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PR-EDB: Power Reactor Embrittlement Data Base, Version 2

Program Description

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ABSTRACT

Investigations of regulatory issues such as vessel integrity over plant life, vessel failure, and sufficiency of current codes, Standard Review Plans (SRPs), and Guides for license renewal can be greatly expedited by the use of a well-designed computerized data base. Also, such a data base is essential for the validation of embrittlement prediction models by researchers. The Power Reactor Embrittlement Data Base (PR-EDB) is such a comprehensive collection of data for U.S. designed commercial nuclear reactors.

The current version of the PR-EDB lists the test results of 98 heat-affected-zone (HAZ) materials, 105 weld materials, and 136 base materials, including 98 plates, 35 forgings, and 3 correlation monitor materials that were irradiated in 252 capsules from 96 reactors. The data files are given in dBASE format and can be accessed with any personal computer using the DOS operating system. "User-friendly" utility programs have been written to investigate the radiation embrittlement using this data base. The utility programs are used to retrieve and select specific data, manipulate data, display data to the screen or printer, and to fit and plot Charpy impact data.

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PREFACE

The first compilation of the U.S. Power Reactor Embrittlement Data Base (PR-EDB), Version 1, was completed in October 1989, and the documentation was published in June 1990. Subsequently in cooperation with the Electric Power Research Institute (EPRI), additional verification and quality assurance of the data were performed by the U.S. reactor vendors. A record-by-record check by the vendors removed some errors and ambiguities, and filled many gaps by providing data from additional documents and vendor records that were not previously available to the authors. Not all data have been verified by the reactor vendors; however, all data have been entered as reported in the quoted references. All data from the Allis-Chalmers reactors Elk River and LaCrosse are unverified. Also, data from two independent studies that were not under the vendor's control, namely, the review of fluence calculation in NUREG/CR-3319 by Hanford Engineering Development Laboratory and a report on Babcock & Wilcox welds (BAW-1803) were not verified by Westinghouse. Several other reports containing data that could not be verified by the vendors are listed in Appendix B. The changes to the first compilation and documentation have been incorporated into PR-EDB, Version 1, Revision 1 (April 1991).

A total of 185 new shift data points were added to the PR-EDB, Version 1, Revision 1, which included 48 welds, 57 plates, 23 forgings, 15 correlation monitor materials, and 42 HAZ materials. There are 53 materials that were not previously in PR-EDB, revision 1; in addition, there are data for 6 HSST welds that were irradiated in Crystal River and Davis Besse, and one HSST plate material in Maine Yankee reactor. The new reactors and the references of the new data points are listed in Appendix C.

The EDB software has also been upgraded since the last publication by removing some mistakes, by adding additional options in the graphic programs, and by making the program execution more reliable and less subject to crashes due to user errors. However, no changes in the structure and running of the programs were made. The data on the distribution diskette include a run of the raw Charpy file with the Monte Carlo fitting program using 100 iterations. The output data file, RAW_C_RS.dbf, should not be used uncritically because the fits were generated without any human intervention and may be distorted by outliers, an insufficient number of data points, and large data scatter. Thus it is recommended to first review the graphic display of every fit for possible irregularities and, perhaps, remove outliers as described in the manual.

The distribution diskette of PR-EDB, Version 2, which is in compressed format, will be available from Energy Science and Technology Software Center, P.O. Box 1020, Oak Ridge, TN 37831, Tel (615) 576-2606.

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The authors gratefully acknowledge the essential contributions of C. A. Baldwin, who wrote the first version of the EDB software; R. B. Miller for providing its linkage to the fitting and plotting program; Professor Erno Sajo of Louisiana State University and Dr. Ernest Eason of Modeling & Computing Services for their valuable suggestions; B. J. Taylor for preparing the data input; Mary Ann Bunch for preparing this manuscript; and C. Z. Serpan, Jr., Al Taboada, M. Mayfield, and A. Hiser of the U.S. Nuclear Regulatory Commission for their financial support and guidance.

1 INTRODUCTION

Investigations of regulatory issues such as vessel integrity over plant life, vessel failure, and sufficiency of current codes, Standard Review Plans (SRPs), and Guides for license renewal can be greatly expedited by the use of a well-designed computerized data base. Also, such a data base is essential for the validation of embrittlement prediction models by researchers. The Power Reactor Embrittlement Data Base (PR-EDB) is such a comprehensive collection of data for U.S. designed commercial nuclear reactors.

The Power Reactor Embrittlement Data Base (PR-EDB) is a comprehensive collection of data from surveillance reports or other published reports of commercial nuclear reactors. The dBASE IV and related software are used for database management under the DOS operating system with IBM-PC compatible computers. The PR-EDB is part of a larger Embrittlement Data Base (EDB) which also includes data from materials test reactor irradiation of pressure vessel steels.

The objectives of this NRC-sponsored program are the following:

1. to compile and to verify the quality of PR-EDB;
2. to provide user-friendly software to access and process the data;
3. to validate or to confirm embrittlement prediction models; and
4. to interact with standards organizations to provide the technical bases for voluntary consensus standards that can be used in regulatory guides, SRP, and codes.

To achieve these goals, the design of the data base architecture was made after much discussions and planning with prospective users, materials scientists and members of research staff. The PR-EDB is designed for use with any personal computer using the DOS base system above Version 2.0. Update will be issued periodically to authorized users. The data files in the PR-EDB are in dBASE format and can be accessed with any version of dBASE or compatible software, such as Clipper. A customized software package (EDB-Utilities), which handles most routine tasks, has been distributed with the data base and will be periodically updated.

The current compilation of the power reactor embrittlement data base (PR-EDB, Version 2) contains Charpy test data that were irradiated in 252 capsules of 96 reactors and consist of 207 data points for heat-affected-zone (HAZ) materials (98 different HAZ), 227 data points for weld materials (105 different welds), 524 data points for base materials (136 different base materials), including 297 plate data points (98 different plates), 119 forging data points (35 different forgings), and 108 correlation monitor materials (SRM) data points (one ASTM and two HSST plate materials). Material from Humbolt reactor was used as an SRM for some General Electric reactors. The menu-driven software, EDB-Utilities, facilitates maintenance, processing, and evaluations of the data. The time and effort required to process and evaluate different types of data in the PR-EDB have been drastically reduced from previous data bases.

2 ARCHITECTURE

2.1 INTRODUCTION

The information in most data bases is contained in one or more "data files," with the data arranged in each file in the form of a table. Each row of such a table is called a "record," and each unit of information is stored in its assigned "data field" that corresponds to a particular column in the table. Older data bases, such as the ones published by MPC, consist of just one table, which means that all different data fields are contained in each record. In creating such a table, a decision must be made which types of data fields are to be included before data collection starts, and the data base must be redesigned whenever new types of data are added. Since every record contains all possible data fields, there are many duplications and a large number of empty fields. It is also fairly difficult to accommodate in such a table, multiple determinations of the same quantity such as chemistry and to provide complete references if the data in the same record come from different sources.

To avoid the problems of a single table data base, the PR-EDB is designed as a collection of many different data files, each of which closely resembles the data tables found in the original surveillance reports. For instance, most reports have tables containing transition temperatures and upper shelf energies for Charpy specimen before and after irradiation and/or the shift in these values during irradiation, and these data are collected in the file "SHFT_PR". Data are collected as reported (i.e., there are fields for unirradiated, irradiated, and shift values, depending on what is reported; fields are added for units because some reports use U.S. units, others, the new international units, and still others, the older European engineering units (see Table 1). Similarly, information about tensile tests is collected in the file TEN_PR, information about the irradiation, such as capsule fluence and temperature, in the file REAC_PR, and so on. A complete list of the data files in the PR-EDB is given in Sect. 2.4. This approach has many significant advantages:

1. The structure of the data files need not be predetermined; the data files are designed according to what is available in the original reports, and new data files can be added without disturbing the existing ones.
2. Because every record in a data file originates from a single report and, in most cases, from a single table in this report, a unique reference, including page number(s), can be given for each record.
3. Multiple determinations of the same quantity are given in different records, each with its proper references. Such multiple determinations occur, for instance, if the chemistry is determined by the manufacturer of the material as well as from broken specimens. Also, fluence determinations are frequently updated in subsequent reports using improved neutron physics calculations. All different determinations are kept in the PR-EDB, and it is up to the user to decide which determination to use for a particular application or, perhaps, calculate averages from several of them.

Table 1. Units used in PR-EDB files

Description	Symbol used in PR-EDB	Type of unit	Conversion factors			
			to U.S. unit		to Int'l unit	
Mil	MIL	Length	0.001	inch	0.00254	cm
mm	MM	Length	0.03937	inch	0.1	cm
cm	CM	Length	0.3937	inch	1.0	cm
Inch	IN.	Length	1.0	inch	2.54	cm
Fahrenheit	F	Temperature	F		(F-32)/1.8 = C	
Centigrade	C	Temperature	1.8 C + 32 = F		C	
Foot-pounds	FT-LB	Energy	1.0	ft-lb	1.3558	joules
Joules	J	Energy	0.7376	ft-lb	1.0	joules
Kilogram-meters	KGM	Energy	7.2330	ft-lb	9.8066	joules
mkp*	MKP	Energy	7.2330	ft-lb	9.8066	joules
mkp.cm ^{2**}	MK/C2	Energy	5.78	ft-lb	7.92	joules
Kilogram/mm ²	K/MM	Stress	1.4223	ksi	9.8066	MPa***
Kip/inch ²	KSI	Stress	1.0	ksi	6.895	MPa***
Pound/inch ²	PSI	Stress	0.001	ksi	6.895	kPa***
Mega pascal	MPA	Stress	0.145	ksi	1.0	MPa***

*Same as kilogram-meters.

**Energy relative to the cross section of the Charpy minus notch $\approx 0.8 \text{ cm}^2$
(reported for the Beznau reactors).

***kPa = kilo pascal = 10^3 pascal, MPa = mega pascal = 10^6 pascal.

Because the data in the PR-EDB are distributed over many different files, means must be provided for combining data from several files. This is done with the techniques of "relational data bases," specifically dBASE by Ashton Tate. The format for data and auxiliary files and the techniques introduced by dBASE are now widely used in data base applications. The choice of the dBASE format for the PR-EDB allows the use of any version of the dBASE software as well as any of the other software packages which use the dBASE format, such as Clipper. The linkage between different data files in a relational data base is provided by "key identifiers" which are common to these files. For instance, all files with data concerning a specific material such as results of material property tests, material manufacture, heat treatment, and chemistry contain a field for the material identifier HEAT_ID. Similarly, files with data concerning irradiations contain fields for the identifiers of the reactor, PLANT_ID, and the surveillance capsule, CAPSULE. A detailed description of the key identifiers is given in Sect. 2.2. Extreme care must be exercised to assign the correct identifier to each record since otherwise connection between data from different records cannot be made or

are made incorrectly. To assure correct identifications, numerous cross checks are made which have the additional advantage that many mistakes are caught in this manner that have eluded conventional proofreading.

The best designed data base is useless without convenient software to extract data for any given application. The dBASE-compatible software provides the necessary tools but requires some expertise from the user for successful application. For this reason, EDB-Utilities has been written to perform many processing steps such as retrieval and selection of data, calculations, and display to the screen or printer. (Output to a plotter is being considered for later release.) This software is menu-driven so that it can be used without extensive training. A description of the EDB-Utilities is given in Appendix A.

An overview of the data flow in the PR-EDB is given in Fig. 1. The source data are first transcribed to "Raw Data Files" in dBASE format as faithfully as possible with complete references. Data entry is currently done through the keyboard. Direct transfer will be used whenever computer-readable documents are available. Any deviation from the norm, which was either reported or noted during transcription (such as the correction of obvious typographical errors) is indicated in the NOTES field. Data from every available report are included, except when the information in a later report is simply a duplication of earlier data without any changes. The dBASE format distinguishes between "character," "numerical," and "date" fields, but all data in the PR-EDB are entered as characters. This somewhat complicates the numerical manipulation of data that have to be converted to numerical form first, but gives much greater freedom to data entry. Information such as <0.001 for an upper bound or RT for room temperature can be copied from the original report without change. Missing information is always indicated by a blank data field, which is not possible in numerical or date formats. The Raw Data Files are next converted to processed files by the EDB-Utilities or other user-supplied software. Processed files will typically be in dBASE format, but ASCII-coded files can also be obtained from dBASE-compatible software for input into scientific software (e.g., numerical analysis programs written in FORTRAN), word processors, and spreadsheets. With the additional software, tables and graphs can be created for the purpose of model fitting, model verification, and other applications.

Fig. 1. Data flow in the PR-EDB.

2.2 KEY IDENTIFIERS

One or more fields in each data file are occupied by "key identifiers," which provide the means for combining data from several files through "relations" that link the corresponding records in these files. These fields differ from other data fields in that the key identifiers are assigned by the manager of the data base in a manner that the same unique identifiers are used to label the data among the various data files that refer to the same experiments, materials, or source documents. The identifiers used in the reports do not always provide such unambiguous labelling. The following key identifiers are used in the current version of the PR-EDB:

1. PLANT_ID

Up to six characters are used to identify the reactor in which the irradiation was performed. Only up to three characters are used at present for the identification of commercial power reactors. A list of these identifiers with full name and other information about the reactor is given in the file REAC_LST.dbf (p. 27). The reactor code in PLANT_ID is also used to identify the surveillance program as a source of data, even if these data do not refer specifically to irradiation (as in files about chemistry or heat treatment; for details see Sect. 2.4).

2. CAPSULE

Up to six characters are used to identify the surveillance capsule. These are mostly identical to the identifications used in the surveillance program. Sometimes specimens are lumped together which come from different capsules with similar fluences, and in these cases special identifiers for data sets from combined capsules are assigned.

3. HEAT_ID

The material identifier can have up to ten characters. A simple scheme was devised which works as follows: The coding used for the PR-EDB assigns the first letter to the material type, namely P_late, F_orging, W_eldment, H_eat-affected-zone material, or S_tandard reference material. The next 3 + 2 letters contain the reactor identifier (first three letters of PLANT_ID) plus some identification number, if more than one material is used in the same reactor (e.g., 01, 02, etc; if practical, some correspondence between the EDB and report identifications is retained, e.g., PCC101, PCC102, and PCC103 stand for D7206-1, D7206-2, and D7206-3, respectively). For standard reference materials that are not restricted to a particular reactor, other identification letters are used, namely, SASTM for the A302B ASTM reference plate and SHSS02 for the HSST plate 02. The last four letters are reserved to distinguish between different parts of the same material (e.g., between surface and 1/2T, or between several sections of a plate) if different parts show markedly different material properties as documented in the reports. For instance, SASTM S1 and SASTM S2, denote pieces of the 6-in. ASTM A302B reference plate used in the Garigliano and Yankee Rowe reactors, respectively, whose baseline properties vary considerably from the same material used in Westinghouse reactors, which is denoted simply by SASTM. The file HEAT_LST.dbf (see p. 30) gives a complete list of

identifiers used in HEAT_ID together with the corresponding identifiers in the surveillance reports.

It was first considered to use the identifiers given in the reports for HEAT_ID, a practice used in the MPC Data base. This, however, has proven to be impractical. Base material (plates or forgings) is usually characterized by the heat number (assigned to the ingot) or a manufacturer's number (assigned to the plate or forging after fabrication; see, for instance, BAW-1820) and one or the other, or neither, is used in reports, frequently with different choices of identification in different reports. For welds, a weld code such as SA-1585 or WF-232 is sometimes used, but the same code may be applied to different welds of the same type (BAW-1820). Alternatively, the wire heat number has been used for identification or just the heat numbers of the two plates joined by the weld. A distinct identification is rarely given for the heat-affected-zone material.

4. SPEC_ORI

Different orientations of the material test specimens may lead to substantially different property test results, thus this identifier is needed to correctly link the properties of irradiated specimens to the corresponding baseline values.

Orientations are assigned in the now customary T-L-S system as described in ASTM Standard E399*, with L the primary rolling or forging direction, or, for welds and HAZ, the direction of the weld seam; T is perpendicular to L and parallel to the plate surface, and S is perpendicular to the plate surface. The first letter describes the longitudinal direction of the specimen (perpendicular to the crack surface, if any), and the second letter describes the direction of the crack propagation (perpendicular to the notch). The orientation for each specimen set was determined as well as possible, preferably from drawings, making sure that the same orientations are assigned to corresponding specimen sets. SPEC_ORI is left blank if no information is available.

5. REF_ID

In most files, each record is assigned a reference which indicates the source of the data. This is done by means of a 20-character field REF_ID. This identifier is usually a report number or a similar code which links it uniquely to the complete bibliographic information, i.e., author, title, and time of publication, which is given in the file REF_TITL.dbf (p. 43).

*Standard E399 applies formally only to CT specimens, but the extension to other types of specimens is straightforward (also see BAW-1820).

2.3 ORGANIZATION OF THE PR-EDB RAW DATA FILES

The current version of the PR-EDB is organized in the manner shown in Fig. 2. At the center is the file SPEC_LST.dbf (Table 2) containing a complete list of test specimen sets which are used in surveillance programs of commercial power reactors. Specimen sets are characterized by type and size of the specimen, given in SPEC_TYPE and SPEC_SIZE, and the four key identifiers PLANT_ID, CAPSULE, HEAT_ID, and SPEC_ORI, which link the sets to the other data files. Specimen sets for testing of the baseline properties of unirradiated materials are characterized by leaving the CAPSULE field blank. The data which are relevant for radiation embrittlement are distributed over three sets of data files. The first set, on the left of Fig. 2, consists of results of material property tests. Charpy, both individual tests and results of curve fittings, and tensile data are currently available (SHFT_PR.dbf, RAW_C_PR.dbf, and CV_RF_PR.dbf, for Charpy data and TEN_PR.dbf for tensile, Tables 4 through 11). Other test results, such as CT, WOL, hardness, and drop weight will be included later. The second set, at the middle of Fig. 2, contains data describing the reactor and radiation environment for each surveillance capsule. Currently available is the file REAC_PR.dbf containing the fluence, irradiation temperature and irradiation time and the file REAC_LST.dbf, which is a list of power reactors as mentioned above. Under consideration is the addition of more detailed files containing the irradiation history, the group fluence spectra, and dosimetry to allow for fluence determination by independent investigators. Finally, the set on the right of Fig. 2 contains the information about the chemistry and fabrication of the materials used in the surveillance programs (HEAT_LST.dbf, CHEM_PR.dbf, HEAT_PR.dbf, WELD_PR.dbf, and HAZ_PR.dbf, discussed in pages 16-20).

The PR-EDB files with the suffix _LST are somewhat different from the other data files in that they provide a sort of directory of the other files and their relations to the key identifiers. SPEC_LST.dbf is a directory of surveillance capsules and baseline specimen sets. REAC_LST.dbf is a directory of power reactors. And finally, HEAT_LST.dbf is a directory of the materials contained in the PR-EDB files. A more detailed description of these data files is given below.

Fig. 2. Architecture of the Power Reactor Embrittlement Data Base PR-EDB.

2.4 LIST OF PR-EDB FILES

1. File SPEC_LST.dbf

Table 2. Structure file for SPEC_LST.dbf

TAG	Used for Internal Operation
PLANT_ID	Reactor Identification
CAPSULE	Surveillance Capsule or Experiment Identification
HEAT_ID	Identification Code for Given Material
SPEC_TYPE	Type of Specimen: Charpy (CV), TEN_sile, C_ompact T_ension, WOL
SPEC_SIZE	Size of the Specimen
SPEC_ORI	Specimen Orientation: TL, LT, TS, etc.
SPEC_POS	Specimen Position: 1/4T, 1/2T, 3/4T, etc.
NO_OF_SPEC	Number of Specimens in Capsule or Experimental Set
REF_ID	Reference Identifier
PAGES	Page Number(s)
NOTES	Pertinent Information Related to Data Entries, If Needed

The key identifiers PLANT_ID + CAPSULE + HEAT_ID + SPEC_ORI link the specimen sets to the corresponding records in the other data files. PLANT_ID + CAPSULE identify a particular experiment (i.e., the surveillance capsule in a given reactor, and HEAT_ID + SPEC_ORI a particular material). SPEC_TYPE indicates the type of specimen; its size, if nonstandard, is listed in SPEC_SIZE. SPEC_POS indicates the layer(s) relative to the surface from which the specimens were cut. (This is 1/4T in most cases; 1/4T + 3/4T means that the set consists of a mixture of specimens cut from the 1/4T and 3/4T layers, 1/4T - 3/4T means the specimens are cut from the whole range between 1/4T and 3/4T.) Also listed is the number of specimens in each set, if available.

A partial listing of the records in SPEC_LST.dbf is given at the end of the section (p. 22).

2. File SHFT_PR.dbf

SHFT_PR.dbf (Table 3) lists transition temperatures and upper shelf energies as determined by the evaluator of the report. It lists 30 ft-lb, 50 ft-lb, and 35-mil transition temperatures (irradiated and unirradiated), and shift (difference between the two), whatever is listed in the report, and similarly for the upper shelf energy with both absolute and relative shift values. Also included are fluences ($E > 1.0$ MeV), taking into account the differences within the capsule between different specimen sets. Not included is the transition temperature at 50% shear since it is seldom reported and is difficult to be determined reliably. It can also be readily reconstructed from the individual Charpy test data. Also not included are transition temperatures at other energy levels or lateral expansion such as 71 ft-lb or 54 mil, which are sometimes listed in older reports. Shift values listed represent the actual differences between unirradiated and irradiated data; additional safety margins that are

sometimes included in reports have been subtracted. Shift values are sometimes determined in separate graphs independent from the determination of unirradiated and irradiated test data and may, for this reason, be inconsistent with the latter. This is indicated in the notes. Fields for temperature and energy units have been added to allow entering of data in different units. (See sample output at the end of section.)

Table 3. Structure file for SHFT_PR.dbf

TAG	Used for Internal Operation
PLANT_ID	Reactor Identification
CAPSULE	Surveillance Capsule or Experiment Identification
HEAT_ID	Identification Code for Given Material
PROD_ID	Material Type: P_late, F_orging, W_eld, HAZ, or SRM
SPEC_ORI	Specimen Orientation: TL, LT, TS, etc.
CSP_F1	Fluence > 1 MeV at Charpy Specimen Location [n/cm ²]
UTT30	CVT at 30 ft-lb, Unirradiated Charpy Specimen
UTT50	CVT at 50 ft-lb, Unirradiated Charpy Specimen
ULE35	CVT at Lateral Expansion = 35 mils, Unirrad. Charpy Spec.
UUSE	Upper Shelf Energy, Unirradiated Charpy Specimen
ITT30	CVT at 30 ft-lb, Irradiated Charpy Specimen
ITT50	CVT at 50 ft-lb, Irradiated Charpy Specimen
ILE35	CVT at Lateral Expansion = 35 mils, Irrad. Charpy Spec.
IUSE	Upper Shelf Energy, Irradiated Charpy Specimen
DTT30	CVT Shift at 30 ft-lb
DTT50	CVT Shift at 50 ft-lb
DLE35	CVT Shift at Lateral Expansion = 35 mils
DUSE_ABS	Absolute Drop in Upper Shelf Energy
DUSE_REL	Percent Drop in Upper Shelf Energy
TEMP_U	Unit used for Temperature Data
USE_U	Unit used for Energy Data (in Upper Shelf Energy)
REF_ID	Reference Identifier
PAGES	Page Number(s)
NOTES	Pertinent Information Related to Data Entries, If Needed

3. Files RAW_C_PR.dbf and CV_RF_PR.dbf

RAW_C_PR.dbf (Table 4) gives a complete list of individual Charpy test results. (See p. 24 at the end of the section for a partial listing.) The same key identifiers are used as in SHFT_PR.dbf and fluence and irradiation temperature are included that may be different for each specimen. Each set is listed only once, even if it appears in more than one report since corresponding data originate from

the same Charpy test. Fields for measuring units are again included to allow entering of data in different units. No references are listed in this file to save space since each specimen in the same set has the same reference. Instead, another file, CV_RF_PR.dbf, is added to this set that contains only the references that are uniquely assigned to the data in RAW_C_PR.dbf by means of the key identifiers. The structure of this file is listed below (Table 5) and a partial listing of the records is given at the end of the section (p. 25).

Table 4. Structure file for RAW_C_PR.dbf

TAG	Used for Internal Operation
PLANT_ID	Reactor Identification
CAPSULE	Surveillance Capsule or Experiment Identification
HEAT_ID	Identification Code for Given Material
PROD_ID	Material Type: P_late, F_orging, W_eld, HAZ, or SRM
SPEC_ORI	Specimen Orientation: TL, LT, TS, etc.
SPEC_ID	Specimen Identifier
TST_TEMP	Test Temperature of Specimen
TST_TEMP_U	Unit of Temperature used in TST_TEMP
IMP_E	Impact Energy of Charpy Specimen
IMP_E_U	Unit of Energy used in IMP_E
FRACT_APP	Fracture Appearance Value [% shear]
LAT_EXP	Lateral Expansion of Charpy Specimen
LAT_EXP_U	Unit of Length used in LAT_EXP
CSP_F1	Fluence > 1 MeV at Charpy Specimen Location [n/cm ²]
CSP_TEMP	Irradiation Temperature of Charpy Specimen
CSP_TEMP_U	Unit of Temperature used in CSP_TEMP

Table 5. Structure file for CV_RF_PR.dbf

TAG	Used for Internal Operation
PLANT_ID	Reactor Identification
CAPSULE	Surveillance Capsule or Experiment Identification
HEAT_ID	Identification Code for Given Material
PROD_ID	Material Type: P_late, F_orging, W_eld, HAZ, or SRM
SPEC_ORI	Specimen Orientation: TL, LT, TS, etc.
REF_ID	Reference Identifier
PAGES	Page Number(s)
NOTES	Pertinent Information Related to Data Entries, If Needed

4. File TEN_PR.dbf

The file TEN_PR.dbf (Table 6) lists the results of tensile tests with separate entries for each individual test. Averages from several experiments are included if no other information is available, but are omitted if individual test data are given. Such cases are indicated in NOTES. Fluences and irradiation temperatures are included and may differ from specimen to specimen as in RAW_C_PR.dbf. Units from the original reports are used as specified in the unit fields. (See p. 26 at the end of the section for a partial listing of the records in TEN_PR.dbf.)

Table 6. Structure file for TEN_PR.dbf

TAG	Used for Internal Operation
PLANT_ID	Reactor Identification
CAPSULE	Surveillance Capsule or Experiment Identification
HEAT_ID	Identification Code for Given Material
PROD_ID	Material Type: P_late, F_orging, W_eld, HAZ, or SRM
SPEC_ORI	Specimen Orientation: TL, LT, TS, etc.
TSP_F1	Fluence > 1 MeV at Tensile Specimen Location [n/cm ²]
TSP_TEMP	Irradiation Temperature of Tensile Specimen
TSP_TEMP_U	Unit of Temperature used for TSP_TEMP
SPEC_ID	Specimen Identifier
TST_TEMP	Test Temperature of Specimen
TST_TEMP_U	Unit of Temperature used for TST_TEMP
YSL	Lower Yield Strength of Tensile Specimen
YSL_U	Unit of Stress used in YSL
YSU	Upper Yield Strength of Tensile Specimen
YSU_U	Unit of Stress used in YSU
UTS	Ultimate Tensile Strength
UTS_U	Unit of Stress used in UTS
ULG	Uniform Elongation of Tensile Specimen [%]
TLG	Total Elongation of Tensile Specimen [%]
RA	Reduction in Area of Tensile Specimen [%]
REF_ID	Reference Identifier
PAGES	Page Number(s)
NOTES	Pertinent Information Related to Data Entries, If Needed

5. File REAC_LST.dbf

For each reactor code given in PLANT_ID, the file REAC_LST.dbf (Table 7) lists the full name of the reactor, the utility, the vendor, the pressure vessel manufacturer, and the architect/engineer of the plant. (A complete listing is given on p. 27 at the end of the section.) No references are included since these data come from many different sources and are easily verifiable.

