PANDORA
Version 7.0b [May 1, 2007]

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This program provides the following physics checks for an ENSDF file.

1. Decay data sets, other than IT and SF decays have a P-card and vice versa.
2. An L-CARD with $T_{1/2}>0.1$ sec should have MS FLAG.
3. Check consistency of spin/parity of levels with multipolarity connecting transitions.
4. For a transfer reaction with even-even target J=L±1/2.
5. For $3.6<\log ft<5.9$, $J_i-1\leq J_f\leq J_i+1$, no parity change. For 1U in cols. 78-79 and $\log ft\geq 8.5$ $J_f=J_i\pm 2$, parity change
6. FOR alpha decay, if the mass is odd and HF<4, $J_f=J_i$, no parity change. If J_f or $J_i=0$, parity change $=-1^{MOD(Jf-Ji)}$
7. Levels out of order

Level and gamma records with non-numeric energies are ignored.

Input files: ENSDF formatted file. Sample input file: pandora.in

Output files:

1. pandora.err. Errors and warnings about the input data. Sample output file: pandora.err.
2. pandora.gam. Report of the gammas in the input file arranged by A, Z, E_γ, and DSID. Sample output file: pandora.gam.
3. pandora.gle. Report of the gammas in the input file arranged by A, Z, E(parent level), E_γ, and DSID. I_γ given are branching ratios (I(strongest γ)=100). Sample output file: pandora.gle.
4. pandora.lev. Report of the levels in the input file arranged by A, Z, E(level) and DSID. Sample output file: pandora.lev.
5. pandora.rad. Report of β/ε in input file arranged by A, Z, E(β/ε), and DSID. Sample output file: pandora.rad.
6. pandora.rep. Reports ignored records, levels that have no match in adopted levels, frequency of XREF symbols, new XREF symbols, *etc*. Sample output file: pandora.rep.
7. pandora.xrf. Reports the cross-reference records. The cross-reference symbols are also given in pandora.lev. Sample output file: pandora.xrf.
8. New ENSDF formatted file with XREF's added or modified. Sample output file: pandora.out.

Generation of the files reporting on the gammas, levels, and radiations and the new ENSDF formatted file is optional. There is no option to specify file names for the pandora.* outputs.

Terminal dialog:

The program will ask for the input file name and then if the user wishes the level, gammas, and radiation reports (default: 0 for no) and a new file generated (default:0 for no). If new output is specified, the user will be queried for the output file name. As generation of the various output files is completed, this will be noted on the terminal.

Command line mode:

The program may also invoked *via* the command line by entering pandora followed by a string with a leading per cent sign ("%") and the input parameters in the same order as in the terminal dialog separated by "%". A blank (" ") or "#" specifies that the program default be used. For output files, "null" (case insensitive) will direct the output to the null device (/dev/null under Linux). A simple example is:

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pandora <ENSDF filename>
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This will process in the specified ENSDF file with the program defaults.

Compilation and loading instructions:

This program requires subroutines from the NSDFLIB95 package.

Additional documentation: Internal document (pandora.pdf).

Version History

	Apr-1989	1. Uncertainty doubled (to 2*sigma) for E(alpha) match. 2. Check T1/2 on P record with DSID (if T1/2 present). 3. Check TI with RI(1+CC) for gammas. 4. If XREF records given in adopted data set then use the same symbols and compare the new and old XREF's. Note: New and old XREF are compared in FILE.REP. 5. Correspondence criteria for levels from different data sets is changed. a. Levels from same dataset are presumed different b. Levels with energies within uncertainty but differing Jpi are considered different c. Levels with T1/2 within uncertainty are considered the same d. For correspondence purposes only the uncertainty is increased to at least 1 keV 6. Final level FL= format added. 7. Up to three Jpi values and five multipolarities will recognized and checked against given multipolarities, HF, *etc*. Error only if mutltipolarity is not consistent with any combination of given Jpi's.
4(1)	Jun-1989	1. Create continuation records giving XREF (FILE.XREF). 2. Delete existing XREF records. 3. Add XREF records in adopted data set. Levels that could not be matched are given in FILE.REP. 4. Give frequency of occurrence for XREF symbols (FILE.REP). Changes in main program, IOFILE, LREC, SAME, LEVREP subroutines. New subroutines: XSORT, ADDXRF, XREFNO
4(2)	15-Sep-1989	Some more modifications by J. Tuli.
4(3)	12-Jan-1990	Modified err message for JPI mismatch with L
4(4)	01-Feb-1990	Introduced code to recognize XREF in adopted levels. If XREF given then for transfer reactions it will check JPI against only those adopted levels which have the given reaction in XREF list. For levels with no uncertainty, the level in adopted levels with closest energy is picked.
4(5)	20-Apr-1990	Modifications to run on IBM PC
4(6)	03-Jul-1990	Fixed bug in GREC. CC field to 9.
4(7)	06-Aug-1990	Fixed bug in the main section. IGNORL set to false. If only one gamma from level, set its int=100 in FILE.GLE, even when no intensity given. Changed dialog.
4(8)	18-Sep-1990	Fixed bug ENTRY SETXRF (subroutine LREC)
5(1)	30-Oct-1990	Extensive changes. Program will process characters x,y,z,u,v,t in energy and intensity fields. Sn, Sp will also be accepted in E field and their values read from Q card. Output will show actual (rather than calculated) energy and intensity values along with their non-numeric uncertainties, where applicable. Improved algorithm for level match in level and gamma reports.

