FOR ELCAP INTERNAL USE

PROBLEM IDENTIFICATION

Mark Halverson
Pat Gilbride

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Pacific Northwest Laboratory
Richland, Washington 99352

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1.0   Introduction

At some point in your analysis, you will find a problem in the ELCAP data base or will want to know about a problem that someone else has found in the data. The following section discusses the PIRCAR system used to track problems in the ELCAP data.

The PIRCAR system contains documentation of problems found in the ELCAP data base and what solutions were applied to those problems. The term "PIRCAR" comes from two acronyms- PIR and CAR. A PIR is a problem identification report. The PIR documents a problem that was found by site maintenance personnel, data processing, verifiers, or analysts. The PIR is typically submitted on a problem identification form, which immediately leads to another acronym, PIF. The terms "PIR" and "PIF" are used interchangeably. A CAR is a corrective action report. Any problem that has been identified on a PIR and fixed is documented on a CAR. CAR's are typically filed by site maintenance personnel, verifiers, and data processing staff. Analysts can suggest solutions to problems they encounter but are not allowed to file CAR's.

All PIR's and CAR's are stored in the CDB on the AVAX, with addtional PIR information in text file in the PIRCAR account on the AVAX. Every PIR or CAR is referenced to a particular site for a specific time period. For example, a PIR might be filed that says that a temperature sensor at a particular site is not working as of some date. Eventually, a CAR will be filed stating that the temperature sensor is now working. Every PIR and CAR is coded with a series of primary and secondary codes discussed below. This allow us to sort through various codes looking for trends in the problems. For example, it can be shown that the number of communications problems in the Residential Sector varies with the time of the year.

The main use of this system to an analyst is in tracking outstanding problems at sites you are interested in. As an example, assume that a verifier has noticed that a particular site has had a series of small power surges in the data. These would manifest themselves as apparent "spikes" in the usage of various devices. A PIR would be filed and entered into the system. Any analyst interested in that particular site could then access the data base and be warned that the data of interest would have some un-accounted for spikes. A post-processing macro could then be run by the analyst to eliminate any suspicious records. Alternatively, the analyst may decide that the spikes are indeed real and of great interest. It has been the policy of the ELCAP verification staff to alert analysts of suspected problems or oddities when making data available for analysis. Few attempts are made to deny access to data except in cases where we definitely know there is a problem.

Another use of the PIRCAR system is to keep track of analysis problems. Many times, the data will look perfectly normal in verification but a problem will show up in analysis. Maybe a temperature is constant for too long a time or an enduse load does not appear to be "normal". These problems are documented and filed for other analysts who may be interested in the same data. This keeps people from "re-inventing the wheel" each time a problem is discovered.

Any particular PIR may have a closed window of applicability or an open window of applicability. An open window means that the problem has not yet been fixed or is useful information to anyone interested in any data for that site. Analysts should check the system for problems any time they start to analyze a particular site.

The following sections describe how to get information out of PIRCAR and what the information might mean. The programs are available to all ELCAP users. One item of great importance is to note that most of the PIRCAR programs key off of the PX number of a particular logger rather than off of the site ID number. The PX number is a property control number associated with the actual data logger at a site. Essentially, there is a one-to-one correspondence between PX and site ID for residential sites. This is because there is one data logger for each site. In commercial site with multiple loggers, a variety of PX numbers are associated with each site ID. See the document entitled "Getting Started" in this users guide for a description of how PX and site are related.

2.0 PIR & CAR PROGRAMS

2.1 OPEN_PIFS

The OPEN_PIFS program produces an abbreviated listing of the PIR's that are currently open for given PX numbers. This is a listing of all PIR's that are currently affecting data that is just being collected. After logging on to the AVAX type:

$ OPEN_PIFS

You will then be prompted for a PX number. Enter the PX number (without the characters "PX"). You will be prompted for PX numbers until you type a blank [RETURN]. That will exit the program.

The output file from this program is called OPEN_PIFS.LIST. This will be located in your current directory.

2.2 PIF_HISTORY

The PIF_HISTORY program produces an abbreviated listing of ALL PIR's for a given PX number and the OPEN/CLOSED status (including the CAR number which closed the problem, if applicable). After logging on to the VAX type:

$ PIF_HISTORY

You will then be prompted for a PX number. Enter the PX number (without the characters "PX"). You will be prompted for PX numbers until you type a blank [RETURN]. That will exit the program.

The output file from this program is called PIF_HISTORY.LIST. This will be located in your current directory.

2.3 PRINTPIF

The PRINTPIF program will produce PIFs from the Charactistics Database (CDB) in the same form as the PIF sheet which it was input from. This is only available in interactive mode.