Table 7. Structure file for REAC_LST.dbf

TAG	Used for Internal Operation
PLANT_ID	Reactor Identification
REAC_TYPE	Reactor Type: PWR, BWR, or TR
REAC_NAME	Reactor Name
LOCATION	Reactor Location
PLANT_OP	Reactor Operator or Utility
PLANT_DES	Reactor Designer or Vendor
ARCH_ENG	Reactor Architect/Engineer
VESSEL_MFG	Reactor Vessel Manufacturer

6. File REAC_PR.dbf

The file REAC_PR.dbf (Table 8) lists fluences for $E > 1.0$ MeV, $E > 0.1$ MeV, and dpa with uncertainties, as well as fluence rates at full power, full-power-equivalent irradiation times, and start-up and removal dates of the surveillance capsules. In a few cases, the capsules had been moved from one reactor to another, and the resulting differences in the irradiation environment are listed in separate records as indicated in the CONFIG field. Maxima and minima of the capsule temperatures during irradiation are also listed; since these values are difficult to determine and there are some questions concerning the reported data, EPRI has assigned seven categories that characterize the reported data and their suggested use. The category number is listed in the TEMP_TAG field having the following interpretation:

<u>Category</u>	<u>Description</u>
1	Temperatures reflect the best known capsule environment during irradiation
2	Temperatures reflect normal cycle operating range, applicable to the capsule during irradiation
3	Maximum temperature can be considered nominal capsule temperature
4	Minimum temperature can be considered nominal capsule temperature
5	Maximum temperature is not known or not reported
6	Minimum temperature is not known or not reported
7	No temperatures reported (listed temperatures, if any, are assumed on the basis of operating temperature or other capsules of the same reactor)

Table 8. Structure file for REAC_PR.dbf

TAG	Used for Internal Operation
PLANT_ID	Reactor Identification
CAPSULE	Surveillance Capsule or Experiment Identification
START_DATE	Date at Start of Irradiation [MM/DD/YYYY]
STOP_DATE	Date at End of Irradiation [MM/DD/YYYY]
CONFIG	Indicator for Change in Irradiation Environment
EFP_TIME	Effective Full Power Time of Irradiation
EFP_T_U	Unit of Time used for EFP_TIME
CAP_T_MIN	Minimum Irradiation Temperature at Capsule Center
CAP_T_MAX	Maximum Irradiation Temperature at Capsule Center
CAP_T_U	Unit of Temperature used for CAP_T_MAX and CAP_T_MIN
TEMP_TAG	Category Number for Irradiation Temperature Determination
CAP_F1	Fluence > 1 MeV at Capsule Center [n/cm ²]
F1_UNC	Uncertainty of Fluence > 1.0 MeV [% Standard Deviation]
F1_RATE	Fluence Rate > 1 MeV at Capsule Center [n/(cm ² ·s)]
CAP_FP1	Fluence > 0.1 MeV at Capsule Center [n/cm ²]
FP1_UNC	Uncertainty of Fluence > 0.1 MeV [% Standard Deviation]
CAP_DPA	Displacements per Atom of Iron at Capsule Center
DPA_UNC	Uncertainty of Displacements per Atom [% Standard Deviation]
REF_ID	Reference Identifier
PAGES	Page Number(s)
NOTES	Pertinent Information Related to Data Entries, If Needed

7. File HEAT_LST.dbf

The file HEAT_LST.dbf (Table 9) relates the material codes given in HEAT_ID to the descriptions and heat numbers given in the surveillance reports and in the MPC data base. It also includes the ASTM material classification, the supplier of the material, and the thickness. SOURCE gives specific information about the origin of the surveillance material (if available) namely SCR-ap, if it was obtained from excess material during the fabrication of the vessel (this applies also to welds), CUTOUT for nozzle cutouts, and SIM-ulated welds, if the material was not obtained from an actual weld seam but fabricated from excess plate material using the same filler and flux. Finally, FABR_icated means, that the material was fabricated separately, as it is done for correlation materials. (A complete listing is given on p. 30 at the end of the section.)

Table 9. Structure file for HEAT_LST.dbf

TAG	Used for Internal Operation
PLANT_ID	Reactor Identification
HEAT_ID	Identification Code for Given Material
RPT_ID	Identifier Used in Surveillance Reports
HEAT_NO	Heat Number of Material Used by Supplier
PROD_ID	Material Type: P_late, F_orging, W_eld, HAZ, or SRM
MAT_ID	Material Classification: A302B, A5082, A533B1, etc.
SUPPLIER	Supplier of Material
THICKNESS	Thickness of Base Material [inches]
SOURCE	Source of Material: FABR_icated, SCR_ap, SIM_ulated, CUTOUT
MPC_ID	Reference Number Assigned by Combustion Engineering (MPC)
MPC_HEAT	Material Heat Number (MPC)
REF_ID	Reference Identifier
PAGES	Page Number(s)
NOTES	Pertinent Information Related to Data Entries, If Needed

8. File CHEM_PR.dbf

The file CHEM_PR.dbf (Table 10) lists the chemistries for the given materials together with information about the laboratory and method used, if given, and whether it is derived from test specimens or represents generic values given by the supplier of the material. Generic values are identified in SPEC_ID as LADLE, CHECK, or just HEAT, depending on what is revealed in the reports. The term WIRE is used if the chemistry of the filler wire rather than that of the actual weld material has been reported. Other terms listed in SPEC_ID are the identifiers of the test specimen whose chemistry was determined. All different chemistry determinations for the same material are listed as reported, but duplications are omitted. (A partial listing is given on p. 39 at the end of the section.)

Table 10. Structure file for CHEM_PR.dbf

TAG	Used for Internal Operation
PLANT_ID	Reactor Identification
HEAT_ID	Identification Code for Given Material
PROD_ID	Material Type: P_late, F_orging, W_eld, HAZ, or SRM
MAT_ID	Material Classification: A302B, A5082, A533B1, etc.
CHEM_LAB	Chemistry Laboratory or Procedure Identification
METHOD	Method for Determining the Chemistry
SPEC_ID	Specimen Identifier
C	Weight Percent Carbon
MN	Weight Percent Manganese
P	Weight Percent Phosphorus
S	Weight Percent Sulfur
SI	Weight Percent Silicon
NI	Weight Percent Nickel
CR	Weight Percent Chromium
MO	Weight Percent Molybdenum
CU	Weight Percent Copper
V	Weight Percent Vanadium
B	Weight Percent Boron
CS	Weight Percent Cesium
TI	Weight Percent Titanium
CO	Weight Percent Cobalt
N	Weight Percent Nitrogen
O	Weight Percent Oxygen
SB	Weight Percent Antimony
AS	Weight Percent Arsenic
ZR	Weight Percent Zirconium
AL	Weight Percent Aluminum
AL_SOL	Weight Percent Aluminum in Solution
AL_INT	Weight Percent Aluminum Interstitial
PB	Weight Percent Lead
W	Weight Percent Tungsten
SN	Weight Percent Tin
ZN	Weight Percent Zinc
TA	Weight Percent Tantalum
H	Weight Percent Hydrogen
NB	Weight Percent Niobium
REF_ID	Reference Identifier
PAGES	Page Number(s)
NOTES	Pertinent Information Related to Data Entries, If Needed

9. File HEAT_PR.dbf

The file HEAT_PR.dbf (Table 11) lists up to eight different steps of heat treatment with temperature ranges, duration, quench method, and an indication of whether the particular step was intended for normalizing, austenizing, tempering, or stress relief, as far as reported. The supplier of the material and the facility performing the heat treatment as well as the identification used for the ingot (HEAT_NO) and the finished material (SUPPL_ID) are also included. The value of MINTEMP represents the nominal temperature of the treatment step, if no MAXTEMP is listed. RANGE, if listed, is the deviation from the nominal temperature in both directions, that is, one-half of the difference between the highest and the lowest temperature during treatment. (A partial listing is given on p. 40 at the end of the section.)

Table 11. Structure file for HEAT_PR.dbf

TAG	Used for Internal Operation
PLANT_ID	Reactor Identification
HEAT_ID	Identification Code for Given Material
PROD_ID	Material Type: P_late, F_orging, W_eld, HAZ, or SRM
SUPPLIER	Supplier of Material
HEAT_TREAT	Facility Performing Heat Treatment
HEAT_NO	Heat Number of Material Used by Supplier
SUPPL_ID	Identifier Used by Supplier
MINTEMP_1	Heat Treatment Minimum Temperature, Run 1
MAXTEMP_1	Heat Treatment Maximum Temperature, Run 1
RANGE_1	Heat Treatment Temperature Range, Run 1
HOURS_1	Heat Treatment Duration, Run 1 [hours]
QCHM_1	Quench Method, Run 1
ID_1	N_ormalizing, A_ustenizing, T_empering, Stress R_elief, Run 1
MINTEMP_2	Heat Treatment Minimum Temperature, Run 2
MAXTEMP_2	Heat Treatment Maximum Temperature, Run 2
RANGE_2	Heat Treatment Temperature Range, Run 2
HOURS_2	Heat Treatment Duration, Run 2 [hours]
QCHM_2	Quench Method, Run 2
ID_2	N_ormalizing, A_ustenizing, T_empering, Stress R_elief, Run 2
MINTEMP_3	Heat Treatment Minimum Temperature, Run 3
MAXTEMP_3	Heat Treatment Maximum Temperature, Run 3
RANGE_3	Heat Treatment Temperature Range, Run 3
HOURS_3	Heat Treatment Duration, Run 3 [hours]
QCHM_3	Quench Method, Run 3
ID_3	N_ormalizing, A_ustenizing, T_empering, Stress R_elief, Run 3

Table 11 (continued)

MINTEMP_4	Heat Treatment Minimum Temperature, Run 4
MAXTEMP_4	Heat Treatment Maximum Temperature, Run 4
RANGE_4	Heat Treatment Temperature Range, Run 4
HOURS_4	Heat Treatment Duration, Run 4 [hours]
QCHM_4	Quench Method, Run 4
ID_4	N_ormalizing, A_ustenizing, T_empering, Stress R_elief, Run 4
MINTEMP_5	Heat Treatment Minimum Temperature, Run 5
MAXTEMP_5	Heat Treatment Maximum Temperature, Run 5
RANGE_5	Heat Treatment Temperature Range, Run 5
HOURS_5	Heat Treatment Duration, Run 5 [hours]
QCHM_5	Quench Method, Run 5
ID_5	N_ormalizing, A_ustenizing, T_empering, Stress R_elief, Run 5
MINTEMP_6	Heat Treatment Minimum Temperature, Run 6
MAXTEMP_6	Heat Treatment Maximum Temperature, Run 6
RANGE_6	Heat Treatment Temperature Range, Run 6
HOURS_6	Heat Treatment Duration, Run 6 [hours]
QCHM_6	Quench Method, Run 6
ID_6	N_ormalizing, A_ustenizing, T_empering, Stress R_elief, Run 6
MINTEMP_7	Heat Treatment Minimum Temperature, Run 7
MAXTEMP_7	Heat Treatment Maximum Temperature, Run 7
RANGE_7	Heat Treatment Temperature Range, Run 7
HOURS_7	Heat Treatment Duration, Run 7 [hours]
QCHM_7	Quench Method, Run 7
ID_7	N_ormalizing, A_ustenizing, T_empering, Stress R_elief, Run 7
MINTEMP_8	Heat Treatment Minimum Temperature, Run 8
MAXTEMP_8	Heat Treatment Maximum Temperature, Run 8
RANGE_8	Heat Treatment Temperature Range, Run 8
HOURS_8	Heat Treatment Duration, Run 8 [hours]
QCHM_8	Quench Method, Run 8
ID_8	N_ormalizing, A_ustenizing, T_empering, Stress R_elief, Run 8
TEMP_U	Unit for Temperature Data
REF_ID	Reference Identifier
PAGES	Page Number(s)
NOTES	Pertinent Information Related to Data Entries, If Needed

10. File WELD_PR.dbf

The file WELD_PR.dbf (Table 12) gives additional information for weldments such as weld method, type and heat number of the filler material, and type and lot number of the flux used. The weld code (e.g., WF-209, plus the supplier of the weld) is also included. (A partial listing is given on p. 41 at the end of the section.)

Table 12. Structure file for WELD_PR.dbf

TAG	Used for Internal Operation
PLANT_ID	Reactor Identification
HEAT_ID	Identification Code for Given Material
WLD_TYPE	Weld Type
WLD_CODE	Identification Code used by Weld Manufacturer
HEAT_1	HEAT_ID of the Plate on one side of the Weld
HEAT_2	HEAT_ID of the Plate on the other side of the Weld
WELD_SUPLY	Supplier of Weld Material
WIRE_TYPE	Type of Weld Wire Used in the Weld
WIRE_HEAT	Weld Wire Heat Identifier
FLUX_TYPE	Type of Flux Used in the Weld
FLUX_LOT	Weld Flux Lot Identifier
REF_ID	Reference Identifier
PAGES	Page Number(s)
NOTES	Pertinent Information Related to Data Entries, If Needed

11. File HAZ_PR.dbf

The file HAZ_PR.dbf (Table 13) identifies the base material and weldments used to prepare the heat-affected-zone specimens. (A partial listing is given on p. 42 at the end of the section.)

Table 13. Structure file for HAZ_PR.dbf

TAG	Used for Internal Operation
PLANT_ID	Reactor Identification
HEAT_ID	Identification Code for Given Material
HEAT_B	HEAT_ID of the Base Material Used in the HAZ
HEAT_W	HEAT_ID of the Weld Material Connected with the HAZ
REF_ID	Reference Identifier
PAGES	Page Number(s)
NOTES	Pertinent Information Related to Data Entries, If Needed

12. File REF_TITL.dbf

All PR-EDB files mentioned so far, with the exception of RAW_C_PR.dbf and REAC_LST.dbf, contain a reference in the field REF_ID plus page numbers for each record. The complete bibliographic listing, including author, title, report number, and date of publication, is located in the file REF_TITL.dbf (Table 14). A complete listing of this file is given on p. 43 at the end of the section.

Table 14. Structure file for REF_TITL.dbf

TAG	Used for Internal Operation
REF_ID	Reference Identifier
CONT	Continuation Tag for References Occupying More than One Record
REF_TITLE	Bibliographic Reference

13. File REF_LST.dbf

The file REF_LST.dbf lists all references used in the PR-EDB arranged according to the reactors for which the reports were written. The references are given as REF_ID; detailed information can be found in the file REF_TITL.dbf. The first few references describe the A302B ASTM and the A533B1 HSST-1 and HSST-02 standard reference materials, respectively. A partial listing of this file is given on p. 58.

Tables 15 through 28 give partial or complete listings of the PR-EDB files discussed earlier.

Table 15. Partial listing of SPEC_LST.dbf

SPEC_LST.dbf: Page 1

TAG	PLANT_ID	CAPSULE	HEAT_ID	SPEC_TYPE	SPEC_SIZE	SPEC_ORI	SPEC_POS	NO_OF_SPEC	REF_ID	PAGES	NOTES
W	AD1		FAD101	CV		LT	1/4T		WCAP-8957	3-3; 3-7	
W	AD1		FAD101	CV		TL	1/4T		WCAP-8957	3-3; 3-7	
W	AD1		HAD101	CV			1/4T		WCAP-8957	3-3; 3-7	
W	AD1		WAD101	CV		TL	1/4T		WCAP-8957	3-3; 3-7	
W	AD1		FAD101	TEN		L	1/4T		WCAP-8957	3-3; 3-7	
W	AD1		FAD101	TEN		T	1/4T		WCAP-8957	3-3; 3-7	
W	AD1		WAD101	TEN			1/4T		WCAP-8957	3-3; 3-7	
W	AD1		FAD101	WOL		LT	1/4T		WCAP-8957	3-3; 3-7	
W	AD1		FAD101	WOL		TL	1/4T		WCAP-8957	3-3; 3-7	
W	AD1		WAD101	WOL			1/4T		WCAP-8957	3-3; 3-7	
W	AD1	N	FAD101	CV		LT	1/4T	12	WCAP-8957	3-3; 3-7	
W	AD1	N	FAD101	CV		TL	1/4T	12	WCAP-8957	3-3; 3-7	
W	AD1	N	HAD101	CV			1/4T	12	WCAP-8957	3-3; 3-7	
W	AD1	N	WAD101	CV		TL	1/4T	12	WCAP-8957	3-3; 3-7	
W	AD1	N	FAD101	TEN		L	1/4T	3	WCAP-8957	3-3; 3-7	
W	AD1	N	FAD101	TEN		T	1/4T	3	WCAP-8957	3-3; 3-7	
W	AD1	N	WAD101	TEN			1/4T	3	WCAP-8957	3-3; 3-7	
W	AD1	N	FAD101	WOL		LT	1/4T	3	WCAP-8957	3-3; 3-7	
W	AD1	N	FAD101	WOL		TL	1/4T	3	WCAP-8957	3-3; 3-7	
W	AD1	N	WAD101	WOL			1/4T	3	WCAP-8957	3-3; 3-7	
W	AD1	P	FAD101	CV		LT	1/4T	12	WCAP-8957	3-3; 3-7	CAPSULE IS IN STANDBY
W	AD1	P	FAD101	CV		TL	1/4T	12	WCAP-8957	3-3; 3-7	CAPSULE IS IN STANDBY
W	AD1	P	HAD101	CV			1/4T	12	WCAP-8957	3-3; 3-7	CAPSULE IS IN STANDBY
W	AD1	P	WAD101	CV		TL	1/4T	12	WCAP-8957	3-3; 3-7	CAPSULE IS IN STANDBY
W	AD1	P	FAD101	TEN		L	1/4T	3	WCAP-8957	3-3; 3-7	CAPSULE IS IN STANDBY
W	AD1	P	FAD101	TEN		T	1/4T	3	WCAP-8957	3-3; 3-7	CAPSULE IS IN STANDBY
W	AD1	P	WAD101	TEN			1/4T	3	WCAP-8957	3-3; 3-7	CAPSULE IS IN STANDBY
W	AD1	P	FAD101	WOL		LT	1/4T	3	WCAP-8957	3-3; 3-7	CAPSULE IS IN STANDBY
W	AD1	P	FAD101	WOL		TL	1/4T	3	WCAP-8957	3-3; 3-7	CAPSULE IS IN STANDBY
W	AD1	P	WAD101	WOL			1/4T	3	WCAP-8957	3-3; 3-7	CAPSULE IS IN STANDBY
W	AD1	R	FAD101	CV		LT	1/4T	12	WCAP-8957	3-3; 3-7	
W	AD1	R	FAD101	CV		TL	1/4T	12	WCAP-8957	3-3; 3-7	
W	AD1	R	HAD101	CV			1/4T	12	WCAP-8957	3-3; 3-7	
W	AD1	R	WAD101	CV		TL	1/4T	12	WCAP-8957	3-3; 3-7	
W	AD1	R	FAD101	TEN		L	1/4T	3	WCAP-8957	3-3; 3-7	
W	AD1	R	FAD101	TEN		T	1/4T	3	WCAP-8957	3-3; 3-7	
W	AD1	R	WAD101	TEN			1/4T	3	WCAP-8957	3-3; 3-7	
W	AD1	R	FAD101	WOL		LT	1/4T	3	WCAP-8957	3-3; 3-7	
W	AD1	R	FAD101	WOL		TL	1/4T	3	WCAP-8957	3-3; 3-7	
W	AD1	R	WAD101	WOL			1/4T	3	WCAP-8957	3-3; 3-7	
W	AD1	S	FAD101	CV		LT	1/4T	12	WCAP-8957	3-3; 3-7	
W	AD1	S	HAD101	CV		TL	1/4T	12	WCAP-8957	3-3; 3-7	
W	AD1	S	WAD101	CV			1/4T	12	WCAP-8957	3-3; 3-7	
W	AD1	S	FAD101	TEN		L	1/4T	3	WCAP-8957	3-3; 3-7	
W	AD1	S	FAD101	TEN		T	1/4T	3	WCAP-8957	3-3; 3-7	
W	AD1	S	WAD101	TEN			1/4T	3	WCAP-8957	3-3; 3-7	

Table 16. Partial listing of SHFT_PR.dbf

SNFT_PR.dbf: Page 1																								
TAG	PLANT_ID	CAPSULE	HEAT_ID	PROD_ID	SPEC_ORI	CSP_F1	UTT30	UTT50	ULE35	UUSE	ITT30	ITT50	ILE35	IUSE	DTT30	DTT50	DLE35	DUSE_ABS	DUSE_REL	TEMP_U	USE_U	REF_ID	PAGES	
W	AD1	V	FAD101	F	LT	4.580E+18	-25	15	11	141	0	50	20	127	25	35	9	14		F	FT-LB	SWR1-06-8976	1, 50	
W	AD1	V	FAD101	F	TL	4.580E+18	-22	15	17	128	3	46	35	119	25	31	18	9		F	FT-LB	SWR1-06-8976	1, 50	
W	AD1	V	HAD101	HAZ		4.580E+18	-180	-140	-115	200	-152	-118	-95	195	28	22	20	5		F	FT-LB	SWR1-06-8976	1, 50	
W	AD1	V	WAD101	W	TL	4.580E+18	-80	-55	-55	171	-70	-45	-49	155	10	10	6	16		F	FT-LB	SWR1-06-8976	1, 50	
B	AN1		HAN101	HAZ	TL		<-40	0		115										F	FT-LB	BAW-1820	4-31	
B	AN1		HAN101	HAZ	TS			0	8	95										F	FT-LB	BAW-1440	C-14	
B	AN1		HAN101	HAZ	TS		<-40	0		95										F	FT-LB	BAW-1820	4-31	
B	AN1		HAN102	HAZ	TL			4	4	110										F	FT-LB	BAW-1440	C-17	
B	AN1		HAN102	HAZ	TL		<-40	4		110										F	FT-LB	BAW-1820	4-31	
B	AN1		HAN102	HAZ	TS				-16	104										F	FT-LB	BAW-1440	C-18	
B	AN1		HAN102	HAZ	TS		<-40	-20		104										F	FT-LB	BAW-1820	4-31	
B	AN1		PAN101	P	LT		<-40	8		132										F	FT-LB	BAW-1820	4-31	
B	AN1		PAN101	P	TL			74		107										F	FT-LB	BAW-1820	4-31	
B	AN1		PAN102	P	LT			18	12	147										F	FT-LB	BAW-1440	C-15	
B	AN1		PAN102	P	LT		-10	18		147										F	FT-LB	BAW-1820	4-31	
B	AN1		PAN102	P	TL			52	40	107										F	FT-LB	BAW-1440	C-16	
B	AN1		PAN102	P	TL		20	52		107										F	FT-LB	BAW-1820	4-31	
B	AN1		SHSS02	SRM	LT		56	93		130										F	FT-LB	BAW-1820	4-31	
B	AN1		WAN101	W	TL		5	65		73										F	FT-LB	BAW-1820	4-31	
B	AN1	A	HAN101	HAZ	TL	1.030E+19	-43	0	42	115	2	90	60	74	45	90	18	41		F	FT-LB	BAW-1836	5-6, 7-7, C-8	
B	AN1	A	PAN101	P	LT	1.030E+19	-31	8	13	132	17	78	73	108	48	70	60	24		F	FT-LB	BAW-1836	5-8, 7-7, C-6	
B	AN1	A	PAN101	P	TL	1.030E+19	17	74	64	96	83	144	127	83	66	70	63	11		F	FT-LB	BAW-1836	5-7, 7-7, C-7	
B	AN1	A	SHSS02	SRM	LT	1.030E+19					94	140	140	95	46	66	85	35		F	FT-LB	BAW-1836	5-10, 7-7	
B	AN1	A	WAN101	W	TL	1.030E+19	5	65	65	73	156		194	45	151		129	28		F	FT-LB	BAW-1836	5-9, 7-7, C-9	
B	AN1	B	HAN102	HAZ	TL	4.280E+18	-64	4	4	110	-8	47	30	75	56	43	26	35		F	FT-LB	BAW-1698	5-5, 7-4, C-7	
B	AN1	B	PAN102	P	LT	4.280E+18	-13	18	12	147	22	56	42	123	35	38	30	24		F	FT-LB	BAW-1698	5-7, 7-4, C-5	
B	AN1	B	PAN102	P	TL	4.280E+18	19	52	40	107	15	76	38	90	-4	24	-2	17		F	FT-LB	BAW-1698	5-6, 7-4, C-6	
B	AN1	B	SHSS02	SRM	LT	4.280E+18					98	141	118	96	50	57	63	34		F	FT-LB	BAW-1698	5-8, 7-4	
B	AN1	E	HAN101	HAZ	TL	7.270E+17		0	42	115	42	60	82		42	18	33			F	FT-LB	BAW-1440	5-8, 7-4, C-13	
B	AN1	E	PAN101	P	LT	7.270E+17		8	13	132	32	30	118		19	17	14			F	FT-LB	BAW-1440	5-6, 7-4, C-11	
B	AN1	E	PAN101	P	TL	7.270E+17		74	64	107	96	92	82		22	28	25			F	FT-LB	BAW-1440	5-7, 7-4, C-12	
B	AN1	E	SHSS02	SRM	LT	7.270E+17					114	110	117		40	55	13			F	FT-LB	BAW-1440	5-10, 7-4	
B	AN1	E	WAN101	W	TL	7.270E+17		65	65	73		202	180	58		137	115	15		F	FT-LB	BAW-1440	5-9, 7-4, C-19	
B	AN1	E	WAN101	W	TL	7.270E+17	5			73	110			58	105			15		F	FT-LB	BAW-1803	3-7, A-15, A-16	
C	AN2		SHSS01	SRM	LT		30	52	47	149					0	-2	0	15	9		F	FT-LB	TR-MCD-002	5, 58, 69
C	AN2	W97	HAN201	HAZ	TL	3.490E+18	-80	-50	-63	161	-80	-52	-63	146	0					F	FT-LB	TR-MCD-002	5, 58, 69	
C	AN2	W97	PAN201	P	LT	3.410E+18	3	24	20	159	24	57	39	140	21	33	19	19	12		F	FT-LB	TR-MCD-002	5, 58, 69
C	AN2	W97	PAN201	P	TL	3.330E+18	10	40	30	134	60	90	57	120	50	50	27	14	10		F	FT-LB	TR-MCD-002	5, 58, 69
C	AN2	W97	WAN201	W	TL	3.340E+18	0	14	10	154	10	25	20	147	10	11	10	7	5		F	FT-LB	TR-MCD-002	5, 58, 69
G	BR	119	HBR_01	HAZ	TS	1.500E+18	-55			100	-55			100	0		0	0	0		F	FT-LB	NE&D 11(3)	401
G	BR	119	PBR_01	P	TL	1.500E+18	-5			82	-5			82	0		0	0	0		F	FT-LB	NE&D 11(3)	401
G	BR	119	SHR_01	SRM	LT	1.500E+18								70	15	20	26	27		F	FT-LB	UCAP-9794	5-8	
G	BR	119	SHR_01	SRM	LT	1.500E+18	0			96	15			70	15		26	27		F	FT-LB	NE&D 11(3)	401	
G	BR	119	WBR_01	W	TS	1.500E+18								80	55	100	15	16		F	FT-LB	UCAP-9794	5-8	
G	BR	119	WBR_01	W	TS	1.500E+18	-70			95	-15			80	55		15	16		F	FT-LB	NE&D 11(3)	401	
G	BR	121	PBR_01	P	TL		-5			82	10			88	15		-6	-7		F	FT-LB	NE&D 11(3)	401	
G	BR	121	WBR_01	W	TS		-70			95	-55			92	15		3	3		F	FT-LB	NE&D 11(3)	401	
G	BR	122	HBR_01	HAZ	TS	2.300E+19								80	130		21	21		F	FT-LB	UCAP-9794	5-8	
G	BR	122	HBR_01	HAZ	TS	2.300E+19	-55			100	15			79	70		21	21		F	FT-LB	NE&D 11(3)	401	
G	BR	122	PBR_01	P	TL	2.300E+19								70	90		20	24		F	FT-LB	UCAP-9794	5-8	
G	BR	122	PBR_01	P	TL	2.300E+19	-5			82	65			62	70		20	24		F	FT-LB	NE&D 11(3)	401	
G	BR	122	WBR_01	W	TS	2.300E+19								190	210		38	40		F	FT-LB	UCAP-9794	5-8	
G	BR	122	WBR_01	W	TS	2.300E+19	-70			95	120			57	190		38	40		F	FT-LB	NE&D 11(3)	401	
G	BR	124	HBR_01	HAZ	TS	1.070E+20								160	190		25	25		F	FT-LB	UCAP-9794	5-8	
G	BR	124	HBR_01	HAZ	TS	1.070E+20	-55			100	105			75	160		25	25		F	FT-LB	NE&D 11(3)	401	
G	BR	124	PBR_01	P	TL	1.070E+20								150	135		12	15		F	FT-LB	UCAP-9794	5-8	
G	BR	124	PBR_01	P	TL	1.070E+20	-5			82	145			70	150		12	15		F	FT-LB	NE&D 11(3)	401	

