

### Summary of changes associated with 24-Oct-2000:

1. Modified module cgetuser.c to eliminate generating ".pfo" and ".pfd" (blank) file names.
2. Modified several ipf modules to implement a new option "SUMMARY=OFF" on /GEN\_DROP commands. The motive is to reduce the amount of output in the \*.pfo files for voluminous output associated with PVCURVE studies.

An example of the original and revised format follows.

```
/GEN_DROP,AI_CONTROL=OFF,INITIAL_DROP=50,TOL=10  
/GEN_DROP,AI_CONTROL=OFF,SUMMARY=OFF,INITIAL_DROP=50,TOL=10
```

3. Revise modules srv\_fcndprs.f to rewind the \*.pfo, \*.pfd, and \*.pff file in IPFSRV following each / OLD\_BASE command. The \*.pfo, \*.pfd, and \*.pff files will reflect only the processing of the current / OLD\_BASE command.
4. Revised module p\_gtdata.f to remove unnecessary debug printout.
5. Installed the following modules in /usr/bin.

```
tkdiff - a graphical text difference routine.  
launch_pf.bash - a useful utility to run bpf, consolidate any  
user analysis, and generate geographic plots.  
dos-linux.bash - a useful utility to remove DOS-carriage returns  
from files and rename those files to lowercase. An example  
of its use is shown below.
```

```
dos-linux.bash '*.TXT *.txt'  
dos-linux.bash '*.DAT *.dat'
```

### Summary of changes associated with 31-Oct-2000:

1. Copied pfmaster.post to /shr/ipf-3.27/dat directory.
2. Added /COMMON\_MODE\_ANALYSIS corrections to ipfbat.
3. Automatically rebuild ipf.

### Summary of changes associated with 2-Nov-2000.tar.

1. Added /COMMON\_MODE\_ANALYSIS corrections to ipfbat.

### Summary of changes associated with 18-Nov-2000:

1. Updated post\_pvcurve.c with version 1.02. Linux version required malloc to accommodate a 12MB character structure.
2. Updated sfctr.f to accommodate revised COMMON\_MODE files compiled by Larry Stadler.

### Summary of changes associated with 22-Nov-2000:

1. Modified dos-linux.bash to accommodate "English" and "troff" files.

**Summary of changes associated with 24-Nov-2000:**

1. Modified all build\_libxxx.bash files to compile with full optimization (-O4) instead of full debug (-g).
2. Modified all \*.make files to link with full optimization (-O4) instead of full debug (-g).

**Summary of changes associated with 14-Dec-2000:**

1. Changed LOAD\_PTI option to parse text in the form xxx, xxx, ...
2. Modified all build\_libxxx.bash files to compile with full debug (-g) instead of full optimization (-O4).
3. Modified all \*.make files to link with full debug (-g) instead of full optimization (-O4).

**Summary of changes associated with 1-Jan-2001:**

1. Corrected FINDOUT to process COMMON\_MODE\_OUTAGES.

**Summary of changes associated with 3-Jan-2001:**

1. Corrected IPFBAT to process COMMON\_MODE\_ANALYSIS (slow outage)

**Summary of changes associated with 1-Feb-2001:**

1. Corrected reinitialization of /GEN\_DROP when used in conjunction with IPFBAT.
2. Corrected resorting of arcnam/arcnum in buildzbo.f

**Summary of changes associated with 15-Feb-2001:**

IPF-3.17.16b Linux version, and to be included in all future Linux-version updates:

1. Modified the GUI so that "File,PlotOptions,UserComments,ViewPlot" and "File,PrintPlot" run Ghostscript/Ghostview for viewing postscript powerflow plot "on-screen", and for printing, using GS list of postscript and non-postscript printers.

**Summary of changes associated with 1-Mar-2001:**

1. Added TRANSFILE=<file> option to /LOAD/GE to replace zone names in EPC file with those in translation file.
2. Corrected GE->IPF import.

**Summary of changes associated with 26-Mar-2001:**

1. Eliminated all CFLOW socket calls
2. Corrected errors affecting GE->IPF import.
3. Corrected IPF\_REPORTS base case comparison error - use names instead of numbers for the area, owner, and zone filters.
4. Added a new Fast Outage option (>NETWORK) per James Randall. This is explained with an example.

```

> NETWORK ZONES NA,NB,NC,ND,NE,NF,NG,NH,NI,NJ,NK,PR,      BASES 30,1100.
> NETWORK ZONES SE,TA,SP,AA,AB,AC,PD,PF,PH,WW,WX,GR,      BASES 30,1100.
> NETWORK ZONES CC,TB,EU,JC,LK,KL,GP,CR,MD,UM,PT,WL,      BASES 30,1100.
> NETWORK ZONES CB,CN,PW,YK,PB,MT,YR,UW,                  BASES 30,1100.
> NETWORK ZONES NA,NB,NC,ND,NE,NF,NG,NH,NI,NJ,NK,PR,      BASES 30,1100.
> NETWORK ZONES SE,TA,SP,AA,AB,AC,PD,PF,PH,WW,WX,GR,      BASES 30,1100.
> NETWORK ZONES CC,TB,EU,JC,LK,KL,GP,CR,MD,UM,PT,WL,      BASES 30,1100.
> NETWORK ZONES CB,CN,PW,YK,PB,MT,YR,UW,                  BASES 30,1100.
> OUTAGE ZONES NA,                                         BASES 30,1100.
> OVERLOAD ZONES NA,                                       BASES 30,1100.

