br>3<br>2<br>2             |

| RECORD | DATE     | INTERLOCK<br>CODE | DAILY<br>DOWN<br>TIME<br>(min) | NUMBER OF<br>INTERLOCKS<br>PER DAY |
|--------|----------|-------------------|--------------------------------|------------------------------------|
| 1081   | 11/19/88 | LRT               | 1                              | 1                                  |

#### CODE IDENTIFICATION USED WITH THE INCINERATOR (MWP-2000) INSTRUMENTATION INTERLOCK DATABASE

and the second second and the bear and the second second with

CODE

DESCRIPTION

Combustion Efficiency

High Average Feed Rate

Low Kiln Outlet Draft Low Kiln Outlet Temperature

Low Retention Time

High Carbon Monoxide (CO)

Kiln Temperature Sensor Out

High Auger RPM

Low Oxygen

Carbon Monoxide (CO) Analyzer Cut

Kiln Outlet Temperature Burnout

Low Packed Tower Recirculation

Scrubber Recirculation Low

Secondary Temperature Burnout

Low Secondary Outlet Temperature

Secondary Temperature Sensor Out

CE COA HAFR HARPM HCO KOTB KTSO LKOD LKOT LO2 LPTR LRT LSOT SRL

STBO

STSO
## NOTICE

The following commercial products (requiring Trademark®) are mentioned in this report. If it becomes necessary to reproduce any segment of this document containing any of these names, this notice must be included as part of that reproduction. 

| Eagle One® | XAD     | PROMIS |
|------------|---------|--------|
| Lotus®     | Molylub |        |
| Ziploc     | Gunnite |        |

Mention of the products listed above does not constitute Air Force or EG&G, Idaho, Inc. endorsement or rejection of this product, and use of information contained herein for advertising purposes without obtaining clearance according to existing contractual agreement is prohibited.

## DISCLAIMER

This book was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, inakes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights. References herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any egency thereof,