Table 17. Partial listing of RAW_C_PR.dbf

RAW_C_PR.dbf: Page 1

TAG	PLANT_ID	CAPSULE	HEAT_ID	PROD_ID	SPEC_ORI	SPEC_ID	TST_TEMP	TST_TEMP_U	IMP_E	IMP_E_U	FRACT_APP	LAT_EXP	LAT_EXP_U	CSP_F1	CSP_TEMP	CSP_TEMP_U
U	AD1		FAD101	F	LT		-100.0	F	6.5	FT-LB	0	3.0			NIL	
U	AD1		FAD101	F	LT		-100.0	F	4.0	FT-LB	0	1.0			NIL	
U	AD1		FAD101	F	LT		-100.0	F	4.0	FT-LB	0	2.5			NIL	
U	AD1		FAD101	F	LT		-20.0	F	54.0	FT-LB	14	39.0			NIL	
U	AD1		FAD101	F	LT		-20.0	F	31.5	FT-LB	9	22.0			NIL	
U	AD1		FAD101	F	LT		-20.0	F	38.5	FT-LB	14	28.0			NIL	
U	AD1		FAD101	F	LT		20.0	F	70.0	FT-LB	39	52.0			NIL	
U	AD1		FAD101	F	LT		20.0	F	77.0	FT-LB	42	57.0			NIL	
U	AD1		FAD101	F	LT		20.0	F	84.0	FT-LB	39	61.0			NIL	
U	AD1		FAD101	F	LT		50.0	F	75.0	FT-LB	20	58.0			NIL	
U	AD1		FAD101	F	LT		50.0	F	75.5	FT-LB	25	56.0			NIL	
U	AD1		FAD101	F	LT		50.0	F	60.0	FT-LB	30	47.0			NIL	
U	AD1		FAD101	F	LT		110.0	F	111.0	FT-LB	77	79.0			NIL	
U	AD1		FAD101	F	LT		110.0	F	117.5	FT-LB	80	80.0			NIL	
U	AD1		FAD101	F	LT		110.0	F	113.0	FT-LB	77	78.0			NIL	
U	AD1		FAD101	F	LT		210.0	F	138.0	FT-LB	100	90.0			NIL	
U	AD1		FAD101	F	LT		210.0	F	145.0	FT-LB	100	88.0			NIL	
U	AD1		FAD101	F	LT		210.0	F	143.0	FT-LB	100	90.0			NIL	
U	AD1		FAD101	F	TL		-50.0	F	25.0	FT-LB	10	17.0			NIL	
U	AD1		FAD101	F	TL		-50.0	F	12.5	FT-LB	6	7.0			NIL	
U	AD1		FAD101	F	TL		-50.0	F	9.0	FT-LB	5	4.0			NIL	
U	AD1		FAD101	F	TL		0.0	F	53.0	FT-LB	30	39.0			NIL	
U	AD1		FAD101	F	TL		0.0	F	49.5	FT-LB	30	36.0			NIL	
U	AD1		FAD101	F	TL		0.0	F	42.0	FT-LB	25	29.0			NIL	
U	AD1		FAD101	F	TL		50.0	F	64.0	FT-LB	36	49.0			NIL	
U	AD1		FAD101	F	TL		50.0	F	70.0	FT-LB	40	52.0			NIL	
U	AD1		FAD101	F	TL		50.0	F	80.0	FT-LB	42	56.0			NIL	
U	AD1		FAD101	F	TL		110.0	F	107.0	FT-LB	73	73.0			NIL	
U	AD1		FAD101	F	TL		110.0	F	131.0	FT-LB	100	84.0			NIL	
U	AD1		FAD101	F	TL		110.0	F	100.0	FT-LB	73	67.0			NIL	
U	AD1		FAD101	F	TL		160.0	F	123.0	FT-LB	100	81.0			NIL	
U	AD1		FAD101	F	TL		160.0	F	132.0	FT-LB	100	89.0			NIL	
U	AD1		FAD101	F	TL		160.0	F	131.0	FT-LB	100	87.0			NIL	
U	AD1		FAD101	F	TL		210.0	F	129.0	FT-LB	100	89.0			NIL	
U	AD1		FAD101	F	TL		210.0	F	130.0	FT-LB	100	82.0			NIL	
U	AD1		FAD101	F	TL		210.0	F	126.0	FT-LB	100	83.0			NIL	
U	AD1		HAD101	HAZ			-200.0	F	24.0	FT-LB	0	8.0			NIL	
U	AD1		HAD101	HAZ			-200.0	F	46.0	FT-LB	50	23.0			NIL	
U	AD1		HAD101	HAZ			-125.0	F	69.5	FT-LB	33	51.0			NIL	
U	AD1		HAD101	HAZ			-125.0	F	89.5	FT-LB	20	40.0			NIL	
U	AD1		HAD101	HAZ			-100.0	F	95.0	FT-LB	85	54.0			NIL	
U	AD1		HAD101	HAZ			-100.0	F	61.0	FT-LB	85	29.0			NIL	
U	AD1		HAD101	HAZ			-50.0	F	45.5	FT-LB	18	28.0			NIL	
U	AD1		HAD101	HAZ			-50.0	F	120.0	FT-LB	51	69.0			NIL	
U	AD1		HAD101	HAZ			-50.0	F	119.0	FT-LB	42	65.0			NIL	
U	AD1		HAD101	HAZ			0.0	F	148.0	FT-LB	85	74.0			NIL	
U	AD1		HAD101	HAZ			0.0	F	127.0	FT-LB	60	80.0			NIL	
U	AD1		HAD101	HAZ			0.0	F	195.0	FT-LB	100	86.0			NIL	
U	AD1		HAD101	HAZ			62.0	F	100.0	FT-LB	90	61.0			NIL	
U	AD1		HAD101	HAZ			62.0	F	190.0	FT-LB	100	92.0			NIL	
U	AD1		HAD101	HAZ			62.0	F	200.0	FT-LB	100	85.0			NIL	

Table 18. Partial listing of CV_RF_PR.dbf

CV_RF_PR.dbf: Page 1								
TAG	PLANT_ID	CAPSULE	HEAT_ID	PROD_ID	SPEC_ORI	REF_ID	PAGES	NOTES
W	AD1		FAD101	F	LT	WCAP-8957	4-2	
W	AD1		FAD101	F	TL	WCAP-8957	4-3	
W	AD1		HAD101	HAZ		WCAP-8957	4-7	
W	AD1		WAD101	W	TL	WCAP-8957	4-6	
W	AD1	V	FAD101	F	LT	SWR1-06-8976	1; 42	
W	AD1	V	FAD101	F	TL	SWR1-06-8976	1; 41	
W	AD1	V	HAD101	HAZ		SWR1-06-8976	1; 44	
W	AD1	V	WAD101	W	TL	SWR1-06-8976	1; 43	
W	AL2		HAL201	HAZ	TL	WCAP-9228	3-8	
W	AL2		PAL201	P	LT	WCAP-9228	3-3	
W	AL2		PAL201	P	TL	WCAP-9228	3-4	
W	AL2		WAL201	W	TL	WCAP-9228	3-7	
B	AN1		HAN101	HAZ	TL	BAW-1440	C-4	
B	AN1		HAN101	HAZ	TS	BAW-1440	C-5	
B	AN1		HAN102	HAZ	TL	BAW-1440	C-8	
B	AN1		HAN102	HAZ	TS	BAW-1440	C-9	
B	AN1		PAN101	P	LT	BAW-1440	C-2	
B	AN1		PAN101	P	TL	BAW-1440	C-3	
B	AN1		PAN102	P	LT	BAW-1440	C-6	
B	AN1		PAN102	P	TL	BAW-1440	C-7	
B	AN1		WAN101	W	TL	BAW-1440	C-10	
B	AN1	A	HAN101	HAZ	TL	BAW-1836	5-3	
B	AN1	A	PAN101	P	LT	BAW-1836	5-4	
B	AN1	A	PAN101	P	TL	BAW-1836	5-4	
B	AN1	A	SHSS02	SRM	LT	BAW-1836	5-5	
B	AN1	A	WAN101	W	TL	BAW-1836	5-5	
B	AN1	B	HAN102	HAZ	TL	BAW-1698	5-3	
B	AN1	B	PAN102	P	LT	BAW-1698	5-4	
B	AN1	B	PAN102	P	TL	BAW-1698	5-3	
B	AN1	B	SHSS02	SRM	LT	BAW-1698	5-4	
B	AN1	E	HAN101	HAZ	TL	BAW-1440	5-4	
B	AN1	E	PAN101	P	LT	BAW-1440	5-4	
B	AN1	E	PAN101	P	TL	BAW-1440	5-4	
B	AN1	E	SHSS02	SRM	LT	BAW-1440	5-5	
B	AN1	E	WAN101	W	TL	BAW-1440	5-5	
W	AS1		HAS101	HAZ	TL	WCAP-9308	3-8	
W	AS1		PAS101	P	LT	WCAP-9308	3-3	
W	AS1		PAS101	P	TL	WCAP-9308	3-4	
W	AS1		WAS101	W	TL	WCAP-9308	3-7	
W	AS2		HAS201	HAZ	TL	WCAP-9330	3-8	
W	AS2		PAS201	P	LT	WCAP-9330	3-3	
W	AS2		PAS201	P	TL	WCAP-9330	3-4	
W	AS2		WAS201	W	TL	WCAP-9330	3-7	
G	BR		HBR_01	HAZ	TS	EPRI NP-2428	3-214	
G	BR		PBR_01	P	TL	EPRI NP-2428	3-207	
G	BR		WBR_01	W	TS	EPRI NP-2428	3-219	
G	BR	119	HBR_01	HAZ	TS	EPRI NP-2428	3-214	
G	BR	119	PBR_01	P	TL	EPRI NP-2428	3-208	
G	BR	119	WBR_01	W	TS	EPRI NP-2428	3-219	
G	BR	122	HBR_01	HAZ	TS	EPRI NP-2428	3-215	
G	BR	122	PBR_01	P	TL	EPRI NP-2428	3-208	
G	BR	122	WBR_01	W	TS	EPRI NP-2428	3-220	
G	BR	124	HBR_01	HAZ	TS	EPRI NP-2428	3-215	
G	BR	124	PBR_01	P	TL	EPRI NP-2428	3-208	
G	BR	124	WBR_01	W	TS	EPRI NP-2428	3-220	
G	BR	125	HBR_01	HAZ	TS	WCAP-9794	5-4	
G	BR	125	PBR_01	P	TL	WCAP-9794	5-4	

Table 19. Partial listing of TEN_PR.dbf

TEN_PR.dbf: Page 1																						PAGES
TAG	PLANT_ID	CAPSULE	HEAT_ID	PROD_ID	SPEC_ORI	TSP_F1	TSP_TEMP	TSP_TEMP_U	SPEC_ID	TST_TEMP	TST_TEMP_U	YSL	YSL_U	YSU	YSU_U	UTS	UTS_U	ULG	TLG	RA	REF_ID	PAGES
U	AD1		FAD101	F	L					64	F	74800	PSI			93550	PSI	13.7	26.1	70.7	WCAP-8957	4-10
U	AD1		FAD101	F	L					64	F	74850	PSI			93550	PSI	13.3	25.7	70.6	WCAP-8957	4-10
U	AD1		FAD101	F	L					300	F	67400	PSI			86250	PSI	11.7	22.1	68.8	WCAP-8957	4-10
U	AD1		FAD101	F	L					300	F	66900	PSI			86200	PSI	12.7	24.7	69.7	WCAP-8957	4-10
U	AD1		FAD101	F	L					550	F	65950	PSI			89200	PSI	14.4	24.6	70.2	WCAP-8957	4-10
U	AD1		FAD101	F	L					550	F	65350	PSI			87450	PSI	12.4	24.0	70.3	WCAP-8957	4-10
U	AD1		FAD101	F	T					64	F	75140	PSI			93600	PSI	14.1	25.9	68.7	WCAP-8957	4-10
U	AD1		FAD101	F	T					64	F	74960	PSI			93200	PSI	13.6	26.2	70.5	WCAP-8957	4-10
U	AD1		FAD101	F	T					300	F	68050	PSI			86800	PSI	12.4	23.3	69.3	WCAP-8957	4-10
U	AD1		FAD101	F	T					300	F	66850	PSI			86100	PSI	12.8	24.1	69.5	WCAP-8957	4-10
U	AD1		FAD101	F	T					550	F	66050	PSI			89350	PSI	13.7	23.4	68.8	WCAP-8957	4-10
U	AD1		FAD101	F	T					550	F	65300	PSI			88550	PSI	12.6	25.0	68.0	WCAP-8957	4-10
U	AD1		WAD101	U						64	F	75350	PSI			85100	PSI	14.0	25.4	75.9	WCAP-8957	4-10
U	AD1		WAD101	U						64	F	74400	PSI			86650	PSI	14.9	28.5	76.3	WCAP-8957	4-10
U	AD1		WAD101	U						300	F	66950	PSI			80100	PSI	12.6	24.2	74.4	WCAP-8957	4-10
U	AD1		WAD101	U						300	F	67800	PSI			79950	PSI	11.3	23.2	75.1	WCAP-8957	4-10
U	AD1		WAD101	U						550	F	66050	PSI			84500	PSI	11.9	22.0	73.1	WCAP-8957	4-10
U	AD1		WAD101	U						550	F	65300	PSI			84900	PSI	14.6	26.2	73.1	WCAP-8957	4-10
U	AD1	V	FAD101	F	L	4.580E+18	579	F	EL3	71	F	75735	PSI			96000	PSI	15.8	25.1	69.6	SMR1-06-8976	1, 51
U	AD1	V	FAD101	F	L	4.580E+18	579	F	EL1	300	F	71204	PSI			88408	PSI	13.5	22.6	67.8	SMR1-06-8976	1, 51
U	AD1	V	FAD101	F	L	4.580E+18	579	F	EL2	550	F	69490	PSI			88204	PSI	13.0	20.5	66.7	SMR1-06-8976	1, 51
U	AD1	V	FAD101	F	T	4.580E+18	579	F	ET1	71	F	76959	PSI			96245	PSI	17.8	25.4	68.8	SMR1-06-8976	1, 51
U	AD1	V	FAD101	F	T	4.580E+18	579	F	ET2	300	F	70735	PSI			87796	PSI	13.5	22.0	70.0	SMR1-06-8976	1, 51
U	AD1	V	FAD101	F	T	4.580E+18	579	F	ET3	550	F	69490	PSI			88429	PSI	12.7	20.3	68.6	SMR1-06-8976	1, 51
U	AD1	V	WAD101	U		4.580E+18	579	F	EW3	71	F	78163	PSI			90633	PSI	15.3	23.9	73.3	SMR1-06-8976	1, 51
U	AD1	V	WAD101	U		4.580E+18	579	F	EW1	300	F	71082	PSI			81694	PSI	13.5	21.0	74.5	SMR1-06-8976	1, 51
U	AD1	V	WAD101	U		4.580E+18	579	F	EW2	550	F	64122	PSI			81224	PSI	12.6	21.6	73.7	SMR1-06-8976	1, 51
U	AL2		PAL201	P	L					76	F	69.9	KSI			91.9	KSI	16.0	27.6	62.3	WCAP-9228	3-11
U	AL2		PAL201	P	L					76	F	70.1	KSI			92.3	KSI	14.3	26.8	68.0	WCAP-9228	3-11
U	AL2		PAL201	P	L					300	F	64.7	KSI			85.7	KSI	12.1	22.6	67.1	WCAP-9228	3-11
U	AL2		PAL201	P	L					300	F	64.7	KSI			85.9	KSI	12.2	21.1	65.3	WCAP-9228	3-11
U	AL2		PAL201	P	L					550	F	63.4	KSI			92.4	KSI	13.4	24.5	66.3	WCAP-9228	3-11
U	AL2		PAL201	P	L					550	F	63.6	KSI			92.4	KSI	14.4	24.6	66.7	WCAP-9228	3-11
U	AL2		PAL201	P	T					76	F	70.5	KSI			92.7	KSI	13.9	23.2	57.2	WCAP-9228	3-11
U	AL2		PAL201	P	T					76	F	70.6	KSI			92.8	KSI	13.8	22.7	57.2	WCAP-9228	3-11
U	AL2		PAL201	P	T					300	F	64.2	KSI			85.9	KSI	12.3	19.0	50.2	WCAP-9228	3-11
U	AL2		PAL201	P	T					300	F	64.5	KSI			85.9	KSI	11.5	19.2	53.2	WCAP-9228	3-11
U	AL2		PAL201	P	T					550	F	63.4	KSI			91.9	KSI	13.1	21.0	44.0	WCAP-9228	3-11
U	AL2		PAL201	P	T					550	F	63.7	KSI			91.1	KSI	13.5	19.0	41.0	WCAP-9228	3-11
U	AL2		UAL201	U	T					76	F	64.3	KSI			79.8	KSI	18.3	30.9	72.3	WCAP-9228	3-11
U	AL2		UAL201	U	T					76	F	64.3	KSI			79.8	KSI	16.4	29.1	70.3	WCAP-9228	3-11
U	AL2		UAL201	U	T					300	F	58.5	KSI			73.1	KSI	12.0	22.6	70.7	WCAP-9228	3-11
U	AL2		UAL201	U	T					300	F	61.0	KSI			75.2	KSI	13.1	24.4	72.4	WCAP-9228	3-11
U	AL2		UAL201	U	T					550	F	58.0	KSI			79.3	KSI	13.7	25.0	70.3	WCAP-9228	3-11
U	AL2		UAL201	U	T					550	F	58.2	KSI			79.5	KSI	13.8	24.7	69.3	WCAP-9228	3-11
B	AN1		HAN101	HAZ	L				GG401	71	F	69.3	KSI			86.7	KSI	7.9	17.1	63.8	BAW-1440	B-3
B	AN1		HAN101	HAZ	L				GG403	71	F	69.7	KSI			87.6	KSI	8.1	18.6	63.5	BAW-1440	B-3
B	AN1		HAN101	HAZ	L				GG406	71	F	70.1	KSI			87.5	KSI	8.4	19.3	63.5	BAW-1440	B-3
B	AN1		HAN101	HAZ	L				GG402	570	F	65.0	KSI			83.8	KSI	6.7	14.3	65.7	BAW-1440	B-3
B	AN1		HAN101	HAZ	L				GG404	570	F	65.1	KSI			82.2	KSI	6.8	14.3	66.8	BAW-1440	B-3
B	AN1		HAN101	HAZ	L				GG405	570	F	64.8	KSI			83.5	KSI	7.5	14.3	53.7	BAW-1440	B-3
B	AN1		HAN101	HAZ	T				GG301	71	F	71.5	KSI			94.4	KSI	10.1	27.9	70.3	BAW-1440	B-3
B	AN1		HAN101	HAZ	T				GG303	71	F	72.3	KSI			95.6	KSI		26.4	67.5	BAW-1440	B-3
B	AN1		HAN101	HAZ	T				GG305	71	F	69.4	KSI			92.7	KSI	12.0	27.9	68.5	BAW-1440	B-3
B	AN1		HAN101	HAZ	T				GG302	570	F	63.5	KSI			90.4	KSI	11.7	25.7	65.9	BAW-1440	B-3
B	AN1		HAN101	HAZ	T				GG306	570	F	64.6	KSI			91.4	KSI	11.8	27.1	65.6	BAW-1440	B-3
B	AN1		HAN102	HAZ	L				HH402	71	F	64.3	KSI			87.2	KSI	10.3	22.9	64.5	BAW-1440	B-5

Table 20 Listing of RE

REAC_LST.dbf: Page 1					
TAG	PLANT_ID	REAC_TYPE	REAC_NAME	LOCATION	PLANT_OP
V	AD1	PWR	Angra Dos Reis Unit 1	Itaorna, RdJ, Brazil	Furnas-Centraís Electricas, S.A.
V	AL2	PWR	Almaraz Unit 2	Almaraz, Caceres, Spain	Compania Sevillana de Electricidad
B	AN1	PWR	Arkansas Nuclear One, Unit 1	Russellville, Arkansas	Arkansas Power & Light Company
C	AN2	PWR	Arkansas Nuclear One, Unit 2	Russellville, Arkansas	Arkansas Power & Light Company
V	AS1	PWR	Asco Unit 1	Asco, Tarragona, Spain	Fuerzas Electricas de Cataluna,
V	AS2	PWR	Asco Unit 2	Asco, Tarragona, Spain	Fuerzas Electricas de Cataluna,
V	BD1	PWR	Braidwood Unit 1	Braidwood, Illinois	Commonwealth Edison Company
V	BD2	PWR	Braidwood Unit 2	Braidwood, Illinois	Commonwealth Edison Company
G	BF3	BWR	Browns Ferry Unit 3	Decatur, Alabama	Tennessee Valley Authority
G	BR	BWR	Big Rock Point Reactor	Charlevoix, Michigan	Consumers Power Company
V	BV1	PWR	Beaver Valley Unit 1	Shippingport, Pennsylvania	Duquesne Light Company
V	BV2	PWR	Beaver Valley Unit 2	Shippingport, Pennsylvania	Duquesne Light Company
G	BW1	BWR	Brunswick Unit 1	Southport, North Carolina	Carolina Power & Light Company
G	BW2	BWR	Brunswick Unit 2	Southport, South Carolina	Carolina Power & Light Company
V	BY1	PWR	Byron Unit 1	Byron, Illinois	Commonwealth Edison Company
V	BY2	PWR	Byron Unit 2	Byron, Illinois	Commonwealth Edison Company
V	BZ1	PWR	Beznau Unit 1	Doettingen, Switzerland	Nordostschweizerische Kraftwerke
V	BZ2	PWR	Beznau Unit 2	Doettingen, Switzerland	Nordostschweizerische Kraftwerke
V	CAB	PWR	Jose Cabrera-Zorita Reactor	Madrid, Spain	Union Electrica, S.A.
V	CB1	PWR	Catawba Unit 1	Clover, South Carolina	Duke Power Company
V	CB2	PWR	Catawba Unit 2	Clover, South Carolina	Duke Power Company
C	CC1	PWR	Calvert Cliffs Unit 1	Lusby, Maryland	Baltimore Gas & Electric Company
C	CC2	PWR	Calvert Cliffs Unit 2	Lusby, Maryland	Baltimore Gas & Electric Company
V	CK1	PWR	Donald C. Cook Unit 1	Bridgman, Michigan	Indiana-Michigan Power Company
V	CK2	PWR	Donald C. Cook Unit 2	Bridgman, Michigan	Indiana-Michigan Power Company
V	CL1	PWR	Callaway Unit 1	Fulton, Missouri	Union Electric Company
V	CP2	PWR	Comanche Peak Unit 2	Glen Rose, Texas	Texas Utilities Generating Comp
G	CPR	BWR	Cooper	Brownville, Nebraska	Nebraska Public Power District
B	CR3	PWR	Crystal River Unit 3	Red Level, Florida	Florida Power Corporation
V	CTY	PWR	Haddam Neck	Haddam Neck, Connecticut	Connecticut Yankee Atomic Power
G	DAC	BWR	Duane Arnold Energy Center Unit 1	Palo, Iowa	Iowa Electric Light and Power C
B	DB1	PWR	Davis-Besse Nuclear Power Station Unit 1	Oak Harbor, Ohio	Toledo Edison Company
V	DC1	PWR	Diablo Canyon Unit 1	Avila Beach, California	Pacific Gas & Electric Company
V	DC2	PWR	Diablo Canyon Unit 2	Avila Beach, California	Pacific Gas & Electric Company
G	DR1	BWR	Dresden Nuclear Plant Station Unit 1	Morris, Illinois	Commonwealth Edison Company
G	DR2	BWR	Dresden Nuclear Plant Station Unit 2	Morris, Illinois	Commonwealth Edison Company
G	DR3	BWR	Dresden Nuclear Plant Station Unit 3	Morris, Illinois	Commonwealth Edison Company
A	ERR	BWR	Elk River	Elk River, Minnesota	Rural Co-operative Power Associ
V	FA1	PWR	Joseph M. Farley Unit 1	Dothan, Alabama	Alabama Power Company
V	FA2	PWR	Joseph M. Farley Unit 2	Dothan, Alabama	Alabama Power Company
C	FC1	PWR	Fort Calhoun Station Unit 1	Fort Calhoun, Nebraska	Omaha Public Power District
G	FT2	BWR	James A. FitzPatrick	Oswego, New York	Power Authority of the State of
G	GAR	BWR	Garigliano	Sessa Aurunca, Italy	Ente Nazionale per l'Energia El
V	GIN	PWR	Robert E. Ginna Nuclear Plant Unit 1	Ontario, New York	Rochester Gas & Electric Corpor
G	HA1	BWR	Edwin I. Hatch Unit 1	Baxley, Georgia	Georgia Power Company
V	HB2	PWR	H. B. Robinson Unit 2	Hartsville, South Carolina	Carolina Power & Light Company
G	HM3	BWR	Humboldt Bay Power Plant Unit 3	Eureka, California	Pacific Gas & Electric Company
V	IP2	PWR	Indian Point Unit 2	Indian Point, New York	Consolidated Edison Company of
V	IP3	PWR	Indian Point Unit 3	Indian Point, New York	Power Authority of the State of
V	KO1	PWR	Korea Nuclear Unit 1	Ko-Ri, Korea	Korea Electric Power Company, L
V	KVE	PWR	Kewaunee Nuclear Power Plant	Carlton, Wisconsin	Wisconsin Public Service Corpor
A	LAC	BWR	Lacrosse Boiling Water Reactor (Genoa-2)	Genoa, Wisconsin	Dairyland Power Cooperative
V	LM2	PWR	Lemoniz Unit 2	Lemoniz, Vizcaya, Spain	Iberduero, S. A.
V	MC1	PWR	W. B. McGuire Unit 1	Cornelius, North Carolina	Duke Power Company
V	MC2	PWR	W. B. McGuire Unit 2	Cornelius, North Carolina	Duke Power Company
B	MD1	PWR	Midland Unit 1	Midland, Michigan	Consumers Power Company

	PLANT_DES	ARCH_ENG	VESSEL_MFG
	=====	=====	=====
ed, S.A.	Westinghouse/EBE	Gibbs & Hill/Promon Engenhana, S.A.	Babcock & Wilcox
	Westinghouse	Empresarios Agrupados/Gibbs & Hill Espanola	Combustion Engineering
	Babcock & Wilcox	Bechtel	Babcock & Wilcox
	Combustion Engineering	Bechtel Corp.	Combustion Engineering
S.A.	Westinghouse	Bechtel Corp./Empresa Nacional de Ingenieros Tech	Combustion Engineering
S.A.	Westinghouse	Bechtel Corp./Empresa Nacional de Ingenieros Tech	Combustion Engineering
	Westinghouse	Sargent & Lundy Engineers	
	Westinghouse	Sargent & Lundy Engineers	
	General Electric	Tennessee Valley Authority	Babcock & Wilcox/INI
	General Electric	Bechtel Corp.	Combustion Engineering
	Westinghouse	Stone & Webster Engineering Corp.	Combustion Engineering
	Westinghouse	Duquesne Light Co./Stone & Webster Engineering	
	General Electric	United Engineers and Constructors, Inc.	Chicago Bridge and Iron
	General Electric	United Engineers and Constructors, Inc.	Chicago Bridge and Iron
	Westinghouse	Sargent & Lundy Engineers	
	Westinghouse	Sargent & Lundy Engineers	
AG (NOK)	Westinghouse	Gibbs & Hill (US)/Brown Boveri et Cie (Switzerland)	Societe des Forges et Ateliers du Creusot
AG (NOK)	Westinghouse	Gibbs & Hill (US)/Brown Boveri et Cie (Switzerland)	Societe des Forges et Ateliers du Creusot
	Westinghouse	Gibbs & Hill	Combustion Engineering
	Westinghouse	Duke Power Company	Rotterdamse Droogdok Maatschappij (Netherlands)
	Westinghouse	Duke Power Company	
	Combustion Engineering	Bechtel Corp.	Combustion Engineering
	Combustion Engineering	Bechtel Corp.	Combustion Engineering
	Westinghouse	American Electric Power Service Corporation	Combustion Engineering
	Westinghouse	American Electric Power Service Corporation	Chicago Bridge and Iron
	Westinghouse	Bechtel Corp.	Combustion Engineering
ry	Westinghouse Corporation	Gibbs & Hill, Inc.	
	General Electric	Burns & Roe, Inc.	Combustion Engineering
	Babcock & Wilcox	Gilbert Associates, Inc.	Babcock & Wilcox
Company	Westinghouse	Stone & Webster Engineering Corp.	Combustion Engineering
Company	General Electric	Commonwealth Associates	Chicago Bridge and Iron
	Babcock & Wilcox	Bechtel	Babcock & Wilcox
	Westinghouse	Pacific Gas & Electric Company/Bechtel	Combustion Engineering
	Westinghouse	Pacific Gas & Electric Company/Bechtel	Combustion Engineering
	General Electric	Bechtel Corp.	New York Ship Building
	General Electric	Sargent & Lundy Engineers	Babcock and Wilcox
	General Electric	Sargent & Lundy Engineers	Babcock and Wilcox
tion	Allis-Chalmers	Sargent & Lundy Engineers	Pacific Coast Engineering
	Westinghouse	Southern Company Services, Inc./Bechtel Corp.	Combustion Engineering
	Westinghouse	Southern Company Services, Inc./Bechtel Corp.	Combustion Engineering
	Combustion Engineering	Gibbs, Hill, Durham & Richardson, Inc.	Combustion Engineering
New York	General Electric	Stone & Webster Engineering Corp.	Combustion Engineering
etrica, Italy	General Electric	Ebasco Services, Inc.	Terni
tion	Westinghouse	Gilbert Associates, Inc.	Babcock & Wilcox
	General Electric	Southern Company Services, Inc./Bechtel Corp.	Combustion Engineering
	Westinghouse	Ebasco Services, Inc.	Combustion Engineering
	General Electric	Bechtel Corp.	Combustion Engineering
ew York, Inc.	Westinghouse	United Engineers and Constructors, Inc.	Combustion Engineering
New York	Westinghouse	United Engineers and Constructors, Inc.	Combustion Engineering
d.	Westinghouse	Gilbert Associates, Inc.	Babcock & Wilcox
tion	Westinghouse	Fluor Pioneer, Inc.	Combustion Engineering
	Allis-Chalmers	Sargent & Lundy Engineers	Combustion Engineering
	Westinghouse	Iberduero, S.A./Bechtel Corp./Sener., S.A./INITEC	Babcock & Wilcox
	Westinghouse	Duke Power Company	Combustion Engineering
	Westinghouse	Duke Power Company	Rotterdamse Droogdok Maatschappij (Netherlands)
	Babcock & Wilcox	Bechtel	Babcock & Wilcox