To operate:

After logging on to the A-VAX, type:

$ PRINTPIF

Your screen will clear and a MENU will appear. You will be prompted for a one-letter choice. Type in the letter of the criterion you wish used in the selection of the PIFs you are printing, or a "?" for HELP. You can print all PIFs for a given PX, for a given PX and PIF number, for a given region, for a given study and region, or any combination of

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the choices on the menu.

The prompt:

Enter choice(s) -->

AFTER TYPING A LETTER, DO NOT TYPE [RETURN] UNLESS ALL YOUR
CRITERION HAS BEEN CHOSEN.

You may type as many selections as you wish, or EXIT by typing "X".
Typing "R" will RESET your selections, and "?" will give you HELP.

After all your criterion has been chosen, type [RETURN].

You will now be prompted for specfics, relating to your choices.
(Like the PX number, or the primary PIF code, etc.) Type [RETURN]
after entering EACH one.

After your specific choices are entered, the program will present
you with your choices and ask you if they are correct. Type "Y"
or "N".

The program will take 1 to 5 minutes, and will created a file in
your current directory titled "PIFS.LIST".

A complete listing of all recognized PIR and CAR codes is given below. The
use of these codes can tell you what was found wrong at a site and how the
site was repaired. The codes also indicate reasons for holes in the data (due
to communication problems) and any oddities noted in the analysis or
verification of the energy or characteristics data. For PIR filed against
the energy data, the primary code is the general type of problem and the
secondary code goes into more detail. For PIR's filed against the
characteristics data, the primary code is the type of relation and the
secondary code is the type of problem.

3.0 ENGINEERING DATA PIF CODES

PRI	SEC	
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COM — Communication Problems

	SEC	
	CPL	CPU won't respond, potential data loss
	CDL	CPU won't respond, data lost
	CPN	CPU won't respond, parms not output
	RPL	Rings no answer, potential data lost
	RDL	Rings no answer, data lost
	RPN	Rings no answer, parms not output
	APL	Answers but no connect, potential data loss
	ADL	Answers but no connect, data lost
	APN	Answers but no connect, parms not output
	EXT	Noisy line (static, music, etc.)
	BSY	Line busy
	PNW	Phone line installed, but not working
	PSD	Parmeters scrambled (or lost), data lost.
	BAU	Baud rate
	GEN	GENERAL

INS — Instrumentation/Installation

	SEC	
	ML	Missing leg
	MNM	Mains not monitored
	MPH	Mixed phasing
	RCT	Reversed CT
	MCT	Multiple wire CT, one or main wires reversed
	SEU	Underscaling apparent in data/power surge
	SEC	Channels could be scaled closer at panel
	NCD	Negative checksum difference
	PCD	Positive checksum difference
	MEU	Mixed enduses/won't meet enduse needs (terminals)
	CAL	Calibration errors
	ICR	Invalid channel rescale needed (channel sensitivity)
	MGD	Monitored power generating device
	SER	Wrong scaling resistor installed
	SCT	Wrong scaling CT installed
	ONL	Owner added new load
	ORL	Owner removed load
	ORT	Owner reversed CT
	NTS	Installation not to standards
	GEN	GENERAL

DOC		Documentation Errors
	WPN	Wrong phone number
	MPE	Measurement plan error
	QL	Questionable load(s)
	ILT	Incomplete load test
	IEI	Insufficient enduse identification
	IMP	Incomplete measurement plan
	IED	Incomplete enduse disaggregation
	NTS	Documentation not to standards
	GEN	GENERAL

HF		Hardware Failures
	PS	Power supply
	CLK	Logger clock problems
	MEM	Memory problem/failure
	FVR	Five volt reference problem/failure
	WHB	Watt hour board failure
	MAX	Channels read maximum value
	HZ	All channels read hard zero
	OV	All channels read offset values only
	UCM	Unspecified channel malfunction
	CPU	CPU problem/failure
	GEN	GENERAL

MET		MET Station or MET Channel Problems/Failures
	IAT	Indoor sensor problems
	OAT	Outdoor sensor problems
	WST	Woodstove sensor problems
	WSP	Windspeed sensor problems
	PYR	Pyranometer sensor problems
	HUM	Humidity sensor problems
	MRV	Five volt MET reference problems
	WDR	Wind direction sensor problems
	TOW	MET tower not installed
	GEN	GENERAL

RFI		Radio Frequency Interference
	INT	Internal RFI (affecting logger)
	EXT	External RFI (affecting resident)
	GEN	GENERAL