```

The > NETWORK records specify the reduced network which in this example is the NORTHWEST area. Only outages and overloads in zone NA are of interest. However, for accuracy, the entire NORTHWEST area must be in the reduced equivalent network.

5. Added requirement to Modify .bash\_profile for IPF /root and /home/"user" directories by adding additional parameters:

Add the following line directly following the IPFDIRS="/shr/ipf-3.27/dat" line:

```
IPFROOTDIR="/shr/ipf-3.27"
```

So it looks like this:

```
IPFDIRS="/shr/ipf-3.27/dat"
IPFROOTDIR="/shr/ipf-3.27"
...
```

Also, append IPFROOTDIR to the "EXPORT" statement:

So it looks like this:

```
export UIDPATH IPFDIRS RUN_IPFSRV IPFSRV_CF IPF SOCK_PATH IPFROOTDIR
```

#### **Summary of changes associated with 1-Apr-2001:**

1. Corrected EPC import to recognize segment names instead of zero equipment numbers.
2. Corrected EPC import to get missing bus and branch ownerships.
3. Changed EPC import to optionally obtain any of the 8 branch ratings.
4. Changed EPC import to preserve +N1, +N2, etc continuation bus types.

### Summary of changes associated with 11-Jun-2001:

1. Corrected Cutting + record pointer.
2. Added >INCLUDE\_GENERATORS feature to cutting.
3. Corrected parsing of LOAD\_GE and LOAD\_PTI command

```
... RATING = (TX=AABC, LN=AAC)
```

4. Added /PROCESS, FILE = <filename> command to IPFBAT.
5. Fixed PTI import errors encountered in case 03HS2C024.RAW.
6. Added new executables:

```
find_qv.exe -> Loops in the sequence
```

```
write *.pcl file
execute bpf via system ()
read *.pfo and extract essential reactive information.
evaluate new reactive and either modify *.pcl file and
repeat steps 1-4 or exit
```

```
find_qv.exe -> Similar to find_qv, except it writes to an *.pcl file and
executes ipfbat.
```

```
read_pf_out -> Useful for failed solutions. It reads the solution history
from an *.pfo file and outputs a bus iteration history
listing.
```

```
read_tbx -> Useful for interpreting *.pfd files. Reads *.pfd files and
outputs *.check file consisting of adjustments by bus or
LTC's.
```

7. Corrected GE export error involving BPA zones which are not in the translation file.
8. Corrected LTC error caused by /CHANGE\_BUS\_TYPES, no changes, and a solution LTC tap update.
9. Corrected PV-curve and QV-curve user\_analysis file open/read errors.
10. Added a new environment variable ARCHIVE\_IPFSRV=ON which archives in a file pvcurve.archive all commands dispatched from pvserve. To enable this feature, this variable must be added to your cygnus.bat file.
11. Added a new Fast Outage feature to unconditionally list base case overloads (including re-rated overloads) in the Outage problem list. The option is the new field BASE\_OVERLOAD on the ANALYSIS command:

```
> ANALYSIS = ON, MIN_LOADING = <nnn>, BASE_OVERLOAD = ON
```

### Summary of changes associated with 1-Jul-2001:

1. Created new ipf-3.28 version with MAXBUS = 14000 and MAXCBS = 14000.
2. Corrected GE import bugs:

- a. Force case rebuild.
- b. Modify to accept NULL terminal of a 3-winding tx.

3. Extended Factor or %change records from 50 to 200.
4. Added new P1 and P2 record (Factor or %change by areas).
5. Modified findout to skip variabce entities when case1 or case 2 is null (which happens when a base overload in one case is below the threshold and in the other it is over the threshold).

**Summary of changes associated with 1-Aug-2001:**

1. Corrected GE export to exclude non-referenced entities in z table data and owner data.
2. Changed ipf\_reports generation summary to include all filtered generators that have Pgen > 0.1 MW or Qmax - Qmin > 0.1 MVAR.
3. Corrected GE export to properly number d-c buses.
4. Added new branch specification option ..FILE=<filename> to > OUTAGE, ... and to > OVERLOAD.
5. Increased the Fast Outage problem size from 25\*MXOLBR to 75\*MXOLBR.