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TAG	PLANT_ID	REAC_TYPE	REAC_NAME	LOCATION	PLANT_OP
B	MD2	PWR	Midland Unit 2	Midland, Michigan	Consumers Power Company
G	ML1	BWR	Millstone Nuclear Power Station Unit 1	Waterford, Connecticut	Northeast Utilities Serv
C	ML2	PWR	Millstone Nuclear Power Station Unit 2	Waterford, Connecticut	Northeast Utilities Serv
W	ML3	PWR	Millstone Nuclear Power Station Unit 3	Waterford, Connecticut	Northeast Utilities Serv
G	MON	BWR	Monticello Nuclear Generating Plant	Monticello, Minnesota	Northern States Power Co
C	MY	PWR	Maine Yankee Nuclear Plant	Wiscasset, Maine	Maine Yankee Atomic Powe
W	NA1	PWR	North Anna Unit 1	Mineral, Virginia	Virginia Electric & Powe
W	NA2	PWR	North Anna Unit 2	Mineral, Virginia	Virginia Electric & Powe
G	NM1	BWR	Nine Mile Point Unit 1	Scribe, New York	Niagara Mohawk Power Cor
B	OC1	PWR	Oconee Nuclear Station Unit 1	Seneca, South Carolina	Duke Power Company
B	OC2	PWR	Oconee Nuclear Station Unit 2	Seneca, South Carolina	Duke Power Company
B	OC3	PWR	Oconee Nuclear Station Unit 3	Seneca, South Carolina	Duke Power Company
G	OYS	BWR	Oyster Creek Nuclear Generating Station	Forked River, New Jersey	Jersey Central Power & L
C	PAL	PWR	Palisades Nuclear Plant	South Haven, Michigan	Consumers Power Company
W	PB1	PWR	Point Beach Nuclear Plant Unit 1	Two Creeks, Wisconsin	Wisconsin Electric Power
W	PB2	PWR	Point Beach Nuclear Plant Unit 2	Two Creeks, Wisconsin	Wisconsin Electric Power
G	PH2	BWR	Peach Bottom Atomic Power Station Unit 2	Delta, Pennsylvania	Philadelphia Electric Co
G	PH3	BWR	Peach Bottom Atomic Power Station Unit 3	Delta, Pennsylvania	Philadelphia Electric Co
W	PI1	PWR	Prairie Island Unit 1	Red Wing, Minnesota	Northern States Power Co
W	PI2	PWR	Prairie Island Unit 2	Red Wing, Minnesota	Northern States Power Co
G	PL1	BWR	Pilgrim Nuclear Power Station Unit 1	Plymouth, Massachusetts	Boston Edison Company
G	QC1	BWR	Quad Cities Nuclear Power Station Unit 1	Cordova, Illinois	Commonwealth Edison Com
G	QC2	BWR	Quad Cities Nuclear Power Station Unit 2	Cordova, Illinois	Commonwealth Edison Com
W	R12	PWR	Ringhals Unit 2	Varberg, Sweden	Statens Vattenfallsverk
B	RS1	PWR	Rancho Seco Unit 1	Clay Station, California	Sacramento Municipal Ut
W	SA1	PWR	Salem Unit 1	Salem, New Jersey	Public Service Electric
W	SA2	PWR	Salem Unit 2	Salem, New Jersey	Public Service Electric
W	SB1	PWR	Seabrook Unit 1	Seabrook, New Hampshire	Public Service Company
G	SH1	BWR	Susquehanna Unit 1	Berwick, Pennsylvania	Pennsylvania Power & Li
C	SL1	PWR	St. Lucie Unit 1	Hutchinson Island, Florida	Florida Power & Light C
C	SL2	PWR	St. Lucie Unit 2	Hutchinson Island, Florida	Florida Power & Light C
W	SO1	PWR	San Onofre Unit 1	San Clemente, California	Southern California Edi
C	SO2	PWR	San Onofre Unit 2	San Clemente, California	Southern California Edi
C	SO3	PWR	San Onofre Unit 3	San Clemente, California	Southern California Edi
W	SQ1	PWR	Sequoyah Unit 1	Soddy Daisy, Tennessee	Tennessee Valley Author
W	SQ2	PWR	Sequoyah Unit 2	Soddy Daisy, Tennessee	Tennessee Valley Author
W	SR1	PWR	Shearon Harris Unit 1	New Hill, North Carolina	Carolina Power & Light
W	ST1	PWR	South Texas Unit 1	Palacios, Texas	Houston Lighting & Powe
W	SU1	PWR	Surry Unit 1	Gravel Neck, Virginia	Virginia Electric & Pow
W	SU2	PWR	Surry Unit 2	Gravel Neck, Virginia	Virginia Electric & Pow
G	TA1	BWR	Tarapur Unit 1	Tarapur, India	Tarapur
G	TA2	BWR	Tarapur Unit 2	Tarapur, India	Tarapur
B	TM1	PWR	Three Mile Island Nuclear Station Unit 1	Londonderry Twp., Pennsylvania	Metropolitan Edison Con
B	TM2	PWR	Three Mile Island Nuclear Station Unit 2	Three Mile Island, PA	Metropolitan Edison Con
W	TP3	PWR	Turkey Point Nuclear Power Station Unit 3	Florida City, Florida	Florida Power & Light C
W	TP4	PWR	Turkey Point Nuclear Power Station Unit 4	Florida City, Florida	Florida Power & Light C
W	TRO	PWR	Trojan Reactor	Prescott, Oregon	Portland General Electri
W	VO2	PWR	Vogtle Unit 2	Waynesboro, Georgia	Georgia Power Company
W	VS1	PWR	Vicgil C. Summer Unit 1	Parr, South Carolina	South Carolina Electric
G	VY	BWR	Vermont Yankee Nuclear Power Station	Vernon, Vermont	Vermont Yankee Nuclear
W	WB1	PWR	Watts Bar Unit 1	Spring City, Tennessee	Tennessee Valley Autho
W	WC1	PWR	Wolf Creek Unit 1	Burlington, Kansas	Kansas City Power & Li
C	WF3	PWR	Waterford Generating Station Unit 3	Taft, Louisiana	Louisiana Power & Ligh
W	YR	PWR	Yankee-Rowe	Rowe, Massachusetts	Yankee Atomic Electric
W	ZN1	PWR	Zion Nuclear Plant Reactor Unit 1	Zion, Illinois	Commonwealth Edison Co
W	ZN2	PWR	Zion Nuclear Plant Reactor Unit 2	Zion, Illinois	Commonwealth Edison Co

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	PLANT_DES	ARCH_ENG	VESSEL_MFG
	Babcock & Wilcox	Bechtel	Babcock & Wilcox
ice Company	General Electric	Ebasco Services, Inc.	Combustion Engineering
ice Company	Combustion Engineering	Bechtel Corp.	Combustion Engineering
ice Company	Westinghouse	Stone & Webster Engineering Corp.	Combustion Engineering
mpany	General Electric	Bechtel Corp.	Chicago Bridge and Iron
r Company	Combustion Engineering	Stone & Webster Engineering Corp.	Combustion Engineering
r Company	Westinghouse	Stone & Webster Engineering Corp.	Rotterdamse Droogdok Maatschappij (Netherlands)
r Company	Westinghouse	Stone & Webster Engineering Corp.	Rotterdamse Droogdok Maatschappij (Netherlands)
poration	General Electric	Niagara Mohawk Power Corporation	Combustion Engineering
	Babcock & Wilcox	Duke Power Company/Bechtel	Babcock & Wilcox
	Babcock & Wilcox	Duke Power Company/Bechtel	Babcock & Wilcox
	Babcock & Wilcox	Duke Power Company/Bechtel	Babcock & Wilcox
ight Company	General Electric	Burns & Roe, Inc./General Electric Company	Combustion Engineering
	Combustion Engineering	Bechtel Corp.	Combustion Engineering
Company	Westinghouse	Bechtel Corp.	Babcock & Wilcox
Company	Westinghouse	Bechtel Corp.	Combustion Engineering
mpany	General Electric	Bechtel Corp.	Babcock & Wilcox/Chicago Bridge & Iron Company
mpany	General Electric	Bechtel Corp.	Babcock & Wilcox/Chicago Bridge & Iron Company
mpany	Westinghouse	Fluor Pioneer, Inc.	Societe des Forges et Ateliers du Creusot
mpany	Westinghouse	Fluor Pioneer, Inc.	Societe des Forges et Ateliers du Creusot
	General Electric	Bechtel Corp.	Combustion Engineering
pany	General Electric	Sargent & Lundy Engineers	Babcock and Wilcox
pany	General Electric	Sargent & Lundy Engineers	Babcock and Wilcox/Chicago Bridge and Iron
(SSPB)	Westinghouse	SSPB/Gibbs & Hill/Stal-Laval Turbin AB	Rotterdamse Droogdok Maatschappij (Netherlands)
ility District	Babcock & Wilcox	Bechtel	Babcock & Wilcox
& Gas Company	Westinghouse	Public Service Electric & Gas Company	Combustion Engineering
& Gas Company	Westinghouse	Public Service Electric & Gas Company	Combustion Engineering
of New Hampshire	Westinghouse	United Engineers & Constructors, Inc.	Westinghouse
ght Company	General Electric	Bechtel Corp.	Chicago Bridge and Iron
mpany	Combustion Engineering	Ebasco Services, Inc.	Combustion Engineering
mpany	Combustion Engineering	Ebasco Services, Inc.	Combustion Engineering
son Company	Westinghouse	Bechtel Corp.	Combustion Engineering
son Company	Combustion Engineering	Bechtel Corp.	Combustion Engineering
son Company	Combustion Engineering	Bechtel Corp.	Combustion Engineering
ity	Westinghouse	Tennessee Valley Authority	Rotterdamse Droogdok Maatschappij (Netherlands)
ity	Westinghouse	Tennessee Valley Authority	Rotterdamse Droogdok Maatschappij (Netherlands)
Company	Westinghouse	Ebasco Services, Inc.	
r Company	Westinghouse	Brown and Root	
er Company	Westinghouse	Stone & Webster Engineering Corp.	Rotterdamse Droogdok Maatschappij (Netherlands)
er Company	Westinghouse	Stone & Webster Engineering Corp.	Rotterdamse Droogdok Maatschappij (Netherlands)
	General Electric	Bechtel	Combustion Engineering
	General Electric	Bechtel	Combustion Engineering
pany	Babcock & Wilcox	Gilbert Associates, Inc.	Babcock & Wilcox
pany	Babcock & Wilcox	Burns & Roe, Inc.	Babcock & Wilcox
mpany	Westinghouse	Bechtel Corp.	Babcock & Wilcox
mpany	Westinghouse	Bechtel Corp.	Babcock & Wilcox
ic Company	Westinghouse	Bechtel Corp.	Chicago Bridge and Iron
	Westinghouse	Bechtel	
& Gas Company	Westinghouse	Gilbert Associates, Inc.	Chicago Bridge and Iron
Power Corporation	General Electric	Ebasco Services, Inc.	Chicago Bridge and Iron
ity	Westinghouse	Tennessee Valley Authority	Rotterdamse Droogdok Maatschappij (Netherlands)
ght Company	Westinghouse	Bechtel Corp./Sargent & Lundy Engineers	Combustion Engineering
t Company	Combustion Engineering	Ebasco Services, Inc.	Combustion Engineering
Company	Westinghouse	Stone & Webster Engineering Corp.	Babcock & Wilcox
pany	Westinghouse	Sargent & Lundy Engineers	Babcock & Wilcox
pany	Westinghouse	Sargent & Lundy Engineers	Babcock & Wilcox

Table 21. Part

REAC_PR.DBF: Page 1												
TAG	PLANT_ID	CAPSULE	START_DATE	STOP_DATE	CONFIG	EFP_TIME	EFP_T_U	CAP_T_MIN	CAP_T_MAX	CAP_T_U	TEMP_TAG	CAP_F1
W	AD1	V	03/01/1982	01/03/1986		358.61	D		579	F	3	4.580E
B	AN1	A			1 of 4	345	D					7.270E
B	AN1	A			2 of 4	374	D					3.160E
B	AN1	A			3 of 4	296	D					2.610E
B	AN1	A			4 of 4	273	D					3.620E
B	AN1	A			TOTAL			610	621	F	1	1.030E+
B	AN1	B			1 of 2	345	D					7.270E
B	AN1	B			2 of 2	374	D					3.550E+
B	AN1	B			TOTAL			588	610	F	1	4.280E+
B	AN1	C			1 OF 2	345.0	D					7.270E+
B	AN1	C			2 OF 2	1609.5	D					1.380E+
B	AN1	C			TOTAL			610	621	F		1.460E+
B	AN1	E				345	D	580	588	F	1	7.270E+
B	AN1	E	08/01/1974	03/01/1976		2.981E+07	S					8.180E+
C	AN2	W97		08/20/1982		617.3	D	558	580	F	1	3.410E+
W	BD1	U	07/12/1987	09/02/1989		1.10	Y		579	F		3.790E+
W	BD2	U	05/24/1988	03/15/1990	TOTAL	1.15	Y		579	F		3.910E+
G	BR	119	03/20/1963	09/18/1964		6578.0	H	585		F	4	1.500E+
G	BR	122	03/20/1963	09/18/1964		6578.0	H	585		F	4	2.300E+
G	BR	124	03/20/1963	05/18/1967		18290.0	H	585		F	4	1.070E+
G	BR	125	12/01/1962	02/01/1979		2.720E+08	S	585		F	4	2.270E+
G	BR	127	03/20/1963	06/21/1968		26114.0	H	585		F	4	7.100E+
W	BV1	U	05/01/1976	10/31/1984		1.130E+08	S	579	590	F	2	6.540E+
W	BV1	V	05/01/1976	11/30/1979		3.220E+07	S	579	590	F	2	2.550E+
W	BV1	W	05/10/1976	12/15/1987		5.89	Y	579	590	F	2	9.490E+
W	BV2	U	08/17/1987	03/17/1989		1.24	Y		579	F		5.990E+
W	BY1	U	03/01/1985	02/14/1987		3.630E+7	S		579	F		3.500E+
W	BY2	U	02/11/1987	01/07/1989		1.15	Y		579	F		3.960E+
W	BZ1	R									7	5.720E+
W	BZ1	S				1920	D				7	1.800E+
W	BZ1	V		06/07/1971							7	2.770E+
W	BZ2	R	04/23/1971	07/15/1978		1.714E+08	S				7	1.340E+
W	BZ2	V		07/21/1973		499	D				7	3.170E+
W	CAB	K						579	590	F	2	1.400E+
W	CAB	M	07/01/1968	04/30/1979		2.330E+08	S	579	590	F	2	3.680E+
W	CAB	P						579	590	F	2	1.430E+
W	CB1	Z	06/01/1985	08/15/1986		0.793	Y	579	590	F	2	3.080E+
W	CB2	Z	08/18/1986	12/24/1987		0.86	Y		579	F		3.360E+
C	CC1	W263		05/ /1979		1073.32	D	550	558	F	2	6.020E+
C	CC2	W263	12/01/1976	10/15/1982		1671.4	D	550	558	F	2	8.060E+
W	CK1	T	02/02/1975	12/23/1976		461.94	D	579	590	F	2	1.800E+
W	CK1	T	02/02/1975	12/24/1976		3.991E+07	S					2.710E+
W	CK1	U	01/16/1975	03/19/1989		9.17	Y		579	F		1.880E+
W	CK1	X	02/02/1975	05/30/1980		1271.07	D	579	590	F		6.200E+
W	CK1	X	02/02/1975	05/30/1980		1271.07	D	579	590	F		7.700E+
W	CK1	X	02/02/1975	05/30/1980		1271.07	D	579	590	F		6.900E+
W	CK1	Y	02/02/1975	07/03/1982		1805.23	D	579	590	F	2	1.300E+
W	CK2	T	03/22/1978	04/19/1978		396.19	D		579	F		1.800E+
W	CK2	T	03/22/1978	04/19/1978		396.19	D		579	F		2.300E+
W	CK2	T	03/22/1978	04/19/1978		396.19	D		579	F		2.000E+
W	CK2	X	03/22/1978	02/28/1986		5.273	Y	579	590	F	3	1.002E+
W	CK2	Y	03/22/1978	11/21/1982		3.24	Y	579	590	F	2	6.700E+
W	CL1	U	10/22/1984	02/28/1986		3.320E+07	S	579	590	F	2	3.270E+
W	CL1	Y	10/ /1984	09/ /1990		4.60	Y		579	F		1.290E+
G	CPR	1	07/01/1974	09/15/1984		2.820E+08	S	550		F	4	2.300E+
B	CR3	B		03/01/1978		268.8	D	580	588	F	2	1.050E+

al listing of REAC_PR.dbf

							REAC_PR.DBF: Page 1		
F1_UNC	F1_RATE	CAP_FP1	FP1_UNC	CAP_DPA	DPA_UNC	REF_ID	PAGES	NOTES	
18						SWRI-06-8976	1, 12, 32		
17	2.440E+10					BAW-1836	6-3, 6-7	IRR. IN AN1 TO 7% OF FLUENCE	
18	9.790E+10					BAW-1836	6-3, 6-7	IRR. IN DB1, CYCLE 1	
18	9.670E+10					BAW-1836	6-3, 6-7	IRR. IN DB1, CYCLE 2	
18	1.540E+11					BAW-1836	6-3, 6-7	IRR. IN DB1, CYCLE 3	
19						BAW-1836	5-1, 6-3, 6-7		
17	2.440E+10					BAW-1698	6-3, 6-4	IRR. IN AN1 TO 17% OF FLUENCE	
18	1.100E+10					BAW-1698	6-3, 6-4	IRR. IN DB1, CYCLE 1	
18						BAW-1698	5-1, 6-3		
17	2.440E+10			0.740E-03		BAW-2075/R1	6-5, 6-9	IRR. IN AN1 TO 5% OF FLUENCE	
19	9.960E+10			2.010E-02		BAW-2075/R1	6-5, 6-9	IRR. IN DB1, CYCLES 1-5, 95%	
19	15			2.090E-02		BAW-2075/R1	5-1, 6-9	REMOVED FROM DB1 AT 5TH REFUEL	
17	2.440E+10	1.380E+18				BAW-1440	5-1, 6-7		
7	8			1.170E-03	8	MUREG/CR-3319	4.1-25, 4.4-41	HEDL ANALYSIS	
8	6.400E+10	6.000E+18				BNI-0584	46, 81, 84, 85	CE: FLUENCE AND FLUX AVERAGES	
8	1.090E+11	1.670E+19	15		7.260E-03	11	WCAP-12685	1-1, 5-1, 6-21, 6-24	
8	1.080E+11	1.720E+19	15		7.530E-03	11	WCAP-12845	5-1, 6-21, 6-24	
8	6.100E+10					NE&D 11(3)	396	CAPS. MIN. TEMP. 582 F	
9	9.600E+11					NE&D 11(3)	396	CAPS. MIN. TEMP. 582 F	
0	1.600E+12					NE&D 11(3)	396	CAPS. MIN. TEMP. 582 F	
9	8.380E+10					WCAP-9794	4-1, 5-1, 6-12, 6-15		
8	7.500E+10					NE&D 11(3)	396	CAPS. MIN. TEMP. 582 F	
8						WCAP-10867	1-1, 4-1, 5-1, 6-23		
8						WCAP-9860	5-1, 6-15, 6-20		
8	9	5.110E+10	2.860E+19	15	1.510E-02	10	WCAP-12005	5-1, 6-19, 6-22, 6-25	
8	1.530E+10	2.820E+19	15		1.190E-02	11	WCAP-12406	5-1, 6-21, 6-24	
8	9.850E+10				6.860E-03	11	WCAP-11651	5-1, 6-18; 6-20; 6-27	
8	1.090E+11	1.690E+19	15		7.450E-03	11	WCAP-12431	5-1, 6-21, 6-24	
19	6.820E+10					PB-ME 75/03	1, 4	FLUX UNCERTAINTY ±22	
9	7.760E+10					PB-ME 78/06	1, 26		
9						PB-ME 75/02	1, 25		
9	7.580E+10			1.980E-02	11	MUREG/CR-3319	4.1-24, 4.2-101	HEDL ANALYSIS	
9						PB-ME 75/02	25		
9	1.580E+11					WENX/76/64	1-1, 5-1		
9						WCAP-10185	4-1, 5-1, 6-17, 6-24		
9						WENX/76/64	1-1, 5-1		
8	1.200E+11					WCAP-11527	1-1, 5-1, 6-14, 6-15		
8	1.240E+11	1.450E+19	15		6.370E-03	11	WCAP-11941	5-1, 6-21, 6-24	
8	6.490E+10	1.150E+19			8.470E-03		BNI-1280	5, 15, 22, 28, 40, 41	CE: FLUENCE AND FLUX AVERAGES
8	5.580E+10	1.560E+19			1.150E-02		SWRI-7524	13, 15, 16, 20, 23	
8	4.500E+10					SWRI-02-4770	1, 16, 18		
22				4.450E-03	25	MUREG/CR-3319	4.1-24, 4.2-171	HEDL ANALYSIS	
13	6.500E+10	6.400E+19	22		3.160E-02	16	WCAP-12483	5-1; 6-22; 6-25; 6-28	
13	5.600E+10					SWRI-02-5928	14; 16; 20; 22	WELD AND PLATE (TL) CV SPEC.	
13	7.000E+10					SWRI-02-5928	14; 16; 22	HAZ AND PLATE (LT) CV SPECIMEN	
13	6.300E+10					SWRI-02-5928	14; 16; 22	TENSILE AND SHSS02 CV SPECIMEN	
13						SWRI-7244-001/1	9, 15, 19		
13	5.300E+10					SWRI-02-5928	1; 14; 16; 21	FLU./FLUX: WELD & HAZ CV SPEC	
13	6.600E+10					SWRI-02-5928	1; 14; 16; 21	FLUENCE/FLUX FOR PLATE CV SPEC	
13	5.900E+10					SWRI-02-5928			
13	6.019E+10					SWRI-06-8888			
13						SWRI-7244-002/1			
8	1.210E+11					WCAP-11374/R1			
8	8.890E+10	5.460E+19	15		2.420E-02	11	WCAP-12946		
8	1.050E+09	3.600E+17					MDE-103-0986		
8	4.510E+10	2.370E+18					BAW-1679/R1		

Table 22. Listing of HEAT_LST.dbf

HEAT_LST.DBF: Page 1													
TAG	PLANT_ID	HEAT_ID	RPT_ID	HEAT_NO	PROD_ID	MAT_ID	SUPPLIER	THICKNESS	SOURCE	MPC_ID	MPC_HEAT	REF_ID	PAGES
		SASTM	ASTM PLATE	A0421	SRM	A302B	U.S. STEEL CORP.	6"	FABR	E20 6	A0421	ASTM A554	2, 3
		SHSS01	HSST 01	A1008-1	SRM	A533B1	LUKENS	12"	FABR	C01 4	HSST01	ORNL-313	4, 5, 40
		SHSS02	HSST 02 PLATE	A1195-1	SRM	A533B1	LUKENS	12"	FABR			ORNL-4312	48
W	AD1	FAD101	ANH161 (SURV.)	ANH161	F	A5082	LADISH	6 3/4"	SCR			WCAP-8957	3-1, A-1
W	AD1	FAD102	ANH153 (FOR WELD)	ANH153	F	A5082	LADISH	6 3/4"	SCR			WCAP-8957	3-1, A-1
W	AD1	HAD101	FROM ANH161	ANH161	HAZ	A5082	LADISH	6 3/4"	SIM			WCAP-8957	3-1, A-1
W	AD1	HAD101	ANH161 AND ANH153	B2912	W	A5082	BABCOCK & WILCOX	6 3/4"	SIM			WCAP-8957	3-1, A-1
W	AL2	NAL201	FROM B9405-1	C0545-2	HAZ	A533B1	LUKENS	8 7/8"	SIM			WCAP-9228	2-1
W	AL2	PAL201	B9405-1 (SURV.)	C0545-2	P	A533B1	LUKENS	8 7/8"	SCR			WCAP-9228	2-1
W	AL2	PAL202	B9405-2 (FOR WELD)	C0623-2	P	A533B1	LUKENS	8 7/8"	SCR			WCAP-9228	A-1
W	AL2	NAL202	B9405-1 AND B9405-2	83642	W	A533B1	COMBUSTION ENG.	8 7/8"	SIM			WCAP-9228	2-1, A-1, A-2
B	AN1	HAN101	FROM C5114-1	C5114-1	HAZ	A533B1	LUKENS	8 3/4"	SCR	807 3	C51141	BAW-1820	4-27, 4-30
B	AN1	HAN102	FROM C5114-2	C5114-2	HAZ	A533B1	LUKENS	8 3/4"	SCR	808 3	C51142	BAW-1820	4-27, 4-30
B	AN1	PAN101	C-5114-1 (SURV.)	C5114-1	P	A533B1	LUKENS	8 3/4"	SCR	807 1	C51141	BAW-1820	4-27, 4-30
B	AN1	PAN102	C-5114-2 (SURV.)	C5114-2	P	A533B1	LUKENS	8 3/4"	SCR	808 1	C51142	BAW-1820	4-27, 4-30
B	AN1	WAN101	WF-193	406L44	W	A533B1	UNION CARBIDE	8 3/4"	SCR	807 4	WF193	BAW-1820	4-27, 4-30
C	AN2	HAN201	C8009-3 AND C8009-2		HAZ	A533B1	COMBUSTION ENG.		SIM			CE-A-MCM-106	3, 11
C	AN2	PAN201	C8009-3 (SURV.)	C8182-2	P	A533B1	LUKENS		SCR			CE-A-MCM-106	3, 11
C	AN2	PAN202	C8009-1 (WELD)	C8161-3	P	A533B1	LUKENS		SCR			CE-A-MCM-106	3, 9
C	AN2	PAN203	C8009-2 (WELD & HAZ)	C8161-1	P	A533B1	LUKENS		SCR			CE-A-MCM-106	3, 10
C	AN2	WAN201	C8009-1 AND C8009-2	83650	W	A533B1	COMBUSTION ENG.		SIM			CE-A-MCM-106	3, 7
C	AN2	WAN202	C8009-3/C8009-2 HAZ		W	A533B1	COMBUSTION ENG.		SIM			CE-A-MCM-106	3
W	AS1	HAS101	FROM B9605-2	C2333-1	HAZ	A533B1	LUKENS	8 7/8"	SIM			WCAP-9308	2-1
W	AS1	PAS101	B9605-2 (SURV.)	C2333-1	P	A533B1	LUKENS	8 7/8"	SCR			WCAP-9308	2-1
W	AS1	PAS102	B9605-1 (FOR WELD)	C2333-2	P	A533B1	LUKENS	8 7/8"	SCR			WCAP-9308	A-1
W	AS1	WAS101	B9605-1 AND B9605-2	83650	W	A533B1	COMBUSTION ENG.	8 7/8"	SIM			WCAP-9308	2-1, A-1
W	AS2	HAS201	FROM R408-1	C4191-2	HAZ	A533B1	LUKENS	8"	SIM			WCAP-9330	2-1
W	AS2	PAS201	R408-1 (SURV.)	C4191-2	P	A533B1	LUKENS	8"	SCR			WCAP-9330	2-1
W	AS2	PAS202	R407-2 (FOR WELD)	C3485-2	P	A533B1	LUKENS	8"	SCR			WCAP-9330	A-1
W	AS2	WAS201	R408-1 AND R407-2	4P6052	W	A533B1	COMBUSTION ENG.	8"	SIM			WCAP-9330	2-1, A-1
W	BD1	FBD101	490867-1	490867-1	F	A5083			SCR			WCAP-12685	3-1, 4-1
W	BD1	FBD102	49C813-1	49C813-1	F	A5083			SCR			WCAP-12685	3-1, 4-1
W	BD1	HBD101	490867-1/49C813-1	490867-1	HAZ	A5083			SIM			WCAP-12685	3-1, 4-1
W	BD1	WBD101	490867-1/49C813-1		W	A5083			SIM			WCAP-12685	3-1, 4-1
W	BD2	FBD201	500102-1/50C97-1	MK24-3	F	A5083	JAPAN STEEL WORKS		SCR			WCAP-12845	3-1, 4-1, 4-4
W	BD2	FBD202	490963-1/49C904-1	MK24-2	F	A5083	JAPAN STEEL WORKS		SCR			WCAP-12845	3-1, 4-1, 4-3
W	BD2	HBD201	500102-1 AND 50C97-1		HAZ	A5083			FABR			WCAP-12845	3-1, 4-1
W	BD2	WBD201	500102-1 AND 50C97-1	442011	W	A5083	B&W		FABR			WCAP-12845	3-1, 4-1, 4-5
G	BR	HBR_01	FROM S-5503-2/3	192462/3	HAZ	A302B		6"	SIM	G10 3	192462	GEGR-4442	4
G	BR	PBR_01	S-5503-2/3 (SURV.)	192462/3	P	A302B	LUKENS	6"	SCR	G10 1	192462	NE&D 11(3)	396, 397
G	BR	WBR_01	FROM S-5503-2/3	192462/3	W	A302B	COMBUSTION ENG.	6"	SIM	G10 2		GEGR-4442	4
W	BV1	HBT01	FROM B6607-1		HAZ	A533B1	LUKENS	9"	SIM	W01 4	B69031	WCAP-8457	2-1, A-1
W	BV1	PBT01	B6903-1 (SURV.)	C6317-1	P	A533B1	LUKENS	9"	SCR	W01 1	B69031	WCAP-8457	2-1
W	BV1	PBT02	B6607-1 (FOR WELD)	C4381-1	P	A533B1	LUKENS	9"	SCR			WCAP-8457	2-1, A-1
W	BV1	PBT03	B6607-2 (FOR WELD)	C4381-2	P	A533B1	LUKENS	9"	SCR			WCAP-8457	2-1, A-1
W	BV1	WBT01	B6607-1 AND B6607-2	305424	W	A533B1	COMBUSTION ENG.	9"	SIM	W01 3	305424	WCAP-10867	4-3
W	BV2	HBT01	FROM B9004-2	B9004-2	HAZ	A533B1			SIM			WCAP-12406	3-1, 4-1
W	BV2	PBT01	B9004-2	B9004-2	P	A533B1			SCR			WCAP-12406	3-1, 4-1
W	BV2	WBT01	83642	83642	W				SIM			WCAP-12406	4-1, 4-3
W	BY1	FBY101	SP-5933 (SURV.)		F	A5082			SCR			WCAP-11651	4-1; 4-5
W	BY1	FBY102	SP-5951 (WELD & HAZ)		F	A5082			SCR			WCAP-11651	4-1; 4-5
W	BY1	HBT01	W-HAZ OF SP-5933		HAZ	A5082			FABR			WCAP-11651	4-1; 4-5
W	BY1	WBT01	SP-5933 AND SP-5951	442002	W	A5082	B&W		FABR			WCAP-11651	4-1; 4-3; 4-5
W	BY2	FBT01	MK24-3	490330	F	A5083			SCR			WCAP-12431	4-1, 4-6, 4-8
W	BY2	HBT01	FROM FORGING MK24-3	490330	HAZ	A5083			SIM			WCAP-12431	4-1, 4-6, 4-8
W	BY2	WBT01	WF-447	442002	W		B&W		SIM			WCAP-12431	4-1, 4-3, 4-6