SW		Software Problems
	DAS	Data aquisition software problems
	REF	REFORMAT program problems
	APP	APPEND program problems
	VER	Verification program problems
	ANL	Analysis program problems
	CDB	Characteristics Database problems
	110	HP 110 software problems
SUR		Survey Problems
	CLL	Capacity less than load
	ICL	Incomplete connected load survey
	IAC	Inadequate HVAC description
	WBZ	Wrong or improper BUZ codes
	TEN	Tenant information missing
	ECP	Equipment code problems
	TSI	Temperature sensor information inadequate
	GEN	General
TEN		Tenant Problems
	UNS	Tenant unsatisfied
	AGR	Needs agreement
	VAC	Site is unoccupied
	GEN	GENERAL
ANL		Analysis Problems
	DAT	Problems with data (Bad data)
	MDA	Missing data/Hole in data
	GEN	GENERAL

4.0 CHARACTERISTICS DATA PIF CODES

FR   Fundamental Relations

         DAT   Problems with data (Bad data).
         MDA   Missing data.
         GEN   General

RI   Residential Building Characteristics on-site inspection

         DAT   Problems with data (Bad data).
         MDA   Missing data.
         GEN   General

CI   Commercial Survey Instrument

         DAT   Problems with data (Bad data).
         MDA   Missing data.
         GEN   General

DAV   Data Acquisition and Verification Relations

         DAT   Problems with data (Bad data).
         MDA   Missing data.
         GEN   General

UTL   Utility data

         DAT   Problems with data (Bad data).
         MDA   Missing data.
         GEN   General

ROS   Residential Occupant mail and telephone surveys

         DAT   Problems with data (Bad data).
         MDA   Missing data.
         GEN   General

HR   Hood River data

         DAT   Problems with data (Bad data).
         MDA   Missing data.
         GEN   General

PC   Pif/Car data

         DAT   Problems with data (Bad data).
         MDA   Missing data.
         GEN   General

SEN   Sensitive data

       DAT   Problems with data (Bad data).
       MDA   Missing data.
       GEN   General

The list below details which specific relations are considered to correspond to the various primary characteristics codes.

FUNDAMENTAL RELATIONS (FR)

     CUCC
     CURC
     PARTICIPANT
     PXTOLOG
     STUDY_CODES
     STUDY_FLAGS

RESIDENTIAL BUILDING CHARACTERISTICS ON-SITE INSPECTION (RI)

     RES_AIR_VENT
     RES_APPLIANCES
     RES_ATTIC_VENTILATION
     RES_CEILING_ROOF
     RES_CRAWL_SPACE
     RES_CRAWL_SPACE_DESCRIPTIONS
     RES_CRAWL_SPACE_VENTS
     RES_DISHWASHERS
     RES_DOORS
     RES_FLOORS
     RES_FOUNDATION
     RES_HOT_WATER_HEATER
     RES_HVAC_DISTRIBUTION
     RES_HVAC_SYSTEMS
     RES_INTRO
     RES_MOD_ADD
     RES_OCCUPIED
     RES_OTHER
     RES_OTHER_CODES
     RES_REFRIG_FREEZERS
     RES_ROOMS
     RES_STATUS
     RES_WALLS
     RES_WATER_RUN_OFF
     RES_WINDOWS

COMMERCIAL SURVEY INSTRUMENT (CI)

     ADDITIONAL_CENTRAL_SYSTEMS
     BUILDING_COMPONENTS

```
        BUILDING_INFO
        BUILDING_USE_ZONE_CODES
        COMM_STATUS
        CONN_LOAD
        CONSTRUCTION_TYPE_CODES
        ENVELOPE
        EQUIPMENT_CODES
        EQUIPMENT_CONTROL_CODES
        FUEL_TYPE_CODES
        HVAC_DIST
        HVAC_DISTRIBUTION_CODES
        HVAC_SYSTEM_TYPE
        MOD_ADD
        OTHER_FUEL_CODES
        SECONDARY_SITEID
        TEMP_SENSOR_INFO
        TENANT
        TENANT_OCCUP
        ZONE_INFO
```

DATA ACQUISITION AND VERIFICATION (DAV)

```
        CHANNEL
        ENDUSES
        LOGGER_HISTORY
        STATUS_CODES
        VERIFY
```

UTILITY (UTL)

```
        UTILITY_BILLING
        UTILITY_RATES
```

RESIDENTIAL OCCUPANT MAIL/TELEPHONE SURVEYS (ROS)

```
        ROS86
        ROSM85
        ROST85
```

HOOD RIVER (HR)

```
        HRLINK
        HRPNWRES
```

PIF/CAR (PC)

```
        CAR
        CAR_PARTS
        PIF
```

SENSITIVE (SEN)

    BASE_CASE_S
    BUILDING_INFO_S
    CRC_SURVEY85
    RES_INFO_S
    RSDP_S
    SITEREL
    TENANT_S

5.0 CAR CODES

The CAR codes are somewhat simpler in nature because there are few ways to fix a problem than there are potential problems. The primary code is essentially a statement of what action was taken and the secondary is a statement of what item that action was taken against. For characteristics PIR, the primary code is the same as those for characteristics PIR's, with a secondary code as indicated below.