**Summary of changes associated with 1-Sep-2001:**

1. Corrected new branch overload (specified with option >OVERLOAD, ..., FILE=<xxx>) to unconditionally be included if already specified with ZONES = ...
2. Forced fast outage overflow errors as fatal errors.
3. Increased GENDROP from 1200 generators to 2000 generators.
4. Corrected common mode error when submitted multiple /OUTAGE\_SIMULATION runs via ipfbat.
5. Increased the number of zones and ownerships permitted on /P\_ANALYSIS, F\_ANALYSIS, P\_INPUT, F\_INPUT, P\_OUTPUT, and F\_OUTPUT from 50 each to 100 each; added overflow warning diagnostics.

**Summary of changes associated with 6-Sep-2001:**

The problems encountered were (1) the Fast Outage program simply and silently stopped adding overloads, over voltages, and failed solutions when a large limit (350,000) was reached, and (2) the Fast Outage program spuriously added additional changes to common mode outage when more than one /OUTAGE\_SIM case was submitted in the same job.

The errors were serious and we were fortunate to find and correct them as soon as they were discovered. The limit has been raised to 1,000,000 problems.

These problems probably never affected ordinary Fast Outage studies since the MIN-LOADING screening level is always above 30% and that no one usually submits multiple /OUTAGE\_SIM runs in a single \*.pcl file. Nevertheless, it is recommended that all large Fast Outage runs use version 3.29.

Summary of changes associated with 12-Sep-2001:

The revision corrected an overflow encountered when more than 50 zones or ownerships are specified on an /P\_ANALYSIS, /F\_ANALYSIS, P\_INPUT, F\_INPUT, P\_OUTPUT, or F\_OUTPUT record.

The new version expands this limit to 100 zones and 100 owners, and ignores excessive zones or ownerships with a diagnostic warning. Before this change, the overflow was overwriting data elsewhere with unpredictable results.

Summary of changes associated with 21-Sep-2001:

IPF version 3.29 was revised to correct an error in the common mode feature within the Fast Outage program. It is recommended that all Fast Outage studies now be conducted with version 3.29.

The error involves type "+ M" and "B M" modification records. Instead of modifying the non-blank quantity as is done in ordinary change modifications, it removes that quantity from the bus. I will illustrate with a specific sample common mode file. A template record was added before the B M records for clarity.

```
> common_mode, file = *
.
> mode CUST-MONE 1&2
L DBPACUSTER W 500 MONROE 5001
L DBPACUSTER W 500 MONROE 5002
B D FREDONA113.2
B D FREDONA213.2
B D WHITHRN113.8
B D WHITHRN213.8
B D WHITHRN313.8
Btc<O>< Bus
><KV>ZN<Pld><Qld>Psh>Qsh><Pm>Pgen>qmax>qmin><vh><vl><rembus><kv>%q>
BQMBCHMICA 16.0 17401200.
BQMBCHREVELSTK16.0 18441300.
```

Before the correction 1200 MW was removed from MICA and 1300 MW from REVELSTK.

		Original Generation	Revised Generation (before correction)	Revised Generation (after correction)
MICA	16.0	1700 MW	500 MW	1200 MW
REVELSTK	16.0	1800 MW	500 MW	1300 MW

This error has been undiscovered since the common mode feature was first introduced (in 1995). Probably the reason that it remained undiscovered so long is that the feature is rarely used, and when it is used, the effects on the Fast Outage studies were perhaps marginal since the B M records are used to represent small tapped loads which are placed on an adjacent bus.

What are the ramifications of this error upon past Fast Outage studies? It probably does not affect those studies severely because the changes represented by B M and + M records pertain to loads which are usually small and remote.

In this case, however, the effects were significant because of the emulation of generator dropping.

Summary of changes associated with 27-Sep-2001:

Note: Major IPF corrections occurring close together are very rare and deserve some explanation.

IPF version 3.29 was revised on Thursday, 27 September, to correct two errors. The first error occurred while processing type B M common modes changes, exactly the problem reported earlier on 21 September and partially fixed. What was missed was correcting also the incorrect modification of the Q-limits of these common mode buses if they were type BQ or BG.

The second error occurred while processing /CHANGE\_BUS\_TYPES for type BQ and BG buses which have their generation quantities on + bus records.

We recommend that all Fast Outage and /CHANGE\_BUS\_TYPE studies be conducted with version 3.29.05 or later [1-Sep-2001e update].

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wlp 24-Oct-2000  
wlp 31-Oct-2000  
wlp 2-Nov-2000  
wlp 18-Nov-2000  
wlp 22-Nov-2000  
wlp 24-Nov-2000  
wlp 14-Dec-2000  
wlp 1-Jan-2001  
wlp 3-Jan-2001  
wlp 16-Jan-2001  
wlp 1-Feb-2001  
jgs 15-Feb-2001  
wlp 26-Mar-2001  
wlp 1-Apr-2001  
wlp 11-Jun-2001  
wlp 1-Jul-2001  
wlp 1-Aug-2001  
wlp 1-Sep-2001  
wlp 6-Sep-2001  
wlp 12-Sep-2001  
wlp 21-Sep-2001  
wlp 27-Sep-2001