REPRESENTATIVE OF INT-LOW WELD

RPT_ID AND REF_ID PER QA

REPRESENTATIVE OF VESSEL SEAMS

HT. 490330-1 AND 49C298-1

HT. 490330-1 AND 49C298-1

Table 22. Continued

HEAT_LST.DBF: TAG	PLANT_ID	HEAT_ID	RPT_IC	HEAT_NO	PROC_ID	MAT_ID	SUPPLIER	THICKNESS	SOURCE	MPC_ID	MPC_HEAT	REF_ID	PAGES	NOTES
W	BZ1	HBZ101	FROM FORGING D		HAZ	1.2-MD-07	CREUSOT (SFAC)	6 1/2"				WCAP-7214	3	
W	BZ1	PBZ101	FORGING C		P	1.2-MD-07	CREUSOT (SFAC)	6 1/2"		W48 1	C	WCAP-7214	3	
W	BZ1	PBZ102	FORGING D		P	1.2-MD-07	CREUSOT (SFAC)	6 1/2"		W48 2	D	WCAP-7214	3	
W	BZ1	WBZ101	FORGINGS C AND D		W	1.2-MD-07	CREUSOT (SFAC)	6 1/2"		W48 3	W	WCAP-7214	3	
W	CAB	HCAB02	FROM B1105-2	B3170-1	HAZ	A53301	LUKENS	6 1/2"	SIM	W02 5	B11052	WCAP-7691	4, 12	
W	CAB	PCAB01	B1105-1 (SURV.)	A8312-1	P	A53301	LUKENS	6 1/2"	SCR	W02 2	B11051	WCAP-7691	4, 12	
W	CAB	PCAB02	B1105-2 (SURV.)	B3170-1	P	A53301	LUKENS	6 1/2"	SCR	W02 3	B11052	WCAP-7691	4, 12	
W	CAB	PCAB03	B1106-1 (FOR WELD)	A8312-2	P	A53301	LUKENS	6 1/2"	SCR			WCAP-7691	4, 12	
W	CAB	PCAB04	B1106-2 (FOR WELD)	B3170-2	P	A53301	LUKENS	6 1/2"	SCR			WCAP-7691	4, 12	
W	CAB	WCAB01	B1106-1 AND B1106-2	1248	W	A53301	COMBUSTION ENG.	6 1/2"	SIM	W02 4	1248	WCAP-7691	4, 12	
W	CB1	FCB101	FORGING 05 (SURV.)	411343	F	A5082	KLÖCKNER	8.5"	SCR			WCAP-9734	2-1, A-1	
W	CB1	FCB102	FORG. 04 (FOR WELD)	527708	F	A5082	FRIED. KRUPP	8.5"	SCR			WCAP-9734	2-1, A-1	
W	CB1	HCB101	FROM FORGING 05		HAZ	A5082	KLÖCKNER	8.5"	SIM			WCAP-9734	2-1	
W	CB1	MCB101	FORGINGS 05 AND 04	895075	W	A5082	KLÖCKNER	8 1/2"	SIM			WCAP-9734	2-1, A-1	
W	CB2	HCB201	FROM B8605-1	B8605-1	HAZ	A53301			SIM			WCAP-11941	4-1, A-16	
W	CB2	PCB201	B8605-1	B8605-1	P	A53301			SCR			WCAP-11941	4-1, A-16	
W	CB2	WCB201	SURVEILLANCE WELD	83648	W				SIM			WCAP-11941	4-1, A-3	
C	CC1	HCC101	D7206-3 AND D7206-1		HAZ	A53301	COMBUSTION ENG.		SIM	C04 3	C44411	BNI-1280	7	
C	CC1	PCC101	D7206-1 (WELD & HAZ)	C4351-2	P	A53301	LUKENS		SCR			DOCKET 50-317	34	
C	CC1	PCC102	D7206-2 (FOR WELD)	C4441-2	P	A53301	LUKENS		SCR			DOCKET 50-317	32	
C	CC1	PCC103	D7206-3 (SURV.)	C4441-1	P	A53301	LUKENS		SCR	C04 1	C44411	DOCKET 50-317	35	
C	CC1	WCC101	D7206-1 AND D7206-2	33A277	W	A53301	COMBUSTION ENG.		SIM	C04 2	33A277	DOCKET 50-317	36	
C	CC1	WCC102	D7206-1/D7206-3 HAZ		W	A53301	COMBUSTION ENG.		SIM			BNI-1280	7	
C	CC2	HCC201	D8907-2 AND D8907-3		HAZ	A53301	COMBUSTION ENG.		SIM			TR-ESS-001	111-1, B-8	USED FOR HAZ
C	CC2	PCC201	D8907-1 (FOR WELD)	C5804-1	P	A53301	LUKENS		SCR			DOCKET 50-318	59	
C	CC2	PCC202	D8907-2 (SURV.)	C5286-1	P	A53301	LUKENS		SCR			DOCKET 50-318	62	
C	CC2	PCC203	D8907-3 (WELD & HAZ)	C5803-3	P	A53301	LUKENS		SCR			DOCKET 50-318	61	
C	CC2	WCC201	D8907-1 AND D8907-3	10137	W	A53301	COMBUSTION ENG.		SIM			DOCKET 50-318	63	
C	CC2	WCC202	D8907-2/D8907-3 HAZ		W	A53301	COMBUSTION ENG.		SIM			TR-ESS-001	111-1, B-8	
W	CK1	HCK101	FROM B4406-3	C3506-1	HAZ	A53301	LUKENS	9 5/8"	SCR	W07 4	B44063	WCAP-8047	2-1, B-1	
W	CK1	PCK101	B4406-3 (SURV.)	C3506-1	P	A53301	LUKENS	9 5/8"	SCR	W07 1	B44063	WCAP-8047	2-1, A-1	
W	CK1	PCK102	B4406-1 (FOR WELD)		P	A53301	LUKENS	9 5/8"	SCR			WCAP-8047	A-1	
W	CK1	WCK101	B4406-3 AND B4406-1	13253	W	A53301	COMBUSTION ENG.	9 5/8"	SIM	W07 3	13253	WCAP-8047	2-1, A-1	
W	CK2	HCK201	FROM C5521-2	C5521-2	HAZ	A53301	CHICAGO BRIDGE	8 3/4"	SIM			WCAP-8512	2-1, A-1	
W	CK2	PCK201	C5521-2 (SURV.)	C5521-2	P	A53301	CHICAGO BRIDGE	8 3/4"	SCR			WCAP-8512	2-1, A-1	
W	CK2	PCK202	C5592-1 (FOR WELD)	C5592-1	P	A53301	CHICAGO BRIDGE	8 3/4"	SCR			WCAP-8512	2-1, A-1	
W	CK2	WCK201	C5521-2 AND C5592-1	S3986	W	A53301	CHICAGO BRIDGE	8 3/4"	SIM			WCAP-8512	2-1, A-1	
W	CL1	HCL101	FROM R2708-1	C4499-2	HAZ	A53301		9 5/8"	SIM			WCAP-9842	2-1	
W	CL1	PCL101	R2708-1 (SURV.)	C4499-2	P	A53301	LUKENS	9 5/8"	SCR			WCAP-9842	2-1	
W	CL1	PCL102	R2707-1 (FOR WELD)	C4344-1	P	A53301	LUKENS	9 5/8"	SCR			WCAP-9842	2-1, A-1	
W	CL1	WCL101	R2708-1 AND R2707-1	90077	W	A53301	COMBUSTION ENG.	9 5/8"	SIM			WCAP-9842	2-1, A-1	
W	CP2	HCP201	WELD HAZ OF R3807-2		HAZ	A53301			SCR			WCAP-10684	2-1, A-1	
W	CP2	PCP201	R3807-2 (SURV.)	C5522-2	P	A53301	LUKENS	9 5/8"	SCR			WCAP-10684	2-1, A-1	
W	CP2	PCP202	R3816-2 (WELD & HAZ)	NR66-439-1	P	A53301	LUKENS	9 5/8"	SCR			WCAP-10684	2-1, A-1	
W	CP2	WCP201	R3807-2 AND R3816-2	89833	W	A53301	COMBUSTION ENG.		FABR			WCAP-10684	2-1, A-1	
G	CPR	HCPR01	G2802-1 AND G2802-2		HAZ	A53301			SIM			MDE-103-0986	3-6, 3-8	
G	CPR	PCPR01	G2802-2 (SURV.)	C2307-2	P	A53301			SCR			MDE-103-0986	3-6, 3-8	
G	CPR	PCPR02	G2802-1 FOR HAZ & W	C2331-2	P	A53301			SCR			MDE-103-0986	3-6, 3-8	
G	CPR	WCPR01	G2802-1 AND G2802-2		W	A53301	COMBUSTION ENG.		SIM			MDE-103-0986	3-6, 3-8	
B	CR3	HCR301	FROM C4344-1	C4344-1	HAZ	A53301	LUKENS	8 3/4"	SCR	B12 2	C43441	BAW-1820	4-21, 4-24	
B	CR3	HCR302	FROM C4344-2	C4344-2	HAZ	A53301	LUKENS	8 3/4"	SCR			BAW-1820	4-21, 4-24	
B	CR3	PCR301	C4344-1 (SURV.)	C4344-1	P	A53301	LUKENS	8 3/4"	SCR	B12 1	C43441	BAW-1820	4-21, 4-24	
B	CR3	PCR302	C4344-2 (SURV.)	C4344-2	P	A53301	LUKENS	8 3/4"	SCR			BAW-1820	4-21, 4-24	
B	CR3	WCR301	ATYPICAL WELD		W	A53301	AM. CHAIN AND CABLE	8 3/4"	SCR			BAW-1820	4-21, 4-24	ERR VESSEL FLANGE
B	CR3	WCR302	WF 209-1	72105	W	A53301	AM. CHAIN AND CABLE	8 3/4"	SCR	B12 3	WF2091	BAW-1820	4-21, 4-24	
B	CR3	WSS63	WF-25	299L44	W	WF-25	BABCOCK & WILCOX		DROPOUT			BAW-1803/R1	4-7, A-35; A-36	HSST WELD, SEE BAW-1975, 3-3

Table 22. Continued

HEAT_LST.DBF: Page 3														
TAG	PLANT_ID	HEAT_ID	RPT_ID	HEAT_NO	PROD_ID	MAT_ID	SUPPLIER	THICKNESS	SOURCE	MPC_ID	MPC_HEAT	REF_ID	PAGES	NOTES
B	CR3	WHSS65	SA-1585	72445	W	SA-1585	BABCOCK & WILCOX		DROPOUT			BAW-1803/R1	4-7; A-39; A-40	HSST WELD, SEE BAW-1975, 3-3
B	CR3	WHSSCR	WF-67	72442	W	WF-67	BABCOCK & WILCOX		DROPOUT			BAW-1803/R1	4-7; A-37; A-38	HSST WELD, SEE BAW-1975, 3-3
W	CTY	HCTY04	W9807-1 AND W9807-8		HAZ	A3028	LUKENS	10.5"	SCR	W04 3		WCAP-7036	4, 5	
W	CTY	PCTY01	W9807-1 (FOR WELD)	A5887	P	A3028	LUKENS	10.5"	SCR			WCAP-7036	4, 5, 12	
W	CTY	PCTY02	W9807-2 (SURV.)	A5892	P	A3028	LUKENS	10.5"	SCR	W04 1	W98072	WCAP-7036	4, 5, 12	
W	CTY	PCTY04	W9807-4 (SURV.)	A5877	P	A3028	LUKENS	10.5"	SCR	W05 2	W98074	WCAP-7036	4, 5, 12	
W	CTY	PCTY07	W9807-7 (SURV.)	A5911	P	A3028	LUKENS	10.5"	SCR	W05 3	W98077	WCAP-7036	4, 5, 12	
W	CTY	PCTY08	W9807-8 (FOR WELD)	80716	W	A3028	LUKENS	10.5"	SCR			WCAP-7036	4, 5, 12	
W	CTY	WCTY01	W9807-1 AND W9807-8	860548	W	A3028	COMBUSTION ENG.	10 1/2"	SCR	W04 2		WCAP-10236	4-1	
G	DAC	WDAC01	2 PC. OF 1-21	80673-1	HAZ	A53381	IEL&P	4.47"	SIM			NEDC-31166/R1	3-3, 3-6	
G	DAC	PDAC01	1-21	80673-1	P	A53381	IEL&P	4.47"	SCR			NEDC-31166/R1	3-3, 3-6	
G	DAC	WDAC01	2 PC. OF 1-21		W	A53381	IEL&P	4.47"	SIM			NEDC-31166/R1	3-3, 3-6	
B	DB1	FDB101	AKJ233 (SURV.)	123X244	F	A5082	LADISH	8 3/4"	SCR			BAW-1820	4-45, 4-48	
B	DB1	FDB102	BCC241 (SURV.)	5P4086	F	A5082	LADISH	8 3/4"	SCR	B10 1	BCC241	BAW-1820	4-45, 4-48	
B	DB1	HDB101	FROM AKJ233	123X244	HAZ	A5082	LADISH	8 3/4"	SCR			BAW-1820	4-45, 4-48	
B	DB1	HDB102	FROM BCC241	5P4086	HAZ	A5082	LADISH	8 3/4"	SCR	B10 3	BCC241	BAW-1820	4-45, 4-48	
B	DB1	WDB101	WF-182-1	821144	W	A5082	UNION CARBIDE	8 3/4"	SCR	B10 4	WF1821	BAW-1820	4-45, 4-48	
B	DB1	WHSS66	WF-70	72105	W	WF-70	BABCOCK & WILCOX		DROPOUT			BAW-1803/R1	4-7; A-41; A-42	HSST WELD, SEE BAW-1975, 3-3
B	DB1	WHSS67	SA-1135	61782	W	SA-1135	BABCOCK & WILCOX		DROPOUT			BAW-1803/R1	4-7; A-45; A-46	HSST WELD, SEE BAW-1975, 3-3
B	DB1	WHSSDB	WF-112	406L44	W	WF-112	BABCOCK & WILCOX		DROPOUT			BAW-1803/R1	4-7; A-43; A-44	HSST WELD, SEE BAW-1975, 3-3
W	DC1	HDC101	FROM B4106-3		HAZ	A53381	LUKENS	9 5/8"	SCR			WCAP-8465	2-1	
W	DC1	PODC101	B4106-1 (SURV.)	C2884-1	P	A53381	LUKENS	9 5/8"	SCR			WCAP-8465	2-1, A-1	
W	DC1	PODC102	B4106-2 (SURV.)	C2854-2	P	A53381	LUKENS	9 5/8"	SCR			WCAP-8465	2-1, A-1	
W	DC1	PODC103	B4106-3 (SURV.)	C2793-1	P	A53381	LUKENS	9 5/8"	SCR			WCAP-8465	2-1, A-1	
W	DC1	PODC104	B4107-1 SUPPLEMENTAL		P		LUKENS		SCR			DOCKET 50-275/3	3; 8	PLATE FOR SUPPLEMENTAL CAPS.
W	DC1	WDC101	B4106-1 AND B4106-3	27204	W	A53381	COMBUSTION ENG.	9 5/8"	SCR			WCAP-8465	2-1, A-1	
W	DC1	WDC102	SURROGATE WELD	27204	W		COMBUSTION ENG.		DROPOUT			DOCKET 50-275/3	3; 8	WELD FOR SUPPLEMENTAL CAPSULES
W	DC2	NDC201	FROM B5454-1	C5161-1	HAZ	A53381	LUKENS	9 5/8"	SIM			WCAP-8783	2-1	
W	DC2	PODC201	B5454-1 (SURV.)	C5161-1	P	A53381	LUKENS	9 5/8"	SCR			WCAP-8783	2-1, A-1	
W	DC2	PODC202	B5454-2 (FOR WELD)	C5168-2	P	A53381	LUKENS	9 5/8"	SCR			WCAP-8783	A-1	
G	DR1	HDR101	FROM 2 PCS. 19716	19716	HAZ	A3028		5.75"	SIM			DOCKET 50-10	3, ATTACHMENT, PG. 6	
G	DR1	DR101	MELT 19716, SLAB 38	19716	P	A3028	LUKENS	5.75"	SCR	G01 1	1971638	DOCKET 50-10	3	ROLL-OUT OF STRAKE NO. 6
G	DR1	DR101I	MELT 19716, SLAB 38	19716	P	A3028	LUKENS	5.75"	SCR	G01 1	1971638	DOCKET 50-10	3	PORT101 INNER SURFACE
G	DR1	DR101O	MELT 19716, SLAB 38	19716	P	A3028	LUKENS	5.75"	SCR	G01 1	1971638	DOCKET 50-10	3	PORT101 OUTER SURFACE
G	DR1	WDR101	FROM 2 PCS. 19716		W	A3028		5.75"	SIM			DOCKET 50-10	3, ATTACHMENT, PG. 6	NOT REPRESENTATIVE OF BELTLINE
G	DR2	HDR201	ESV HAZ		HAZ	A3028			SIM	G02 7	A91281	BCL-585-10	3, 5	
G	DR2	HDR202	SAW HAZ		HAZ	A3028			SIM	G02 4	A91281	BCL-585-10	3, 5	
G	DR2	DR201	SURVEILLANCE BASE	A9128-1	P	A3028	LUKENS		SCR	G02 1	A91281	BCL-585-10	3, 5	
G	DR2	WDR201	ESV WELD		W	A3028			SIM	G02 5		BCL-585-10	3, 5	
G	DR2	WDR202	SAW WELD		W	A3028			SIM	G02 3		BCL-585-10	3, 5	
G	DR3	HDR301	ESV HAZ		HAZ	A3028			SIM	G03 8		SWRI-06-7484-003	5	
G	DR3	HDR302	SAW HAZ		HAZ	A3028			SIM	G03 4		SWRI-06-7484-003	5	
G	DR3	DR301	SURVEILLANCE BASE	C1256-2	P	A3028			SIM	G03 1		SWRI-06-7484-003	5	
G	DR3	WDR301	ESV WELD		W	A3028			SIM	G03 7		SWRI-06-7484-003	5	
G	DR3	WDR302	SAW WELD		W	A3028			SIM	G03 3		SWRI-06-7484-003	5	
A	ERR	FERR11	CODE 1-1		F	A1052	ALLIS-CHALMERS		FABR			SWRI-07-1599	9, 77	INITIAL SURVEILLANCE MATERIAL
A	ERR	FERR12	CODE 1-2		F	A1052	SWRI	6"	FABR			SWRI-07-1599	9, 77	PLATES IN AS-FORGED CONDITION
A	ERR	FERR13	CODE 1-3		F	A1052	ALLIS-CHALMERS		SCR			SWRI-07-1599	9, 77	TREPPANNED FROM VESSEL FLANGE
A	ERR	PERR21	CODE 2-1, PL. 252696	73MS73	P	A2128	U.S. STEEL CORP.		FABR			SWRI-07-1599	9, 77	
A	ERR	PERR31	CODE 3-1		P	A3028	ALLIS-CHALMERS	3"	FABR	E01 1	73MS73	SWRI-07-1599	9, 77	INITIAL SURVEILLANCE MATERIAL
A	ERR	PERR32	CODE 3-2		P	A3028	LUKENS	3"	FABR	E01 6		SWRI-07-1599	9, 77	PLATE STOCK USED BY SWRI
A	ERR	PERR33	CODE 3-3	A5498	P	A3028	LUKENS	3"	FABR	E01 7	A5498	SWRI-07-1599	9, 77	HEAT NO. ALSO GIVEN AS A4116
W	FA1	HFA101	FROM B6919-1	C6940-1	HAZ	A53381		9"	SIM	W08 4	69191	WCAP-8810	2-1	
W	FA1	PFA101	B6919-1 (SURV.)	C6940-1	P	A53381	LUKENS	9"	SCR	W08 1	B69191	WCAP-8810	2-1, A-1	
W	FA1	PFA102	B6903-2 (FOR WELD)	C6294-1	P	A53381	LUKENS	9"	SCR			WCAP-8810	A-1	