PRIMARY CODES FOR ENERGY DATA CARs

```
SW  =  SOFTWARE
REP =  REPLACED/CHANGED
COR =  CORRECTED/FIXED
INS =  INSTALLED/PICKED UP
RST =  RESET
F   =  FAILED ATTEMPT (THE CORRECTION DIDN'T WORK OR WAS NOT POSSIBLE)
V   =  VERIFICATION CHANGE
O   =  DEALT WITH OWNER
N   =  NO PROBLEM
DOC =  DOCUMENTATION (SERIAL NUMBERS, MP CORRECTIONS, etc.)
TOT =  TOTAL REWORK
DIS =  DISCONNECTED/REMOVED/WITHDREW
```

SECONDARY CODES FOR ENERGY DATA CARs

```
A/D = ANALOG TO DIGITAL CONVERTER
WIR = WIRES
CPU = CPU
CT  = CT
BP  = BACKPLANE
WHB = WATT-HOUR BOARD/WATT-METER CARD
PS  = POWER SUPPLY
RES = RESISTOR
FUS = FUSE
FVR = FIVE VOLT REFERENCE
LGB = LOGGER BOARD
MET = MET BOARD, TOWER, OR CHANNELS
RIB = RIBBON CABLE
SL  = SECOND LEGS
MNS = MAINS
LOA = LOAD
CHN = OTHER CHANNEL (BESIDES MAINS)
ALL = COMPLETE FDAS

MOD = MODEM
RFI = RFI
BAU = BAUD RATE
PHJ = PHONE JACK
```

```
PL  = PHONE LINE
PC  = PHONE CABLE

MP  = MEASUREMENT PLAN
CAL = WATT METER CARD CALIBRATIONS
PIR = PROBLEM IDENTIFICATION REPORT

PHA = PHASING
END = ENDUSE(S)
OFF = OFFSETS

110 = HP 110 SOFTWARE
REF = REFORMAT SOFTWARE
APP = APPEND SOFTWARE
DAS = DATA AQUISITION SOFTWARE
VS  = VERIFICATION SOFTWARE
ANS = ANALYSIS SOFTWARE
CDB = CHARACTERISTICS DATABASE SOFTWARE

AGR = OWNER AGREEMENT
DRP = DROPPED FROM STUDY

GEN = GENERAL

SECONDARY CODES FOR CHARACTERISTICS DATA CARs

N   = NO PROBLEM
PF  = PROBLEM FIXED
PCF = PROBLEM CAN'T BE FIXED
MF  = MISSING DATA FILLED IN
MCF = MISSING DATA CAN'T BE FILLED IN
CDN = CODE DEFINTION CHANGED- DATA MODIFIED USING CURRENT VERSION
```

6.0 FILING ANALYSIS PIFS

At some time during your analysis work, you will find a problem or a series of problems with the data. The overall quality of the data is extremely high but it is not perfect. The people in charge of the data base would be extremely happy to hear from you as to the problems you have found. They will either fix the problem for you, explain to you why it is not a problem or will arrange things so that no other analysts come across the same problem. None of this can be done without your input.

The general process for filing a PIF is to fill out a Problem Identifaction Report. A sample form is attached. The essential information for you as an analyst to supply is the site id number (shown as di # on the PIR), your name, the time frame of the data that has the apparent problem (in either ELCAP or calendar dates), a brief description of the problem (less than 60 characters), and your guess as to the appropriate PIR code (taken from the list above). A space for expansion of the problems found is provided at the bottom of the form.

Please fill out one form for each site. If you find multiple problems at a site, feel free to list all the problems for that site on one form. All PIR's should be given to one of the sector verification coordinators or any other member of the ELCAP operations staff. See the list in the "Getting Started" section of this User's Guide for a list of appropriate names and addresses.

NEW / MOD

PROBLEM INDENTIFICATION REPORT

DI# _____
PX# _____
Filed by: _____ (_____) initials   REG# _____
PIF# _____
Date written: _____   CASE STUDY _____

Applicable window of data: from_____to_____ (DD-MMM-YY)

                             from_____to_____ (DD-MMM-YY)

(For more than five problems, use an additional PIR sheet, and attach.)
- -
                                                          CODES
PROBLEM# DESCRIPTION (60 char. for each Problem #)   PRI ----- SEC
1.   -

2.   -

3.   -

4.   -

5.   -

EXPANSION on above problems, if desired. List the appropriate problem# (May
         use back)

- -
Corrective Action Decided:

Assigned to: _____