5(2)	14-Mar-1991	Added GAMMA3 labeled common. Added IPC overlay comments. IPC version TEMP declared correctly.
5(3)	30-Dec-1991	Several subscript out of range prob. fixed.
5(4)	15-Oct-1992	Added Machine coding for ANS
5(5)	19-Apr-1993	1. Explicitly typed all variables and functions 2. Cleaned up character typing (Some compilers are inefficient in problems handling mixed sizes in same statement) 3. Replaced string concatenation with other calls (Problems on some compilers) 4. Replaced STR(:x) with STR(1:x) (Problems on some compilers) 5. Added version number and date to terminal and other outputs 6. Corrected error in TEMP declaration in GAMREP for IPC 7. Delinted using FLINT 2.83 (TWB)
5(6)	05-May-1993	1. Corrected subscript out of bound error in LREC (JKT) 2. Corrected logic error in SAMET (TWB)
5(7)	17-May-1993	Corrected more logic errors in SAMET (TWB)
5(8)	26-May-1993	Minor bug fixed in READE (JKT)
6.0	16-Jul-1993	1. Added daughter level JPI in the gamma reports 2. Modified SPNPAR subroutine to restrict no. of JPI on a level to 3. (JKT)
6.0a	09-Aug-1993	Fixed word-boundary alignment for Alpha Fortran (TWB)
6.1	15-Nov-1993	Fixed subscript out of range error in SPNPAR subroutine (TWB)
6.2	29-Nov-1994	1. Fixed error output to wrong file in CHKID 2. Improved error checking in CHKID 3. Corrected logic errors in LEVREP which caused a. erroneous error messages in FILE.REP and b. occasional bad XREF's (TWB)
6.3	18-Sep-1996	1. Divided error messages in <E> and <W> 2. Provided dialog to suppress warnings 3. Extended characters allowed in energy field 4. Check for blank BR field 5. Modified SPNPAR subroutine-pick up parity even a. if J is given as limit 6. New common /Level3/ to save alpha char in a. level E field. Better determination of b. daughter level from such levels. (JKT)
6.4	21-Feb-1998	In case of unique parent/daughter JPI all mults must be valid (JKT)
6.4a	25-Feb-1998	Ignore blanks following FL= (JKT)
6.5	09-Feb-1999	Fixed a bug in subroutine IDTYPE
6.5a	12-Mar-1999	1. Explicitly typed all variables 2. Corrected non-standard ANSI-77 coding 3. Checked for Y2K compliance 4. Corrected format records which were creating records longer than 133

		bytes 5. Corrected initialization problem in LEVREP which caused nulls to be outputted to FILE.XREF (TWB)
6.5b	13-Sep-1999	Do not check A,Z on P card for SF decay (JKT)
6.5c	02-Nov-2000	Increased the allowed decay modes
6.6	07-Feb-2001	Added UNX MDC coding. (RRK)
6.6a	26-Mar-2001	Corrected problems introduced in 6.6 (TWB)
6.6b	27-Aug-2001	1. Fixed error in Fmt 201 (Levrep) for Z>100. 2. Modified ADDXRF to add xrf for non-numeric energy fields also (JKT)
6.6c	07-Apr-2003	Increased dimension for lasitid in LEVREP
7.0	05-Apr-2004	1. Converted to Fortran 95 2. Command line input added (CLD)
7.0a	13-Jun-2006	Increased dimensions in GAMINT from 150 to 500 (TWB)
7.0b	01-May-2007	1. Modified dimensions of adopted level properties consistent with MAXLEV parameter 2. Added check for existence of source datasets before trying to create file with new XREF's

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