Table 22. Continued

HEAT_LST.DBF: Page 4		HEAT_ID	RPT_ID	HEAT_NO	PROD_ID	MAT_ID	SUPPLIER	THICKNESS	SOURCE	MPC_ID	MPC_HEAT	REF_ID	PAGES	NOTES
U	FA1	WFA101	B6919-1 AND B6903-2	33A277	W	A53381	COMBUSTION ENG.	9"	SIM	W08 3	33A277	WCAP-11563/R1	3-3, 4-3	
U	FA2	HFA201	FROM B7212-1	C7466-1	HAZ	A53381		9"	SIM			WCAP-8956	2-1	
U	FA2	PFA201	B7212-1 (SURV.)	C7466-1	P	A53381	LUKENS	9"	SCR			WCAP-8956	2-1, A-1	
U	FA2	PFA202	B7203-1 (FOR WELD)	C6309-2	P	A53381	LUKENS	9"	SCR			WCAP-8956	A-1	
U	FA2	WFA201	B7212-1 AND B7203-1	BOLA	W	A53381	COMBUSTION ENG.	9"	SIM			WCAP-11438	4-3	
C	FC1	HFC101	D4802-2 AND D4802-3		HAZ	A53381	COMBUSTION ENG.	5.0"	SIM	C06 3	A17681	TR-O-MCH-002	4, 5, A-6	
C	FC1	PFC101	D4802-2 (SURV.)	A1768-1	P	A53381	LUKENS	5.0"	SCR	C06 1	D48022	TR-O-MCH-002	4, 5, A-6	
C	FC1	PFC102	D4802-1 (FOR WELD)	C2585-3	P	A53381	LUKENS	5.0"	SCR			TR-O-MCH-002	4, 5, B-5	
C	FC1	PFC103	D4802-3 (WELD & HAZ)	A1768-2	P	A53381	LUKENS	5.0"	SCR			TR-O-MCH-002	4, 5, B-5	
C	FC1	WFC101	D4802-1 AND D4802-3	305414	W	A53381	COMBUSTION ENG.	5.0"	SIM	C06 2	305414	TR-O-MCH-002	4, 5, A-5	
C	FC1	WFC102	D4802-2/D4802-3 HAZ		W	A53381	COMBUSTION ENG.	5.0"	SIM			TR-O-MCH-001/R1	4	USED FOR HAZ
G	FT2	HFT201	G3414-1 AND G3414-2		HAZ	A53381		6.5"	SIM			MDE-49-0386	3-6, 3-8, 3-16	
G	FT2	PFT201	G3414-2	C3278-2	P	A53381		6.5"	SCR			MDE-49-0386	3-6, 3-8, 3-17	
G	FT2	PFT202	G3414-1	C3301-1	P	A53381		6.5"	SCR			MDE-49-0386	3-6, 3-8, 3-15	
G	FT2	WFT201	G3414-1 AND G3414-2		W	A53381	COMBUSTION ENG.	6.5"	SIM			MDE-49-0386	3-6, 3-8, 3-15	
G	GAR	FGAR01ID	T81D, RING 5 I.D.	1675	F	A336	TERMI	4.75"	SCR	G09 4	1675	NEAD 26	313, 314	
G	GAR	FGAR01OD	T80D, RING 5 O.D.	1675	F	A336	TERMI	4.75"	SCR			NEAD 26	314	
G	GAR	FGAR02	RING 4 (FOR WELD)	2120	F	A336	TERMI	4.75"	SCR			NEAD 26	314	
G	GAR	FGAR02ID	L81D, RING 4 I.D.	2120	F	A336	TERMI	4.75"	CUTOUT	G09 9	2120	NEAD 26	314	CUT FROM 406-MM-DIA NOZZLE
G	GAR	FGAR02OD	L80D, RING 4 O.D.	2120	F	A336	TERMI	4.75"	CUTOUT			NEAD 26	314	CUT FROM 406-MM-DIA NOZZLE
G	GAR	FGAR03	RING 7 (FOR WELD)	2289	F	A336	TERMI	4.75"	SCR			NEAD 26	314	
G	GAR	FGAR04	RING 6	2686	F	A336	TERMI	4.75"	VESSEL			DPT/SH/041/R/79	6	
G	GAR	HGAR01			HAZ	A336	TERMI	4.75"	SIM			DPT/SH/041/R/79	3	
G	GAR	SASTH S2	ASTM PLATE	A0421	SRM	A3028	U.S. STEEL COMP.	6"	FABR			NEAD 26	313, 314	REF. MATERIAL IN GARIGLIANO
G	GAR	WGAR01	RING 4 AND RING 7		W	A336		4.75"	SIM	G0914		NEAD 26	314	
W	GIN	FGIN01	125P666 (SURV.)	125P666	F	A5082	BETHLEHEM STEEL	8 7/32"	SCR	W10 1	125P666	WCAP-7254	4	
W	GIN	FGIN02	125S255 (SURV.)	125S255	F	A5082	BETHLEHEM STEEL	8 7/32"	SCR	W10 2	125S255	WCAP-7254	4	
W	GIN	HGIN01	FROM 125P666	125P666	HAZ	A5082	BETHLEHEM STEEL	8 7/32"	SCR	W09 4		WCAP-7254	4	
W	GIN	WGIN01	125P666 AND 125S255	61782	W	A5082	BABCOCK & WILCOX	8 7/32"	SCR	W09 3	61782	WCAP-7254	4	
G	HA1	HMA101	G-8404-2 & G-8404-1		HAZ	A53381			SIM			NEDC-30997	3-6, 3-7	
G	HA1	PMA101	G-4804-2 (SURV.)	C4114-2	P	A53381	COMBUSTION ENG.		SCR			NEDC-30997	3-2, 3-6	
G	HA1	PMA102	G-4804-1 (FOR WELD)	C3985-2	P	A53381	COMBUSTION ENG.		SCR			NEDC-30997	3-2, 3-6	
G	HA1	WMA101	G-8404-2 & G-8404-1		W	A53381	COMBUSTION ENG.		SIM			NEDC-30997	3-6, 3-7, 3-8	
W	H82	HNB201	W10201-1 & W10201-3		HAZ	A3028		10.75"	SCR	W13 3		WCAP-7373	4	
W	H82	PNB201	W10201-4 (SURV.)	A6604-1	P	A3028	LUKENS	10.75"	SCR	W12 1	W102014	WCAP-7373	4, 12	
W	H82	PNB202	W10201-5 (SURV.)	B1256-1	P	A3028	LUKENS	10.75"	SCR	W12 2	W102015	WCAP-7373	4, 12	
W	H82	PNB203	W10201-6 (SURV.)	B1250-1	P	A3028	LUKENS	10.75"	SCR	W12 3	W102016	WCAP-7373	4, 12	
W	H82	PHB204	W10201-1 (FOR WELD)	A6623-1	P	A3028	LUKENS	10.75"	SCR			WCAP-7373	12	
W	H82	PHB205	W10201-3 (FOR WELD)	B1255-1	P	A3028	LUKENS	10.75"	SCR			WCAP-7373	12	
W	H82	WMB201	W10201-1 & W10201-3	W5214	W	A3028	COMBUSTION ENG.	10 3/4"	SCR	W45 2		DOCKET 50-261	TABLE 1	
G	HM3	HNM301	FROM A0638-2		HAZ	A3028	LUKENS	5"	SCR	G12 3		GEGR-4443	C-1	
G	HM3	PHM301	S-4201-2	A0638-2	P	A3028	LUKENS	5"	SCR			GEGR-4443	C-1	
G	HM3	PHM302	S-4201-4	20239-3	P	A3028	LUKENS	5"	SCR			GEGR-4443	C-1	
G	HM3	SASTH M	REFERENCE MATERIAL	A0421	SRM	A3028	U.S. STEEL	6"	FABR			GEGR-4443	1-1, 1-2	FROM MID-LAYER
G	HM3	SHM3	S-4201-3	20192-2	SRM	A3028	LUKENS	5"	SCR			GEGR-4443	C-1	
G	HM3	SHM3 O	S-4201-3	20192-2	SRM	A3028	LUKENS	5"	SCR			GEGR-4443	C-1	OUTER SURFACE
G	HM3	WMM301	2 PC. S-4201-2		W	A3028	COMBUSTION ENG.	5"	SCR			GEGR-4443	D-1	
W	IP2	HIP201	FROM B2002-3	B4922-1	HAZ	A3028		9 5/8"	SCR	W46 2	B20023	WCAP-7323	4	
W	IP2	PIP201	B2002-1 (SURV.)	B4688-2	P	A3028	LUKENS	9 5/8"	SCR	W43 1	B20021	WCAP-7323	4, 12	
W	IP2	PIP202	B2002-2 (SURV.)	B4701-2	P	A3028	LUKENS	9 5/8"	SCR	W43 2	B20022	WCAP-7323	4, 12	
W	IP2	PIP203	B2002-3 (SURV.)	B4922-1	P	A3028	LUKENS	9 5/8"	SCR	W46 1	B20023	WCAP-7323	4, 12	
W	IP2	WIP201	B2002-1 AND B2002-3	W5214	W	A3028	COMBUSTION ENG.	9 5/8"	SCR	W46 3	W5214	WCAP-11815	4-5	
W	IP3	HIP304	FROM B2803-3	A0512-2	HAZ	A3028		9"	SCR			WCAP-8475	2-1	
W	IP3	PIP301	B2802-1 (SURV.)	B5394-2	P	A3028	LUKENS	9"	SCR	W14 1	B28021	WCAP-8475	2-1, A-1	
W	IP3	PIP302	B2802-2 (SURV.)	A0516-2	P	A3028	LUKENS	9"	SCR			WCAP-8475	2-1, A-1	
W	IP3	PIP303	B2802-3 (SURV.)	B5391-2	P	A3028	LUKENS	9"	SCR			WCAP-8475	2-1, A-1	

Table 22. Continued

HEAT_LST.DBF: TAG	PLANT_ID	Page 5 HEAT_ID	RPT_ID	HEAT_NO	PROD_ID	MAT_ID	SUPPLIER	THICKNESS	SOURCE	MPC_ID	MPC_HEAT	REF_ID	PAGES	NOTES
U	IP3	PIP304	B2803-3 (SURV.)	A0512-2	P	A3028	LUKENS	9"	SCR	W14 2	B28033	SURI-02-5212	4-1, 4-3	
U	IP3	WIP301	B2802-1 AND B2803-3	W5214	U	A3028	COMBUSTION ENG.	9"	SCR	W14 4	W5214	WCAP-10300	4-1, 4-3, 4-5	
U	K01	FK0101	124U375VA1 (SURV.)	124U375VA1	F	A5082	BETHLEHEM STEEL	6 3/4"	SCR			WCAP-8586	3-1, A-1	
U	K01	HK0101	FROM 124U375VA1	124U375VA1	HAZ	A5082	BETHLEHEM STEEL	6 3/4"	SCR			WCAP-8586	3-1, A-1	
U	K01	WK0101	124U375 AND 122X371	T29744	U	A5082	BETHLEHEM STEEL	6 3/4"	SCR			WCAP-8586	3-1, A-1	
U	KVE	FKVE01	122X208VA1 (SURV.)	122X208VA1	F	A5082	BETHLEHEM STEEL	6.5"	SCR	W16 1	122X208	WCAP-8107	2-1, A-1	
U	KVE	FKVE02	123X167VA1 (SURV.)	123X167VA1	F	A5082	BETHLEHEM STEEL	6.5"	SCR	W16 2	123X167	WCAP-8107	2-1, A-1	
U	KVE	HKVE01	FROM 122X208VA1	122X208VA1	HAZ	A5082	BETHLEHEM STEEL	6.5"	SIM	W16 4	122X208	WCAP-8107	2-1, A-1	
U	KVE	WKVE01	122X208 AND 123X167	1P3571	U	A5082	COMBUSTION ENG.	6 1/2"	SIM	W16 3	1P3571	WCAP-12020	3-1, 4-1	
A	LAC	HLAC01	FROM NP1056		HAZ	A3028		4"	SIM			NEAD 8	96, 99	
A	LAC	PLAC01	NP1054 (SURV.)	A5848	P	A3028	LUKENS	4"	SCR	A02 1	NP1054	DOCKET 50-409	4, 7	
A	LAC	PLAC02	NP1055 (SURV.)	A5848	P	A3028	LUKENS	4"	SCR	A02 2	NP1055	DOCKET 50-409	4, 7	
A	LAC	PLAC03	NP1056 (SURV.)	A5852	P	A3028	LUKENS	4"	SCR	A01 3	NP1056	DOCKET 50-409	4, 7	
A	LAC	PLAC04	NP1057		P	A3028	LUKENS	4"	SCR			NEAD 8	95, 96	LC-2 AND LC-3
A	LAC	PLAC05	NP1058		P	A3028	LUKENS	4"	SCR			NEAD 8	95, 96	LC-4 AND LC-5
A	LAC	SLAC01	CORRELATION MATERIAL	N31438	SRM	A3028	U.S. STEEL CORP.	6"	FABR	A02 7	N31438	SURI-02-3467	6, 25	
A	LAC	VLAC01	FROM NP1056	3C28	U	A3028	ALLIS-CHALMERS	4"	SIM	A02 5		NEAD 8	96, 97, 99	DOCKET 50-409, P. 2, 3, 7 (CV)
A	LAC	VLAC02	NP1057 AND NP1058	3C28	U	A3028	ALLIS-CHALMERS	4"	SIM			SURI-02-3467	A-6	DOCKET 50-409, P. 2 (CV & TEN)
U	LM2	FLM201	123J398 (SURV.)		F	A5082	BETHLEHEM STEEL	9.5"	SCR			WCAP-9329	2-1	
U	LM2	FLM202	122J333 (FOR WELD)		F	A5082	BETHLEHEM STEEL	9.5"	SCR			WCAP-9329	A-1	
U	LM2	FLM201	FROM 123J398		HAZ	A5082	BETHLEHEM STEEL	9.5"	SIM			WCAP-9329	2-1	
U	LM2	VLM201	123J398 AND 122J333	442002	U	A5082	BABCOCK & WILCOX	9 1/2"	SIM			WCAP-9329	2-1, A-1, A-2	
U	MC1	HMC101	FROM B5012-2	C4417-3	HAZ	A53381		9 5/8"	SIM			WCAP-9195	2-1	
U	MC1	PMC101	B5012-1 (SURV.)	C4387-2	P	A53381	LUKENS	9 5/8"	SCR			WCAP-9195	2-1, A-1	
U	MC1	PMC102	B5012-2 FOR W & HAZ	C4417-3	P	A53381	LUKENS	9 5/8"	SCR			WCAP-9195	2-1, A-1	
U	MC1	PMC103	B5012-3 (FOR WELD)	C4377-2	P	A53381	LUKENS	9 5/8"	SCR			WCAP-9195	2-1, A-1	
U	MC1	WMC101	B5012-2 AND B5012-3	20291	U	A53381	COMBUSTION ENG.	9 5/8"	SIM			WCAP-12354	4-3	
U	MC2	FMC201	FORGING 05 (SURV.)	526840	F	A5082	KRUPP HÜTTENWERKE AG	8 1/2"	SCR			WCAP-9489	A-1, A-2	
U	MC2	FMC202	FORGING 04, FOR WELD	411337/11	F	A5082	KRUPP HÜTTENWERKE AG	8 1/2"	SCR			WCAP-9489	A-1, A-2	SEE ALSO WCAP-12556
U	MC2	HMC201	FROM FORGING 05		HAZ	A5082	KRUPP HÜTTENWERKE AG	8 1/2"	SIM			WCAP-9489	A-1, A-2	
U	MC2	WMC201	FORGINGS 04 AND 05	895075	U	A5082	ROTTERDAM	8 1/2"	SIM			WCAP-11029	4-1, 4-2	
B	MD1	FMD101	A8Z196	A8Z196	F	A5082	LADISH	8 3/4"	SCR			BAW-1543/R2	A-11	
B	MD1	HMD101		532598	HAZ	A5082		8 3/4"	SCR			BAW-1543/R2	0-14	
B	MD1	WMD101	WF 209-1		U	A5082		8 3/4"	SCR			BAW-1543/R2	A-11	
B	MD1	WMD102	WF 70		U	A5082		8 3/4"	SCR			BAW-1543/R2	A-11	
B	MD2	FMD201	BZB243	BZB243	F	A5082	LADISH	8 3/4"	SCR			BAW-1543/R2	A-12	
B	MD2	HMD201		BZB243	HAZ	A5082		8 3/4"	SCR			BAW-1543/R2	0-15	
B	MD2	WMD201	WF 336		U	A5082		8 3/4"	SCR			BAW-1543/R2	A-12	
G	ML1	HML101	FROM G-2002-5	C1140-1	HAZ	A3028	LUKENS		SIM			NEDC-30833	3-2, 3-8, 3-17	
G	ML1	PHL101	G-2002-6 (SURV.)	C1079-1	P	A3028	LUKENS		SCR			NEDC-30833	3-2, 3-8, 3-15	
G	ML1	PHL102	G-2002-4	B5013-2	P	A3028	LUKENS		SCR			NEDC-30833	3-2, 3-8, 3-15	
G	ML1	PHL103	G-2002-5	C1140-1	P	A3028	LUKENS		SCR			NEDC-30833	3-2, 3-8, 3-15	
G	ML1	WML101	FROM G-2002-6	348009	U	A3028	COMBUSTION ENG.		SIM			NEDC-30833	3-2, 3-8, 3-16	
C	ML2	HML201	C-506-1 AND C-506-3		HAZ	A53381	COMBUSTION ENG.		SIM	C03 4	C56671	TR-N-MCH-008	3, 4, 5	
C	ML2	PHL201	C-506-1 (SURV.)	C5667-1	P	A53381	LUKENS		SCR	C03 1	C56671	TR-N-MCH-008	3, 4, 5, 8	
C	ML2	PHL202	C-506-2, FOR WELD	C5667-2	P	A53381	LUKENS		SCR			TR-N-MCH-008	3, 4, 5	
C	ML2	PHL203	C-506-3 (WELD & HAZ)	A5518-1	P	A53381	LUKENS		SCR			TR-N-MCH-008	3, 4, 5	
C	ML2	WML201	C-506-2 AND C-506-3	90136	U	A53381	COMBUSTION ENG.		SIM	C03 3	90136	TR-N-MCH-008	3, 4, 8	GENERIC NAME FOR SURV. WELD
C	ML2	WML201ID	C-506-2 AND C-506-3	90136	U	A53381	COMBUSTION ENG.		SIM			TR-N-MCH-008	3, 4, 8, 52	NT. 90136 I.D.
C	ML2	WML201OD	C-506-2 AND C-506-3	10137	U	A53381	COMBUSTION ENG.		SIM			TR-N-MCH-008	3, 4, 8, 52	NT. 10137 O.D.
C	ML2	WML202	C-506-1/C-506-3 HAZ		U	A53381	COMBUSTION ENG.		SIM			TR-N-MCH-008	3, 4	USED FOR HAZ
U	ML3	HML301	FROM B9805-1		HAZ	A53381			SCR			WCAP-11878	4-1	
U	ML3	PHL301	B9805-1 (SURV.)		P	A53381			SCR			WCAP-11878	4-1	
U	ML3	WML301	WELD	4P6052	U	A53381	COMBUSTION ENG.		FABR			WCAP-11878	4-1, 4-3	
G	MON	HMON01	2 PCS. OF 1-15		HAZ	A53381	CHICAGO BRIDGE		SCR			BCL-585-84-2/R1	9	C&I PER WEDO-24197
G	MON	PHMON01	1-15	C2220-2	P	A53381	LUKENS		SCR			BCL-585-84-2/R1	2	PREVIOUSLY REPORTED AS 1-14

Table 22. Continued

HEAT_LST.DBF: Page 6														
TAG	PLANT_ID	HEAT_ID	RPT_ID	HEAT_NO	PROD_ID	MAT_ID	SUPPLIER	THICKNESS	SOURCE	MPC_ID	MPC_HEAT	REF_ID	PAGES	NOTES
G	MON	MON001	2 PCS. OF 1-15		U	A53381	CHICAGO BRIDGE		SCR			BCL-585-84-2/R1	8	CB&I PER MEDO-24197
C	MY	MY01	D-8406-1 & D-8406-2		HAZ	A53381	COMBUSTION ENG.	9 11/16"	SIM	C08 4	D84061	CR 75-269	A-2, A-4	
C	MY	PHY_01	D-8406-1 (SURV.)	B7955-1	P	A53381	LUKENS	9 11/16"	SCR	C01 1	D84061	CR 75-269	A-2	
C	MY	PHY_02	D-8406-2 (FOR HAZ)	B7955-2	P	A53381	LUKENS	9 11/16"	SCR			CR 75-269	A-2, A-4	
C	MY	PHY_11	D-8407-1 (FOR WELD)	B8330-1	P	A53381	LUKENS	9 11/16"	SCR			CR 75-269	A-4	
C	MY	PHY_13	D-8407-3 (FOR WELD)	B8324-1	P	A53381	LUKENS	9 11/16"	SCR			CR 75-269	A-4	
C	MY	UNY_01	D-8407-1 & D-8407-3	IP3571	U	A53381	COMBUSTION ENG.	9 11/16"	SIM	C01 2	D840713	CR 75-269	A-4	WELD #9-203
C	MY	UNY_02	D-8406-1/-2 (HAZ)	33A277	U	A53381	COMBUSTION ENG.	9 11/16"	SIM			CR 75-317	A-2, A-4	WELD #9-203
U	NA1	FNA101	FRG 03 990400/292332	990400	F	A5082	RHEINSTAHL HÜTTEN	10"	SCR	W42 2	990400	DOCKET 50-338	TABLE 1	
U	NA1	FNA102	FRG 04 990311/298244	990311	F	A5082	RHEINSTAHL HÜTTEN	10"	SCR			DOCKET 50-338	TABLE 1	
U	NA1	HNA101	FROM FORGING 03	990400	HAZ	A5082		10"	SIM	W42 3	990400	WCAP-8771	2-1, A-1	
U	NA1	UNA101	SURVEILLANCE WELD	25531	U	A5082	ROTTERDAM	10"	SIM	W42 4		DOCKET 50-338	TABLE 3	
U	NA2	FNA201	FRG 04 990496/292424	990496	F	A5082	RHEINSTAHL HÜTTEN	10"	SCR			DOCKET 50-339	TABLE 5	
U	NA2	FNA202	FRG 03 990533/297355	990533	F	A5082	RHEINSTAHL HÜTTEN	10"	SCR			DOCKET 50-339	TABLE 5	
U	NA2	HNA201	FROM FORGING 04	990496	HAZ	A5082		10"	SIM			WCAP-8772	2-1, A-1	
U	NA2	UNA201	FORGINGS 03 AND 04	716126	U	A5082	ROTTERDAM	10"	SIM			DOCKET 50-339	TABLE 7	
G	NM1	NHM101			HAZ	A30281			SIM			BCL-585-84-6	8	
G	NM1	PNM101	G-8-4	P2130	P	A30281	LUKENS		SCR			BCL-585-84-6	8	
G	NM1	PNM102	G-307-3	P2074	P	A30281	LUKENS		SCR			DOCKET 50-220	TABLE 9	SURVEILLANCE MATERIAL IN DOUBT
G	NM1	PNM103	G-307-4	P2076	P	A30281	LUKENS		SCR			DOCKET 50-220	TABLE 9	SURVEILLANCE MATERIAL IN DOUBT
G	NM1	PNM104	G-307-10	P2091	P	A30281	LUKENS		SCR			DOCKET 50-220	TABLE 9	SURVEILLANCE MATERIAL IN DOUBT
G	NM1	PNM105	G-8-1	P2112	P	A30281	LUKENS		SCR			DOCKET 50-220	TABLE 9	SURVEILLANCE MATERIAL IN DOUBT
G	NM1	PNM106	G-8-3 (SURV.)	P2130	P	A30281	LUKENS		SCR			BCL-585-84-6	8	SEE TABLE 9
G	NM1	UNM101			U	A30281	COMBUSTION ENG.		SIM			BCL-585-84-6	8	DEPTH OF 1-1/16" FROM W ROOT
B	OC1	HOC101	FROM C2800-2	C2800-2	HAZ	A3028	LUKENS	8 3/4"	SCR	B01 3	C28002	BAW-1820	4-3, 4-6	
B	OC1	HOC102	FROM C3265-1	C3265-1	HAZ	A3028	LUKENS	8 3/4"	SCR	B02 3	C32651	BAW-1820	4-3, 4-6	
B	OC1	POC101	C2800-2 (SURV.)	C2800-2	P	A3028	LUKENS	8 3/4"	SCR	B01 2	C28002	BAW-1820	4-3, 4-6	
B	OC1	POC102	C3265-1 (SURV.)	C3265-1	P	A3028	LUKENS	8 3/4"	SCR	B02 2	C32651	BAW-1820	4-3, 4-6	
B	OC1	WOC101	WF-112	406L44	U	A3028	UNION CARBIDE	8 3/4"	SCR	B02 4	WF112	BAW-1820	4-3, 4-6	
B	OC2	FOC201	AAW-163 (SURV.)	3P2359	F	A5082	LADISH	8 3/4"	SCR	B03 2	AAW163	BAW-1820	4-9, 4-12	
B	OC2	FOC202	AWG-164 (SURV.)	4P1885	F	A5082	LADISH	8 3/4"	SCR			BAW-1820	4-9, 4-12	
B	OC2	HOC201	FROM AAW-163		HAZ	A5082	LADISH	8 3/4"	SCR	B03 3	AAW163	BAW-1820	4-9, 4-12	
B	OC2	HOC202	FROM AWG-164		HAZ	A5082	LADISH	8 3/4"	SCR			BAW-1820	4-9, 4-12	
B	OC2	WOC201	WF-209-1	72105	U	A5082	AM. CHAIN AND CABLE	8 3/4"	SCR	B04 4	WF2091A	BAW-1820	4-9, 4-12	
B	OC3	FOC301	ANK-191 (SURV.)	522194	F	A5082	LADISH	8 3/4"	SCR	B05 1	ANK191	BAW-1820	4-33, 4-36	
B	OC3	FOC302	AMS-192 (SURV.)	522314	F	A5082	LADISH	8 3/4"	SCR	B05 4	AMS192	BAW-1820	4-33, 4-36	BAW-1543/R2 - WT. 522314K
B	OC3	HOC301	FROM ANK-191	522194	HAZ	A5082	LADISH	8 3/4"	SCR	B05 3	ANK191	BAW-1820	4-33, 4-36	
B	OC3	HOC302	FROM AMS-192	522314	HAZ	A5082	LADISH	8 3/4"	SCR	B06 4	AMS192	BAW-1820	4-33, 4-36	
B	OC3	WOC301	W. 209-1	72105	U	A5082	AM. CHAIN AND CABLE	8 3/4"	SCR	B05 5	WF2091B	BAW-1820	4-33, 4-36	
G	OYS	HOYS01	FROM G-308-1		HAZ	A30281	LUKENS		SCR			BCL-382-85-1/R1	6, 7	
G	OYS	POYS01	G-308-1	T1937-1	P	A30281	LUKENS		CUTOUT			BCL-382-85-1/R1	6, 7	
G	OYS	WOYS01	FROM G-308-1		U	A30281	LUKENS		SCR			BCL-382-85-1/R1	6, 7	
C	PAL	HPAL01	D3803-3 AND D3803-2		HAZ	A3028M	COMBUSTION ENG.		SIM	C05 4	B52942	WCAP-10637	3-1, 4-1, 4-2	A3028 MOD.
C	PAL	PPAL01	D3803-1 (SURV.)	C1279-3	P	A3028M	LUKENS		SCR	C05 1	B52942	DOCKET 50-255	29	A3028 MOD.
C	PAL	PPAL02	D3802-2 (WELD & HAZ)	A0313-2	P	A3028M	LUKENS		SCR			DOCKET 50-255	5, 23	A3028 MOD.
C	PAL	PPAL03	D3803-3 (HAZ)	C1279-1	P	A3028M	LUKENS		SCR			DOCKET 50-255	24	A3028 MOD.
C	PAL	WPAL01	D3803-1 AND D3803-2	3277	U	A3028M	COMBUSTION ENG.		SIM	C05 3	27204	DOCKET 50-255	5	
C	PAL	WPAL02	D3803-2/D3803-3 HAZ		U	A3028M	COMBUSTION ENG.		SIM			WCAP-10637	3-1, 4-1, 4-2	WELD USED FOR HAZ, A3028 MOD.
U	PB1	HPB101	FROM A9811	A9811	HAZ	A3028		6.75"		U19 4	A9811	WCAP-7513	2-1	
U	PB1	PPB101	A9811 (SURV.)	A9811	P	A3028	LUKENS	6.75"	SCR	U19 1	A9811	WCAP-7513	2-1, A-1	
U	PB1	PPB102	C1423 (SURV.)	C1423	P	A3028	LUKENS	6.75"	SCR	U19 2	C1423	WCAP-7513	2-1, A-1	
U	PB1	WPB101	A9811 AND C1423	72445	U	A3028	BABCOCK & WILCOX	6 3/4"		U19 3	72445	WCAP-7513	2-1, A-1	
U	PB2	FPB201	122W195VA1 (SURV.)	122W195VA1	F	A5082	BETHLEHEM STEEL	6.5"	SCR	W20 2	122W195	WCAP-7712	4	
U	PB2	FPB202	123V500VA1 (SURV.)	123V500VA1	F	A5082	BETHLEHEM STEEL	6.5"	SCR	W20 1	123V500	WCAP-7712	4	
U	PB2	HPB201	FROM 122W195VA1	122W195VA1	HAZ	A5082		6.5"	SIM	W20 4	122W195	WCAP-7712	4	
U	PB2	WPB201	122W195 AND 123V500	406L44	U	A5082	BABCOCK & WILCOX	6 1/2"	SIM	W20 3	40644	WCAP-7712	4	

Table 22. Continued

HEAT_LST.DBF: Page 7	HEAT_ID	RPT_ID	HEAT_NO	PROD_ID	MAT_ID	SUPPLIER	THICKNESS	SOURCE	MPC_ID	MPC_HEAT	REF_ID	PAGES	NOTES
G PH2 HPH201	HK-57 AND HK-58	HAZ	A3028					SIM			SASR 88-24	3-6, 3-7, 3-9	
G PH2 PPH201	HK-58	C2761-2	A3028					SCR			SASR 88-24	3-6, 3-7, 3-9	
G PH2 PPH202	HK-57	C2761-1	A3028					SCR			SASR 88-24	3-6, 3-7, 3-9	
G PH2 WPH201	HK-57 AND HK-58		A3028			BABCOCK & WILCOX		SIM			SASR 88-24	3-6, 3-7, 3-9	
G PH3 HPH301	FROM 6-139-12	C3103-1	A3028					SCR			SASR 90-50	3-1, 3-6	
G PH3 PPH301	6-139-12	C3103-1	A3028					SCR			SASR 90-50	3-1, 3-6, 3-9	
G PH3 WPH301	2 PCS. OF 6-139-12		A3028			BABCOCK & WILCOX		SIM			SASR 90-50	3-1, 3-6	
W P11 FP1101	FRG C, 21918/38566	21918	A5083			CREUSOT-LOIRE	6.692"	SCR	W24 2	21918	DOCKET 50-282	5	
W P11 HP1101	FROM FORGING C	21918	A5083			CREUSOT-LOIRE	6.692"	SIM	W23 4	21918	UCAP-8086	4-1, A-1	
W P11 WP1101	FORGINGS C AND D	1752	A5083			CREUSOT-LOIRE	6.692"	SIM	W24 3	1752	DOCKET 50-282	3	
W P12 FP1201	FORGING D	22642	A5083			CREUSOT-LOIRE	6.692"	SCR	W26 1	22642	DOCKET 50-306	11	
W P12 HP1201	FROM FORGING D	22642	A5083			CREUSOT-LOIRE	6.692"	SIM	W25 4	22642	UCAP-8193	4-1, A-1	
W P12 WP1201	FORGINGS C AND D	2721	A5083			CREUSOT-LOIRE	6.692"	SIM	W26 3	2721	DOCKET 50-306	9	
G PL1 HPL101		HAZ	A53381					SIM			SUR1-02-5951	7	
G PL1 PPL101		C2921-2	A53381			COMBUSTION ENG.		SCR			SUR1-02-5951	7	
G PL1 WPL101			A53381					SIM			SUR1-02-5951	7	
G OC1 HOC101	ESW HAZ	HAZ	A3028					SCR	G05 7		BNI-0275	3	
G OC1 HOC102	SAW HAZ	HAZ	A3028					SCR	G05 4		BNI-0275	3	
G OC1 POC101	SURVEILLANCE BASE	A0610-1	A3028					SCR	G05 2	A01601	BNI-0275	3	
G OC1 WOC101	ESW WELD		A3028					SCR	G05 5		BNI-0275	3	
G OC1 HOC102	SAW WELD		A3028					SCR	G05 3		BNI-0275	3	
G OC2 HOC201	ESW HAZ	HAZ	A30281					SCR	G07 7	C33072	BNI-0275	3	
G OC2 HOC202	SAW HAZ	HAZ	A30281					SCR	G07 4	C33072	BNI-0275	3	
G OC2 POC201	SURVEILLANCE BASE	C3307-2	A30281					SCR	G07 1	C33072	BNI-0275	3	
G OC2 WOC201	ESW WELD		A30281					SCR	G07 5		BNI-0275	3	
G OC2 HOC202	SAW WELD		A30281					SCR	G07 3		BNI-0275	3	
U R12 FR1201	FRG 03 990710/294525	990710	A5082			RHEINSTAHL MÜTLEN	7.75"	SCR			UCAP-8216	2-1, A-1	
U R12 FR1202	FRG 04 990622/293414	990622	A5082			RHEINSTAHL MÜTLEN	7.75"	SCR			UCAP-8216	2-1, A-1	
U R12 HR1201	FROM FORGING 03		A5082				7.75"	SIM			UCAP-8216	2-1	
U R12 VR1201	FORGINGS 03 AND 04	1725	A5082			ROTTERDAM	7 3/4"	SIM			UCAP-8216	2-1, A-1	
B RS1 HRS101	FROM C-5062-1	C5062-1	A53381			LUKENS	8 3/4"	SCR	B11 2	C50621	BAW-1820	4-39, 4-42	
B RS1 HRS102	FROM C-5070-1	C5070-1	A53381			LUKENS	8 3/4"	SCR			BAW-1820	4-39, 4-42	
B RS1 PRS101	C-5062-1 (SURV.)	C5062-1	A53381			LUKENS	8 3/4"	SCR	B11 1	C50621	BAW-1820	4-39, 4-42	
B RS1 PRS102	C-5070-1 (SURV.)	C5070-1	A53381			LUKENS	8 3/4"	SCR			BAW-1820	4-39, 4-42	
B RS1 VRS101	VF-193	406144	A53381			UNION CARBIDE	8 3/4"	SCR	B11 3	VF193	BAW-1820	4-39, 4-42	
U SA1 HSA101	FROM B2402-2		A53381			LUKENS	9"	SIM			UCAP-8511	2-1	
U SA1 PSA101	B2402-1 (SURV.)	C1354-1	A53381			LUKENS	9"	SCR	W27 1	24021	DOCKET 50-272	TABLE 5	
U SA1 PSA102	B2402-2 (SURV.)	C1354-2	A53381			LUKENS	9"	SCR	W27 2	B24022	DOCKET 50-272	TABLE 5	
U SA1 PSA103	B2402-3 (SURV.)	C1397-2	A53381			LUKENS	9"	SCR	W27 3	B24023	DOCKET 50-272	TABLE 5	
U SA1 PSA104	B2403-1 FOR W & HAZ	C1356-1	A53381			LUKENS	9"	SCR			DOCKET 50-272	TABLE 5	
U SA1 VSA101	B2402-2 AND B2403-1	398196	A53381			COMBUSTION ENG.	9"	SIM			UCAP-8511	2-1	
U SA2 HSA201	FROM B4712-2		A53381			COMBUSTION ENG.	9 5/8"	SCR			UCAP-10492	4-1	
U SA2 PSA201	B4712-2 (SURV.)	C4186-2	A53381			COMBUSTION ENG.	9 5/8"	SCR			UCAP-10492	4-1	
U SA2 PSA202	B4712-1 (SURV.)	C4173-1	A53381				9 5/8"	SCR			UCAP-10492	4-1	
U SA2 VSA201	B4712-1 AND B4712-2	13253	A53381			COMBUSTION ENG.	9 5/8"	SCR			UCAP-10492	4-1	
U SB1 HSB101	HEAT-AFFECTED-ZONE		A53381			CE		FABR			YAE-1853	3	
U SB1 PSB101	R1808-3	R1808-3	A53381			CE		SCR			YAE-1853	4, A-1	
U SB1 PSB102	R1808-1 (FOR WELD)	R1808-1	A53381			CE		SCR			YAE-1853	4, A-1	
U SB1 WSB101	R1808-1 AND R1808-3	4P6052	A53381			CE		FABR			YAE-1853	3; 4	
C SL1 HSL101	C-8-2 AND C-8-3		A53381			COMBUSTION ENG.		SIM	C07 4		TR-F-MCM-004	4, 60, 8-8	
C SL1 PSL101	C-8-2 (SURV.)	C5935-2	A53381			LUKENS		SCR	C07 2	C59352	DOCKET 50-335	28, 31	
C SL1 PSL102	C-8-1 FOR HAZ	C5935-1	A53381			LUKENS		SCR			DOCKET 50-335	27	
C SL1 PSL103	C-8-3 FOR WELD & HAZ	C5935-3	A53381			LUKENS		SCR			DOCKET 50-335	29	
C SL1 WSL101	C-8-1/C-8-3 FOR WELD	90136	A53381			COMBUSTION ENG.		SIM	C07 3	90136	DOCKET 50-335	30	
C SL1 WSL102	C-8-2/C-8-3 FOR HAZ		A53381			COMBUSTION ENG.		SIM			TR-F-MCM-004	4	
C SL2 HSL201	M-605-1 AND M-605-2	HAZ	A53381			COMBUSTION ENG.		SIM			TR-L-MCM-001	8, 9, 10	

ALSO UCAP-8824, A-1
ALSO UCAP-8824, A-1

ALL BELTLINE WELDS ARE SAME

PIECE NO. 215-03C
PIECE NO. 215-03B
PIECE NO. 215-03A
WELD # D-10686

Table 22. Continued

HEAT_LST.DBF: Page 8	TAG	PLANT_ID	HEAT_ID	RPT_ID	HEAT_NO	PROD_ID	MAT_ID	SUPPLIER	THICKNESS	SOURCE	NPC_ID	NPC_HEAT	REF_ID	PAGES	NOTES
C	SL2	PSL201	M-605-1 (SURV.)		A8490-2	P	A53381	LUKENS		SCR			TR-L-MCH-001	8, 9, 10	
C	SL2	PSL202	M-605-2 (WELD & HAZ)		B3416-2	P	A53381	LUKENS		SCR			TR-L-MCH-001	8, 9, 10	
C	SL2	PSL203	M-605-3 (FOR WELD)		A8490-1	P	A53381	LUKENS		SCR			TR-L-MCH-001	8, 9, 10	
C	SL2	WSL201	M-605-2 AND M-605-3		83637	W	A53381	COMBUSTION ENG.		SIM			TR-L-MCH-001	8, 9, 10	
C	SL2	WSL202	M-605-1/M-605-2 HAZ			W	A53381	COMBUSTION ENG.		SIM			TR-L-MCH-001	8, 9, 10	
U	SO1	HSO101	W7601-6 AND W7601-3			HAZ	A3028		10.5"	CUTOUT	W28 3	W76019	WCAP-9520	4-1; A-5	ALSO SEE DOCKET 50-206
U	SO1	PSO101	W7601-1 (SURV.)	19585		P	A3028	LUKENS	10.5"	SCR	W29 1	W76011	DOCKET 50-206	TABLE 1	
U	SO1	PSO102	W7601-8 (SURV.)	A3099		P	A3028	LUKENS	10.5"	SCR	W29 2	W76018	DOCKET 50-206	TABLE 1	
U	SO1	PSO103	W7601-9 (SURV.)	A3119		P	A3028	LUKENS	10.5"	SCR	W29 3	W76019	DOCKET 50-206	TABLE 1	
U	SO1	PSO104	W7601-6 (FOR WELD)	A3099		P	A3028	LUKENS	10.5"	SCR			DOCKET 50-206	FIG. 1, TABLE 1	
U	SO1	PSO105	W7601-3 (FOR WELD)	A3110		P	A3028	LUKENS	10.5"	SCR			DOCKET 50-206	FIG. 1, TABLE 1	
U	SO1	WSO101	W7601-6 AND W7601-3			W	A3028		10.5"	CUTOUT	W28 2		WCAP-9520	4-1; 4-3	SEE DOCKET 50-206; SEAM 6-0608
C	SO2	HSO201	HAZ-AFFECTED-ZONE			HAZ	A53381		5"	SIM			BHI-1288	2; 7; 13	
C	SO2	PSO201	C6404-3			P	A53381	LUKENS	5"	SCR			BHI-1288	2; 7; 11; 109	
C	SO2	PSO202	C6404-1 (FOR WELD)			P	A53381	LUKENS	5"	SCR			BHI-1288	110	
C	SO2	WSO201	C6404-1 AND C6404-3			W	A53381		5"	SIM			BHI-1288	2; 7; 12; 110	
C	SO3	HSO301	HAZ OF C6802-1			HAZ	A53381	CE		FABR			WCAP-12920	4-2	
C	SO3	PSO301	C6802-1	C6802-1		P	A53381	CE		SCR			WCAP-12920	4-1	
C	SO3	PSO302	C6802-2 (FOR WELD)	C6802-2		P	A53381	CE		SCR			WCAP-12920	4-1; 4-5	
C	SO3	PSO303	C6802-3 (FOR WELD)	C6802-3		P	A53381	CE		SCR			WCAP-12920	4-1; 4-5	
C	SO3	WSO301	C6802-2 AND C6802-3			W	A53381	CE		FABR			WCAP-12920	4-2; 4-5	
U	SO1	FSO101	FRG 04 980919/281587	980919		F	A5082	RHEINSTAHL HÜTTEN	8.5"	SCR			WCAP-8233	2-1, A-1	
U	SO1	FSO102	FRG 05 980807/281489	980807		F	A5082	RHEINSTAHL HÜTTEN	8.5"	SCR			WCAP-8233	2-1, A-1	
U	SO1	NSO101	FROM FORGING 04			HAZ	A5082		8.5"	SIM			WCAP-8233	2-1	
U	SO1	USO101	FORGINGS 04 AND 05	25295		W	A5082	ROTTERDAM	8 1/2"	SIM			WCAP-8233	2-1, A-1	
U	SO2	FSO201	FRG 05 288757/981057	288757		F	A5082	RHEINSTAHL HÜTTEN	8.5"	SCR			WCAP-8513	2-1, A-1	
U	SO2	FSO202	FRG 04 990469/293323	990469		F	A5082	RHEINSTAHL HÜTTEN	8.5"	SCR			WCAP-8513	2-1, A-1	
U	SO2	HSO201	FROM FORGING 05	288757		HAZ	A5082		8.5"	SIM			WCAP-8513	2-1	
U	SO2	WSO201	FORGINGS 05 AND 04	4278		W	A5082	ROTTERDAM	8 1/2"	SIM			WCAP-8513	2-1, A-1	
U	SR1	HSR101	FROM B4197-2	B4197-2		HAZ	A53381	LUKENS		SCR			BAU-2083	3-1, 3-2, 3-3, 5-5	
U	SR1	PSR101	B4197-2	B4197-2		P	A53381	LUKENS		SCR			BAU-2083	3-1, 3-2, 3-3	
U	SR1	WSR101	SURVEILLANCE WELD	5P6771		W		CB&I		SIM			BAU-2083	3-2, 3-3, 5-5, C-9	
U	ST1	HST101	U-HAZ OF R1606-2			HAZ	A53381			SIM			WCAP-12629	4-1	
U	ST1	PST101	R1606-2			P	A53381			SCR			WCAP-12629	4-1	
U	ST1	PST102	R1606-3 (FOR WELD)			P	A53381			SCR			WCAP-12629	4-1	
U	ST1	WST101	R1606-2 AND R1606-3	V89476		W	A53381			SIM			WCAP-12629	4-1, 4-3	
U	SU1	NSU101	FROM C4415-1			HAZ	A53381		7 7/8"	SIM	W31 3		WCAP-7723	3, 35	
U	SU1	PSU101	C4415-1 (SURV.)	C4415-1		P	A53381	LUKENS	7 7/8"	SCR	W31 1	C44151	WCAP-7723	3, 35	
U	SU1	PSU102	C4326-1 (SURV.)	C4326-1		P	A53381	LUKENS	7 7/8"	SCR			WCAP-7723	3, 35	
U	SU1	WSU101	SA-1526	299L44		W	A53381	BABCOCK & WILCOX	7 7/8"	SIM	W31 2	299L44	DOCKET 50-280/1	TABLE 1	
U	SU2	HSU201	FROM C4339-1	C4339-1		HAZ	A53381	LUKENS	7 2/3"	SIM	W32 4	C43391	DOCKET 50-281	TABLE 5	
U	SU2	PSU201	C4339-1 (SURV.)	C4339-1		P	A53381	LUKENS	7 2/3"	SCR	W32 1	C43391	DOCKET 50-281	TABLE 5	
U	SU2	PSU202	C4208-2 (FOR WELD)	C4208-2		P	A53381	LUKENS	7 2/3"	SCR			DOCKET 50-281	TABLE 5	
U	SU2	WSU201	C4339-1 AND C4208-2	0227		W	A53381	ROTTERDAM	7 2/3"	SIM	W32 3	0227	DOCKET 50-281	TABLE 1	
G	TA1	PTA101	S-11403-T	S-11403-3		P	A3028	COMBUSTION ENG.	5"				FELR 200.65.414.1	ATTACHMENT, PG. 1	
G	TA1	UTA101				W	A3028		5"				FELR 200.65.414.1	1	NO DATA GIVEN
B	TM1	NTM101	FROM C-2789-2	C2789-2		HAZ	A3028	LUKENS	8 3/4"	SCR	B09 3	C27892	BAU-1820	4-15, 4-18	
B	TM1	NTM101	FROM C2789-2	C2789-2		HAZ	A3028	LUKENS		SCR			BAU-1901	3-1; 3-2	ALSO IDENTIFIED AS A53381
B	TM1	NTM102	FROM C-3307-1	C3307-1		HAZ	A3028	LUKENS	8 3/4"	SCR			BAU-1820	4-15, 4-18	
B	TM1	PTM101	C-2789-2 (SURV.)	C2789-2		P	A3028	LUKENS	8 3/4"	SCR	B09 1	C27892	BAU-1820	4-15, 4-18	
B	TM1	PTM101	C2789-2 (SURV.)	C2789-2		P	A3028	LUKENS		SCR			BAU-1901	3-1; 3-2; 7-10	ALSO IDENTIFIED AS A53381
B	TM1	PTM102	C-3307-1 (SURV.)	C3307-1		P	A3028	LUKENS	8 3/4"	SCR			BAU-1820	4-15, 4-18	
B	TM1	UTM101	WF-25	299L44		W	A3028	UNION CARBIDE	8 3/4"	SCR	B09 4	WF25	BAU-1820	4-15, 4-18	
B	TM1	UTM101	WF-25	299L44		W	A3028	UNION CARBIDE		SCR			BAU-1901	3-1; 3-2; 7-10	ALSO IDENTIFIED AS A53381
B	TM2	PTM201	C1946-2 (SURV.)	C1946-2		P	A53381	LUKENS	8 3/4"	SCR			BAU-1543/R2	A-6	
B	TM2	PTM202	C1937-2 (SURV.)	C1937-2		P	A53381	LUKENS	8 3/4"	SCR			BAU-1543/R2	A-6	

Table 22. Continued

HEAT_LIST.dbf: Page 9	TAG	PLANT_ID	HEAT_ID	RPT_ID	HEAT_NO	PROD_ID	MAT_ID	SUPPLIER	THICKNESS	SOURCE	NPC_ID	NPC_HEAT	REF_ID	PAGES	NOTES
	B	1N2	UTN201	WF-182-1		M	A53381	BETHLEHEM STEEL	8 3/4"	SCR			BAM-1543/R2	A-6	
	M	TP3	FTP301	123P461VA1 (SURV.)	123P461VA1	F	A5082	BETHLEHEM STEEL	7 7/8"	SCR	M35 2	123P461	WCAP-7656	4, 37	
	M	TP3	FTP302	123S266VA1 (SURV.)	123S266VA1	F	A5082	BETHLEHEM STEEL	7 7/8"	SCR	M35 1	123S266	WCAP-7656	4, 37	
	M	TP3	HTP301	FROM 123P461VA1	123P461VA1	HAZ	A5082		7 7/8"	SCR	M34 3		WCAP-7656	4, 38	
	M	TP3	WTP301	123P461 AND 123S266	71249	M	A5082	BARCOCK & WILCOX	7 7/8"	SCR	M34 2		WCAP-7656	4, 37	
	M	TP4	FTP401	122S180VA1 (SURV.)	122S180VA1	F	A5082	BETHLEHEM STEEL	7 7/8"	SCR	M37 1	122S180	SMR1-02-4221	8, 10	
	M	TP4	FTP402	123P481VA1 (SURV.)	123P481VA1	F	A5082	BETHLEHEM STEEL	7 7/8"	SCR	M37 2	123P481	SMR1-02-4221	8, 10	
	M	TP4	HTP401	FROM 123P481VA1	123P481VA1	HAZ	A5082		7 7/8"	SCR	M36 3		WCAP-7660	4, 37	
	M	TP4	WTP401	122S180 AND 123P481	71249	M	A5082	BARCOCK & WILCOX	7 7/8"	SCR	M36 2		SMR1-02-4221	8	
	M	TRO	HTRO01	FROM C5583-1	C5583-1	HAZ	A53381		8 3/4"	SCR	M33 3	C55831	WCAP-10061	4-1, A-7	
	M	TRO	PTRO01	C5583-1 (SURV.)	C5583-1	P	A53381	LUKENS	8 3/4"	SCR	M33 1	C55831	DOCKET 50-344	TABLE 5	
	M	TRO	PTRO02	C5587-1 (FOR WELD)	C5587-1	P	A53381	LUKENS	8 3/4"	SCR			WCAP-8426	2-1, A-1	
	M	TRO	WTR001	C5583-1 AND C5587-1	S3986	M	A53381	CHICAGO BRIDGE	8 3/4"	SCR	M33 2	S3986	DOCKET 50-344	TABLE 1	
	M	VO2	HVO201	WELD-HAZ OF 88628-1		HAZ	A53381			FABR			WCAP-13007	3-1, 4-1; 4-3	
	M	VO2	PVO201	88628-1 (SURV.)		P	A53381	LUKENS		SCR			WCAP-13007	3-1, 4-1; 4-3	
	M	VO2	PVO202	88825-1 (WELD & HAZ)		P	A53381	LUKENS		SCR			WCAP-13007	3-1, 4-1; 4-3	
	M	VO2	HVO201	88628-1 AND 88825-1	87005	M	A53381			FABR			WCAP-13007	3-1, 4-1; 4-3	REPRESENTATIVE OF INT-LOW WELD
	M	V51	HVS101	FROM A9154-1	A9154-1	HAZ	A53381		8"	SIM			WCAP-9234	2-1	
	M	V51	PVS101	A9154-1 (SURV.)	A9154-1	P	A53381	LUKENS	8"	SCR			WCAP-9234	2-1, A-1	
	M	V51	PVS102	C9923-2 (FOR WELD)	C9923-2	P	A53381	LUKENS	8"	SCR			WCAP-9234	2-1, A-1	
	M	V51	HVS101	A9154-1 AND C9923-2	4P4784	M	A53381	CHICAGO BRIDGE	8"	SIM			WCAP-9234	2-1, A-1	
	G	VY	HVY_01			HAZ	A53381			SCR			BCL-585-84-1	4	
	G	VY	PVY_01	PC. 1-14	C3017-2	P	A53381	LUKENS		SCR			BCL-585-84-1	4	PIECE 1-14
	G	VY	WVY_01			M	A53381	CHICAGO BRIDGE		SCR			BCL-585-84-1	4	SHIELDED METAL ARC WELD
	M	WB1	FWB101	FORGING 05 (SURV.)	527536	F	A5082	RHEINSTAHL MÜTTEH	8.5"	SCR			WCAP-9298	2-1, A-1	
	M	WB1	FWB102	FORG. 04 (FOR WELD)	528522	F	A5082	RHEINSTAHL MÜTTEH	8.5"	SCR			WCAP-9298	2-1	
	M	WB1	HWB101	FROM FORGING 05	527536	HAZ	A5082		8.5"	SIM			WCAP-9298	2-1	
	M	WB1	HWB101	FORGING 05 AND 04	899680	M	A5082	ROTTERDAM	8 1/2"	SIM			WCAP-9298	2-1, A-1, A-2	
	M	WC1	HWC101	FROM R2508-3		HAZ	A53381		9 5/8"	SIM			WCAP-11553	4-1, A-15	
	M	WC1	PWC101	R2508-3 (SURV.)	C4935-2	P	A53381	LUKENS	9 5/8"	SCR			WCAP-10015	2-1, A-1	
	M	WC1	PWC102	R2508-1 FOR M & HAZ	88759-2	P	A53381	LUKENS	9 5/8"	SCR			WCAP-10015	2-1, A-1	
	M	WC1	PWC103	R2508-2	C4840-2	P	A53381	LUKENS	9 5/8"	SCR			WCAP-10015	A-2	
	M	WC1	HWC101	R2508-3 AND R2508-1	90146	M	A53381	COMBUSTION ENG.	9 5/8"	SIM			WCAP-10015	2-1, A-1	
	C	WF3	HWF301	HAZ OF M-1004-2	57286-1	HAZ	A53381	CE		SCR			BAM-2177	3-1; 3-2	
	C	WF3	PWF301	M-1004-2	57286-1	P	A53381	CE		SCR			BAM-2177	3-1; 3-2; 7-9	
	C	WF3	HWF301	101-171	88114	M	A53381	CE		SCR			BAM-2177	3-1; 3-2; 7-9; A-4	
	M	YR	PYR_01	MELT 19281, MARK 8	19281-2	P	A3028	LUKENS	8 1/8"	SCR	M38 3	19281	JOE 12	898	
	M	YR	SASTH E1	ASTH PLATE	A0421	SRM	A3028	U.S. STEEL CORP.	6"	FABR	E1121		JOE 12	898	
	M	ZN1	HZN101	FROM 87835-1	87835-1	HAZ	A53381		9 3/4"	SCR	M39 4	878351	WCAP-8064	2-1	
	M	ZN1	PZN101	87835-1 (SURV.)	87835-1	P	A53381	LUKENS	9 3/4"	SCR	M39 2	878351	WCAP-8064	2-1	
	M	ZN1	HZN101	87835-1 (2 PIECES)	72105	M	A53381	BARCOCK & WILCOX	9 3/4"	SCR	M39 3	72105	WCAP-8064	2-1, A-1	
	M	ZN2	HZN201	FROM C4007-1	C4007-1	HAZ	A53381		9 3/4"	SCR	M41 4	C40071	WCAP-8132	2-1	
	M	ZN2	PZN201	C4007-1 (SURV.)	C4007-1	P	A53381	LUKENS	9 3/4"	SCR	M41 1	C40071	SMR1-06-6901-001	7	
	M	ZN2	HZN201	C4007-1 (2 PIECES)	72105	M	A53381	BARCOCK & WILCOX	9 3/4"	SCR	M41 3	72105	WCAP-8132	2-1, A-1	

Table 23. Par

CHEM_PR.dbf: Page 1

TAG	PLANT_ID	HEAT_ID	PROD_ID	MAT_ID	CHEM_LAB	METHOD	SPEC_ID	C	MM	P	S	SI	NI	CR	MO
W	AD1	FAD101	F	A5082	WESTINGHOUSE		HEAT								
W	AD1	FAD101	F	A5082	B&W		HEAT								
W	AD1	FAD101	F	A5082	LADISH		HEAT	0.210	0.600	0.012	0.009	0.230	0.740	0.320	0.0
W	AD1	WAD101	W	A5082	B&W		HEAT	0.130	1.400	0.005	0.005	0.310	0.560	0.150	0.0
W	AL2	PAL201	P	A53381			HEAT	0.260	1.330	0.009	0.018	0.220	0.560	0.060	0.0
W	AL2	VAL201	V	A53381			HEAT	0.150	1.130	0.004	0.011	0.190	0.040	0.050	0.0
B	AN1	PAN101	P	A53381	LUKENS		HEAT	0.210	1.320	0.010	0.016	0.200	0.520	0.190	0.0
B	AN1	PAN102	P	A53381	LUKENS		HEAT	0.210	1.320	0.010	0.016	0.200	0.520	0.190	0.0
B	AN1	SHSS02	SRM	A53381			HEAT	0.230	1.390	0.013	0.013	0.210	0.640		0.0
B	AN1	WAN101	W	A53381			HEAT	0.065	1.500	0.016	0.008	0.420	0.590		0.0
B	AN1	WAN101	W	A53381	UCC		HEAT	0.090	1.490	0.016	0.016	0.510	0.590	0.060	0.0
C	AN2	PAN201	P	A5338	BATTELLE	ICAP, MO-BLUE-PHOTO FOR P	13T	0.078		0.012			0.559		
C	AN2	PAN201	P	A5338	BATTELLE	ICAP, MO-BLUE-PHOTO FOR P	14M	0.077		0.013			0.548		
C	AN2	PAN201	P	A5338	BATTELLE	ICAP, MO-BLUE-PHOTO FOR P	21U	0.075		0.015			0.545		
C	AN2	PAN201	P	A5338	BATTELLE	ICAP, MO-BLUE-PHOTO FOR P	264	0.078		0.015			0.555		
C	AN2	PAN201	P	A5338	BATTELLE	ICAP, MO-BLUE-PHOTO FOR P	257	0.078		0.014			0.559		
C	AN2	WAN201	W	A5338	BATTELLE	ICAP, MO-BLUE-PHOTO FOR P	315	0.046		0.008			0.090		
C	AN2	WAN201	W	A5338	BATTELLE	ICAP, MO-BLUE-PHOTO FOR P	344	0.047		0.008			0.088		
C	AN2	WAN201	W	A5338	BATTELLE	ICAP, MO-BLUE-PHOTO FOR P	37J	0.045		0.008			0.075		
C	AN2	WAN201	W	A5338	BATTELLE	ICAP, MO-BLUE-PHOTO FOR P	356	0.044		0.008			0.082		
C	AN2	WAN201	W	A5338	BATTELLE	ICAP, MO-BLUE-PHOTO FOR P	33J	0.045		0.008			0.081		
W	AS1	PAS101	P	A53381			HEAT	0.240	1.560	0.008	0.015	0.230	0.560	0.030	0.0
W	AS1	WAS101	W	A53381			HEAT	0.150	1.250	0.011	0.013	0.170	0.270	0.040	0.0
W	AS2	PAS201	P	A53381			HEAT	0.220	1.370	0.007	0.008	0.270	0.610	0.030	0.0
W	AS2	WAS201	W	A53381			HEAT	0.150	1.290	0.005	0.007	0.150	0.050	0.020	0.5
G	BR	PBR_01	P	A3028			HEAT	0.300	1.420	0.016	0.018	0.250	0.180	0.130	0.5
G	BR	WBR_01	W	A3028			HEAT	0.120	1.250	0.014	0.012	0.280	0.100	0.190	0.5
W	BV1	PBV101	P	A53381			HEAT	0.200	1.310	0.010	0.015	0.180	0.540	0.140	0.5
W	BV1	WBV101	W	A53381			HEAT	0.110	1.370	0.018	0.006	0.270	0.620	0.015	0.4
W	BV1	WBV101	W	A53381			DU63	0.124	1.420	0.008	0.004	0.277	0.637	0.029	
G	BW1	PBW101	P	A53381	LUKENS		HEAT	0.250	1.400	0.007	0.016	0.270	0.600		0.5
G	BW2	PBW201	P	A53381	LUKENS		HEAT	0.230	1.500	0.010	0.015	0.270	0.560		0.5
H	BZ1	PBZ101	P				HEAT	0.185	1.160	0.014	0.011	0.190	0.710	0.240	
W	BZ1	PBZ101	P				HEAT								
W	BZ1	PBZ102	P				HEAT	0.185	1.160	0.014	0.011	0.190	0.710	0.240	
W	BZ1	PBZ102	P				HEAT								
W	BZ1	SASTM	SRM				HEAT	0.240	1.340	0.011	0.023	0.230			0.5
W	CAB	PCAB01	P	A53381			HEAT	0.200	1.290	0.013	0.022	0.250	0.500		0.4
W	CAB	PCAB02	P	A53381			HEAT	0.210	1.240	0.011	0.020	0.240	0.530		0.4
W	CAB	SASTM	SRM	A3028			HEAT	0.240	1.340	0.011	0.023	0.230	0.180		0.5
W	CAB	WCAB01	W	A53381			HEAT	0.170	1.250	0.015	0.011	0.320	0.110		0.5
W	CAB	WCAB01	W	A53381			W5		1.510	0.021		0.245	0.063		0.2

NOTE: Due to the large number of fields and limited page space, not all fields are displayed here.

	CU	V	B	CS	TI	CO	N	AS	ZR	AL	AL_SOL	AL_INT	PB	W	SN	REF_ID	PAGES	NOTES
										- .009						SWRI-06-8976	9	AL = -.009 ?
	0.040				<0.01		0.007							<0.01	-.009	WCAP-8957	A-1; A-2	SN = -.009 ?
30	0.010					0.010										SWRI-06-8976	9	
30	0.030	<0.01			0.020	<0.01	.0138			<0.01				<0.01	<0.01	WCAP-8957	A-1; A-2	
10	0.060	0.002			<0.01	0.007	0.007	0.004	<.001	0.042				<0.01	0.004	WCAP-9228	A-2	PLATE 89405-1
10	0.050	0.005			<0.01	0.005	0.003	0.004	<.001	<.001				<0.01	0.001	WCAP-9228	A-2	HEAT NO. 83642, FLUX LOT 3536
10	0.150					0.012										BAW-1820	4-29; 4-30	
10	0.150					0.012										BAW-1820	4-29; 4-30	
10	0.170															BAW-1836	3-5	HEAT A1195-1; PER ORNL-4463 ?
10	0.190															BAW-1836	3-4	WF-193; PER QUAL. TEST REPORT
10	0.280															BAW-1820	4-29; 4-30	USED FOR DATA ANALYSIS
		0.009														BM1-0584	16	HEAT C8009-3
		0.008														BM1-0584	16	HEAT C8009-3
		0.006														BM1-0584	16	HEAT C8009-3
		0.008														BM1-0584	16	HEAT C8009-3
		0.009														BM1-0584	16	HEAT C8009-3
		0.009														BM1-0584	16	HEAT C8009-1
		0.009														BM1-0584	16	C8009-1
		0.006														BM1-0584	16	HEAT C8009-1
		0.004														BM1-0584	16	HEAT C8009-1
		0.007														BM1-0584	16	HEAT C8009-1
0	0.040	0.004			<0.01	0.003	0.010	0.004	<.001					<0.01	0.001	WCAP-9308	A-2	PLATE B9605-2
0	0.040	0.004			<0.01	0.007	0.011	0.006	0.002	0.004				0.010	0.004	WCAP-9308	A-2	HEAT NO. 83650, FLUX LOT 1122
0	0.050	0.005			<0.01	0.012	0.008	0.005	<.001	0.028				<0.01	0.004	WCAP-9330	A-2	PLATE R408-1
0	0.020	0.005			<0.01	0.007	0.013	<.001	<.001	<.001				<0.01	0.001	WCAP-9330	A-2	HEAT NO. 4P6051, FLUX LOT 0145
0	0.100	0.020														WCAP-9794	4-2	HEAT 192462
0	0.270	0.030														WCAP-9794	4-2	
0	0.200	0.001				0.014	0.004			0.028				0.010		WCAP-10867	4-3	PLATE B6903-1
0	0.260	0.001				0.014	0.014			0.010				0.008		WCAP-10867	4-3	AS DEPOSITED WELD
0	0.230	0.008				0.009				0.028				0.010		WCAP-10867	4-3	AS DEPOSITED WELD
0	0.120															WEDO-24161	5; 8	PIECE NO. 301; HEAT NO

Table 24. Partia

HEAT_PR.dbf: Page 1

TAG	PLANT_ID	HEAT_ID	PROD_ID	SUPPLIER	HEAT_TREAT	HEAT_NO	SUPPL_ID	MINTEMP_1	MAXTEMP_1	RANGE_1	HOURS_1	QCHM_1	ID_1	MINTEMP_2	MAXTEMP_2
C		SHSS01	SRM	LUKENS	COMBUSTION ENG.	A10081	HSST01	1600	1750		4.00	AC	N	1500	1650
W	AD1	FAD101	F	LADISH		ANH161		1590		10	3.00	WQ	A	1250	
W	AD1	FAD101	F	LADISH			ANH161	1590		10	3.00	WQ	A	1250	
W	AD1	WAD101	W	B&W				1150		25	21.00	FC	R		
W	AL2	PAL201	P	LUKENS			B94051	1600		25	4.00	WQ	A	1225	
W	AL2	WAL201	W	LUKENS		83642		1100	1150		13.00	FC	R		
B	AN1	PAH101	P			C51141		1550	1600		4.50	BQ	A	1200	1225
B	AN1	PAH101	P	LUKENS	LUKENS	C5114-1	C5114-1	1650	1700		1 H/1H	WQ	A	1200	
B	AN1	PAH101	P	LUKENS		C5114-1		1650	1770		1 H/1H	WQ	A	1200	
B	AN1	PAH102	P			C51142		1550	1600		4.50	BQ	A	1200	1225
B	AN1	PAH102	P	LUKENS	LUKENS	C5114-2	C5114-2	1650	1700		1 H/1H	WQ	A	1200	
B	AN1	PAH102	P	LUKENS		C5114-2		1650	1770		1 H/1H	WQ	A	1200	
B	AN1	SHSS02	SRM	LUKENS	COMBUSTION ENG.	A11951	HSST02	1675		75			N	1600	
B	AN1	SHSS02	SRM	LUKENS	COMBUSTION ENG.	A11951	HSST02	1600		75	4.00	WQ	A	1225	
B	AN1	WAN101	W				WF193	1100	1150		27.50	FC	R		
B	AN1	WAN101	W	UNION CARBIDE	UNION CARBIDE	406L44	WF 193	1100	1150		29.00	FC	R		
B	AN1	WAN101	W				WF-193	1100	1150		29.00	FC	R		
W	AS1	PAS101	P	LUKENS			B96052	1600		25	4.00	WQ	A	1225	
W	AS1	WAS101	W	LUKENS		83650		1140		25	22.00	FC	R		
W	AS2	PAS201	P	LUKENS			R4081	1600		25	4.00	WC	A	1225	
W	AS2	WAS201	W	LUKENS		4P6052		1140		25	6.00	FC	R		
G	BR	PBR_01	P	LUKENS	COMBUSTION ENG.	192462/3	S55032	1650	1700			WQ	A	1200	1250
G	BR	WBR_01	W	COMBUSTION ENG.	COMBUSTION ENG.	192462	S55032	1125		25	20.00	FC	R		
W	BV1	PBV101	P	LUKENS	COMBUSTION ENG.	C63171	B69031	1500	1650		4.00	WQ	A	1200	1250
W	BV1	PBV101	P	LUKENS		C63171	B69031	1550	1650		4.00	WQ	A	1220	1250
W	BV1	WBV101	W	LUKENS	COMBUSTION ENG.			1150		25	15.00	FC	R		
W	BV1	WBV101	W	COMBUSTION ENG.		305424		1125	1175		40.00	FC	R		
G	BW1	PBW101	P	LUKENS		C4489	PIECE 301	1650		25	5.50	WQ	A	1220	
G	BW2	PBW201	P	LUKENS		C4887	PIECE 301	1650		25	5.50	WQ	A	1220	
W	CAB	PCAB01	P				B11051	1550	1600		4.00	WC	A	1225	
W	CAB	PCAB02	P				B11052	1550	1600		4.00	WC	A	1225	
W	CAB	SASTM	SRM	U.S. STEEL	U.S. STEEL	C40071	ASTM PLATE	1650			4.00	WQ	A	1200	
W	CAB	WCAB01	W					1150			24.00	FC	R		
W	CB1	FCB101	F	ROTTERDAM		411343	FORGING 05	1679	1697		3.50	WQ	A	1220	1247
W	CB1	FCB101	F			411343	FORGING 05	1679	1697		3.50	WQ	A	1220	1247
W	CB1	WCB101	W	ROTTERDAM		B95075		1140		25	15.00	FC	R		
W	CB1	WCB101	W			B95075		1115	1165		15.00	FC	R		
C	CC1	PCC103	P	LUKENS	COMBUSTION ENG.	C44411	D72063	1575		25	4.00	WQ	A	1225	
C	CC1	WCC101	W	COMBUSTION ENG.		33A277		1125		25	40.00		R		
C	CC2	PCC202	P	LUKENS	COMBUSTION ENG.	C52861	D89072	1575		25	4.00	WQ	A	1225	
C	CC2	WCC201	W	COMBUSTION ENG.		10137		1125		25	40.00		R		
W	CK1	PCX101	P				B44063	1600			4.00	WQ	A	1225	

NOTE: Due to the large number of fields and limited page space, not all fields are displayed here.

. listing of HEAT_PR.dbf

RANGE_2	HOURS_2	QCHM_2	ID_2	MINTEMP_3	MAXTEMP_3	RANGE_3	HOURS_3	QCHM_3	ID_3	TEMP_U	REF_ID	PAGES	NOTES
10	4.00	WQ	A	1200	1250		4.00	AC	T	F	ORNL-4313	5; 19-32	
10	4.50	AC	T	1150		25	21.00	LC	R	F	WCAP-8957	A-1	
10	4.50	AC	T	1150		25	21.00	FC	R	F	SWRI-06-8976	9	
										F	WCAP-8957	A-1	
25	4.00		T	1150		25	40.00	FC	R	F	WCAP-9228	A-1	
										F	WCAP-9228	A-1	
	5.00	BQ	T	1100	1150		40.00	FC	R	F	BAW-1440	3-3	PER CERTIFICATE OF TEST
1	N/IN	AC	T	1550	1600		4.50	BQ	A	F	BAW-1820	4-30	PROBABLY SECOND AUS. AND TEMP.
1	N/IN	AC	T	1100	1150		60.00	FC	R	F	BAW-1543/R2	A-7	
	5.00	BQ	T	1100	1150		40.00	FC	R	F	BAW-1698	3-3	PER CERTIFICATE OF TEST
1	N/IN	AC	T	1550	1600		4.50	BQ	A	F	BAW-1820	4-30	PROBABLY SECOND AUS. AND TEMP.
1	N/IN	AC	T	1100	1150		60.00	FC	R	F	BAW-1543/R2	A-7	
75	4.00	WQ	A	1225		25	4.00	FC	T	F	BAW-1698	3-1; 3-4	PER IDENTIFICATION CARD
25	4.00	FC	T	1125		25	40.00	FC	R	F	BAW-1820	4-30	
										F	BAW-1440	3-3	PER WELD CERTIFICATION
										F	BAW-1820	4-30	
										F	BAW-1543/R2	A-7	
25	4.00	AC	T	1140		25	28.75	FC	R	F	WCAP-9308	A-1	
										F	WCAP-9308	A-1	PLATES B9605-2 AND B9605-1
25	4.00	AC	T	1140		25	29.00	FC	R	F	WCAP-9330	A-1	
		FC	T	1600		25	4.00	BQ	A	F	GEGR-4442	C-2; C-3	PLATES R408-1 AND R407-2
										F	GEGR-4442	C-3; D-1	PLATES S55032 AND S55033
	4.00	AC	T	1125		25	40.00	FC	R	F	WCAP-8457	A-1	
	4.00	AC	T	1125	1175		40.00	FC	R	F	DOCKET 50-334	TABLE 4	
										F	WCAP-8457	2-1; A-1	
										F	DOCKET 50-334	TABLE 1	
10	5.50	AC	T	1150		25	50.00	FC	R	F	NEDO-24161	6; 7; 13	
10	5.50	AC	T	1150		25	50.00	FC	R	F	NEDO-24157/R1	6; 7; 13	
	4.00	AC	T	1150			24.00	FC	R	F	WEIX/76/64	4-1	
	4.00	AC	T	1150			24.00	FC	R	F	WEIX/76/64	4-3	
	6.00	AC	T							F	WEIX/76/64	4-1; 4-4	
										F	WCAP-10185	4-3	
	6.00	AC	T	1140		25	22.00	FC	R	F	WCAP-9734	2-1; A-1	
	6.00	AC	T	1115	1165		22.00	FC	R	F	WCAP-11527	4-1; 4-4	
										F	WCAP-9734	A-1	
										F	WCAP-11527	4-3; 4-4	
25	4.00		T	1150		25	40.00	FC	R	F	DOCKET 50-317	4; 6; 35	
										F	DOCKET 50-317	6; 36	
25	4.00	T		1150		25	40.00	FC	R	F	DOCKET 50-318	4; 6; 62	
										F	DOCKET 50-318	6; 63	
	4.00	AC	T	1150			40.00	FC	R	F	SWRI-02-4770	9	

Table 25. Partial listing of WELD_PR.dbf

WELD_PR.dbf: Page 1													PAGES		NOTES
TAG	PLANT_ID	HEAT_ID	WLD_TYPE	WLD_CODE	HEAT_1	HEAT_2	WELD_SUPPLY	WIRE_TYPE	WIRE_HEAT	FLUX_TYPE	FLUX_LOT	REF_ID			
V	AD1	WAD101	SAW	WF-268	FAD101	FAD102	B&W	MN-MO-WI	82912	L0091	3490	SWR1-06-8976	5;	9	FROM ANH161 AND ANH153
V	AL2	WAL201	SAW	G1.42	PAL201	PAL202	COMBUSTION ENG.	B-4	83642	L0091	3536	WCAP-9228	A-1;	A-2	FROM B9405-1 AND B9405-2
B	AN1	WAN101		WF-193			UNION CARBIDE		406144	L80	8773	BAW-1820	4-30		
C	AN2	WAN201	SAW		PAN202	PAN203	COMBUSTION ENG.	B-4 MOD	83650	L0091	1122	CE-A-MCM-106	3;	7	PLATES C8009-1 AND C8009-2
V	AS1	WAS101	SAW	G1.55	PAS101	PAS102	COMBUSTION ENG.	B-4	83650	L0091	1122	WCAP-9308	A-1;	A-2	FROM B9605-2 AND B9605-1
V	AS2	WAS201	SAW	G1.72	PAS201	PAS202	COMBUSTION ENG.	B-4	4P6052	L0091	0145	WCAP-9330	A-1;	A-2	FROM R408-1 AND R407-2
G	BR	WBR_01			PBR_01	PBR_01	COMBUSTION ENG.					GEGR-4442	C-1		PLATES 19246-2 AND 19246-3
V	BV1	WBV101	SAW	M1.34	PBV102	PBV103	COMBUSTION ENG.	B-4 MOD	305424	L1092	3889	WCAP-8457	2-1;	A-1	FROM B6607-1 AND B6607-2
V	CAB	WCAB01	SAW		PCAB03	PCAB04	COMBUSTION ENG.		1248			WENX/76/64	4-1		FROM B1106-1 AND B1106-2
V	CB1	WCB101	SAW	R747	PCB101	PCB102	ROTTERDAM	GRAU LO	895075	LV320	P46	WCAP-9734	A-1		FROM FORGINGS 04 AND 05
C	CC1	WCC101	SAW		PCC101	PCC102	COMBUSTION ENG.	B-4	33A277	L0091	3922	DOCKET 50-317	5;	36	PLATES D-7206-1 AND D-7206-2
C	CC2	WCC201	SAW		PCC201	PCC203	COMBUSTION ENG.	B-4 MOD	10137	L0091	3995	DOCKET 50-318	5;	63	PLATES D-8907-1 AND D-8907-3
V	CK1	WCK101	SAW	M1.13	PCK101	PCK102	COMBUSTION ENG.	B-4 MOD	13253	L11	3791	SWR1-02-4770	7		FROM B4406-3 AND B4406-1
V	CK2	WCK201	SAW		PCK201	PCK202	CHICAGO BRIDGE	ADCOM INMM	S3986	L124	934	SWR1-06-8888	6;	8; 10	FROM C5521-2 AND C5592-1
V	CL1	WCL101	SAW	E3.14	PCL101	PCL102	COMBUSTION ENG.	B-4	90077	L124	1061	WCAP-9842	A-1		FROM R2708-1 AND R2707-1
G	CPR	WCPR01	SAW		PCPR01	PCPR02	COMBUSTION ENG.					MDE-103-0986	3-6;	3-8	
B	CR3	WCR301	SAW	ATYPICAL			AMERICAN CHAIN			L80	8773	BAW-1820	4-24		ATYPICAL WELD
B	CR3	WCR302	SAW	WF-209-1			AMERICAN CHAIN		72105	L80	8773	BAW-1820	4-24		WF-209-1
V	CTY	WCTY01	SAW	M2.08	PCTY01	PCTY08	COMBUSTION ENG.	RACO 3	860548	ARCO 85	3K2F	BMI-0372	A-4		WELD CODE M2.08 AND P1.04
G	DAC	WDAC01	SMA		PDAC01	PDAC01	CHICAGO BRIDGE					NEDC-31166/R1	3-2;	3-3	
B	DB1	WDB101	SAW	WF-182-1	FDB101	FDB102	UNION CARBIDE		821144	L80	8754	BAW-1820	4-48		WF-193
V	DC1	WDC101	SAW	M1.07	PDC101	PDC103	COMBUSTION ENG.	B-4 MOD	27204	L1092	3714	WCAP-11567	4-3		TANDEM HEATS 27204 AND 12008
V	DC2	WDC201	SAW	M1.30	PDC201	PDC202	COMBUSTION ENG.	B-4 MOD	21935	L1092	3869	WCAP-11851	4-3		TANDEM HEATS 21935 AND 12008
G	DR1	WDR101	SAW		PDR101			E801882		L80		DOCKET 50-10	3;	6	OXWELD #40 TYPE
G	DR2	WDR201	ESW									SWR1-06-6901-002	7		
G	DR2	WDR202	SAW									SWR1-06-6901-002	7		
G	DR3	WDR301	ESW									SWR1-06-7484-003	5		
G	DR3	WDR302	SAW									SWR1-06-7484-003	5		
V	FA1	WFA101	SAW	G1.03	PFA101	PFA102	COMBUSTION ENG.	B-4	33A277	L0091	3922	WCAP-11563/R1	4-3		FROM B6919-1 AND B6903-2
V	FA2	WFA201	SMA	A1.40	PFA201	PFA202	COMBUSTION ENG.	E8018C3	BOLA			WCAP-11438	4-3		FROM B7212-1 AND B7203-1
C	FC1	WFC101	SAW		PFC102	PFC103	COMBUSTION ENG.	B-4	305414	L1092	3833	TR-O-MCM-001/R1	4;	6	D4802-1 & D4802-3; SEAM #9-410
G	FTZ	WFTZ01	SAW		PFTZ01	PFTZ02	COMBUSTION ENG.			L1092		MDE-49-0386	3-2;	3-8	
G	GAR	WGAR01			FGAR02	FGAR03						NEDC 26	314		HEATS 1675 AND 2686
V	GIM	WGIM01	SAW	SA-1036	FGIM01	FGIM02	B&W	MN-MO-WI	61782	L80	8436	BAW-1803	3-3;	3-6	FROM 125P666 AND 125S255
G	HA1	WHA101	SAW	PHA101	PHA102		COMBUSTION ENG.	RACO 3 +WI	W5214	L1092	3617	NEDC-30997	3-6;	3-8	PLATES G-4804-1 AND G-4804-2
V	H82	WHB201	SAW	M2.01	PHB204	PHB205	COMBUSTION ENG.	RACO 3 +WI	W5214	L1092	3600	DOCKET 50-261	TABLE 1		HT. U5214/N7753A RACO 3 +N1200
G	HM3	WHM301			PHM301		COMBUSTION ENG.					GEGR-4443	D-1;	D-2	2 PCS. S-4201-2
V	IP2	WIP201	SAW	P1.50	PIP201	PIP203	COMBUSTION ENG.	RACO 3 +WI	W5214	L1092	3692	DOCKET 50-247	TABLE 1		HT. U5214/N7048A RACO 3 +N1200
V	IP3	WIP301	SAW				COMBUSTION ENG.	RACO 3 +WI	W5214	L1092	3692	WCAP-10300	4-5		HT. U5214/N7753A RACO 3 +N1200
V	KO1	WKO101	SAW	WF-233			B&W	MN-MO-WI	T29744	L80	8790	SWR1-17-7517-219	6;	11	FROM 124V375 AND 122X371
V	KVE	WKVE01	SAW	M1.42	FKVE01	FKVE02	COMBUSTION ENG.	B-4 MOD	1P3571	L1092	3958	DOCKET 50-305/C	TABLE 1		FROM 122X208VA1 AND 123X167VA1
A	LAC	WLAC01			PLAC02	PLAC03	ALLIS CHALMERS					SWR1-02-4074-001	A-5		FOR CHARPY
A	LAC	WLAC02			PLAC04	PLAC05	ALLIS CHALMERS					SWR1-02-4074-001	A-6		FOR MINIATURE TENSILE & CHARPY
V	LM2	WLM201	SAW	WF-407	FLM201	FLM202	B&W	MN-MO-WI	442002	L80	8968	WCAP-9329	A-1;	A-2	FROM 123J398 AND 122J333
V	MC1	WMC101	SAW	M1.22	PMC101	PMC102	COMBUSTION ENG.	B-4 MOD	20291	L1092	3854	WCAP-9195	2-1		TANDEM HEATS 20291 AND 12008
V	MC2	WMC201	SAW	L747	PMC201		ROTTERDAM	GRAU LO	895075	LV320	P46	WCAP-11029	4-1;	4-2	FROM FORGINGS 04 AND 05
G	ML1	WML101	SAW		PLM103		COMBUSTION ENG.		348009	L1092		NEDC-30833	3-2;	3-8	

Table 26. Partial listing of HAZ_PR.dbf

HAZ_PR.dbf: Page 1							
TAG	PLANT_ID	HEAT_ID	HEAT_B	HEAT_W	REF_ID	PAGES	NOTES
W	AD1	HAD101	FAD101	WAD101	WCAP-8957	3-1	W-HAZ OF ANH161
W	AL2	HAL201	PAL201	WAL201	WCAP-9228	2-1	FROM W-HAZ OF PLATE B9405-1
B	AN1	HAN101	PAN101		BAW-1440	3-2	FROM PLATE C-5114-1 LONG.
B	AN1	HAN102	PAN102		BAW-1698	3-2	FROM PLATE C-5114-2 LONG.
C	AN2	HAN201	PAN201		BMI-0584	14	FROM HEAT C-8009-3
W	AS1	HAS101	PAS101	WAS101	WCAP-9308	2-1	FROM W-HAZ OF PLATE B9605-2
W	AS2	HAS201	PAS201	WAS201	WCAP-9330	2-1	FROM W-HAZ OF PLATE R408-1
G	BR	HBR_01	PBR_01	WBR_01	GCCR-4442	4	MADE FROM TEST WELD MATERIAL
W	BV1	HBV101	PBV101	WBV101	WCAP-10867	4-1	FROM WITHIN HAZ OF PL. B6903-1
W	BZ1	HBZ101			PB-ME 75/03	2	
W	CAB	NCAB02	PCAB02	WCAB01	WCAP-10185	4-1	FROM WELD HAZ MATERIAL
W	CB1	HCB101	FCB101	WCB101	WCAP-9734	2-1	FROM W-HAZ OF FORGING 05
C	CC1	HCC101	PCC103	WCC102	BMI-1280	7	FROM D7206-3 SIDE OF WELD
C	CC2	HCC201		WCC201	SWRI-7524	6; 29	FROM D8907-1 AND D8907-3
W	CK1	HCK101	PKC101	WCK101	SWRI-02-4770	7	FROM B4406-3 SIDE OF WELD
W	CK2	HCK201	PKC201	WCK201	WCAP-8512	2-1	FROM W-HAZ OF C5521-2
W	CL1	HCL101	PCL101	WCL101	WCAP-9842	2-1	FROM W-HAZ OF R2708-1
G	CPR	HCPR01		WCPR01	MOE-103-0986	3-6	FROM G2802-1 AND G2802-2
B	CR3	HCR301	PCR301		BAW-1898	3-2	FROM C4344-1, HEAT NW
B	CR3	HCR302	PCR302		BAW-1898	3-2	FROM C4344-2, HEAT PP
W	CTY	HCTY04		WCTY01	WCAP-7036	5	FROM W9807-1 AND W9807-8
B	DB1	HDB101	FDB101		BAW-1882	3-2	FROM HEAT BCC241
B	DB1	HDB102	FDB102		BAW-1882	3-2	FROM HEAT AKJ233
W	DC1	HDC101	PDC103	WDC101	WCAP-8465	2-1	FROM WITHIN HAZ OF B4106-3
W	DC2	HDC201	PDC201	WDC201	WCAP-8783	2-1	FROM W-HAZ OF B5454-1
G	DR1	HDR101			NEDC-12585	1	
G	DR2	HDR201		WDR201	BCL-585-10	5; 8	ESW HAZ
G	DR2	HDR202		WDR202	BCL-585-10	5; 8	SAW HAZ
G	DR3	HDR301	PDR301	WDR301	SWRI-06-7484-003	5	ESW HAZ
G	DR3	HDR302	PDR301	WDR302	SWRI-06-7484-003	5	SAW HAZ
W	FA1	HFA101	PFA101	WFA101	WCAP-8810	2-1	FROM W-HAZ OF B4919-1
W	FA2	HFA201	PFA201	WFA201	WCAP-8956	2-1	FROM W-HAZ OF B7212-1
C	FC1	HFC101		WFC102	TR-O-MCM-001/R1	4	FROM D4802-2 AND D4802-3
G	GAR	HGAR01		WGAR01	DPT/SN/041/R/79	3	
W	GIN	HGIN01	FGIN01	WGIN01	WCAP-7254	4	FROM W-HAZ OF 125P666
G	HA1	HHA101		WHA101	NEDC-30997	3-6; 3-19	FROM G-8404-2 AND G-8404-1
W	HB2	HNB201		WHB201	WCAP-7373	4	FROM W10201-1 AND W10201-3
G	HM3	HNM301			DOCKET 50-133	TABLE III	
W	IP2	HIP201	PIP203	WIP201	WCAP-7323	4	FROM HAZ OF B2002-3
W	IP3	HIP304	PIP304		WCAP-8475	2-1	FROM W-HAZ OF B2803-3
W	KO1	HKO101		WKO101	SWRI-17-5759-201	7	FROM W-HAZ
W	KVE	HKVE01	FKVE01	WKVE01	WCAP-8107	2-1	FROM W-HAZ OF 122X208VA1
A	LAC	HLAC01	PLAC03	WLAC01	NE&O 8	96; 97; 99	FROM NP-1056
W	LM2	HLM201	FLM201	WLM201	WCAP-9329	2-1	FROM W-HAZ OF 123J398
W	MC1	HMC101	PMC102	WMC101	WCAP-9195	2-1	FROM W-HAZ OF B5012-2
W	MC2	HMC201	FMC201	WMC201	WCAP-11029	4-1; 4-2; A-7	FROM W-HAZ OF FORGING 05
G	ML1	HML101	PML102	WML101	NEDC-30833	3-2; 3-3; 3-17	FROM PLATE G-2002-6
C	ML2	HML201	PML201	WML202	TR-N-MCM-008	3; 4; 8	FROM C-506-1 AND C-506-3
G	MON	HMON01	PHON01	WMON01	BMI-0483	6; 7	
C	MY	HMY_01		WMY_02	CR 75-317	8; A-4	FROM D-8406-1 AND D-8406-2
W	NA1	HNA101	FNA101	WNA101	WCAP-8771	2-1; A-1	FROM W-HAZ OF FORGING 03
W	NA2	HNA201	FNA201	WNA201	WCAP-8772	2-1; A-1	FROM W-HAZ OF FORGING 04
G	NM1	HNM101			DOCKET 50-220	111-1; 111-2	
B	OC1	HOC101	POC101		BAW-1421/R1	3-1; 3-2	FROM HEAT C2800-2
B	OC1	HOC102	POC102		BAW-1436	3-1; 3-2	FROM HEAT C3265-1
B	OC2	HOC201	FOC201		BAW-1437	A-4	FROM HEAT AAW-163
B	OC2	HOC202	FOC202		BAW-1437	A-4	FROM HEAT AWG-164

Table 27 Listing of REF_TITL.dbf

REF_TITL.dbf: Page 1

TAG	REF_ID	CONT	REF_TITLE
18767-TR-MCD-009	1	1	A. Ragl, Northeast Utilities Service Company Millstone Nuclear Unit No. 2
18767-TR-MCD-009	2	2	Evaluation of Baseline Specimens Reactor Vessel Materials Irradiation Surveil-
18767-TR-MCD-009	3	3	lance Program, 18767-TR-MCD-009, Combustion Engineering, Inc., Windsor, CT,
18767-TR-MCD-009	4	4	October 18, 1976.
ACNP-66513	1	1	LaCrosse Boiling Water Reactor, Reactor Vessel Material Surveillance Program for
ACNP-66513	2	2	Evaluation of Radiation Effects, ACNP-66513, Allis-Chalmers, Bethesda, MD,
ACNP-66513	3	3	February 1966.
APED-3988	1	1	F. A. Brandt and A. J. Alexander, Dresden Nuclear Power Station Reactor Vessel
APED-3988	2	2	Steel Surveillance Program, APED-3988, General Electric, San Jose, CA, July 1962
ASTM D554	1	1	J. R. Hawthorne, Radiation Effects Information Generated on the ASTM Reference
ASTM D554	2	2	Correlation Monitor Steels, ASTM D554, American Society for Testing and
ASTM D554	3	3	Materials, Philadelphia, PA, 1974.
ASTM STP 481	1	1	L. E. Steele and C. Z. Serpan, Jr., Analysis of Reactor Vessel Radiation Effects
ASTM STP 481	2	2	Surveillance Programs, ASTM STP 481, American Society for Testing and Materials,
ASTM STP 481	3	3	Philadelphia, PA, December 1970.
BAW-1421	1	1	A. L. Lowe, Jr., L. A. Hassler, H. S. Palme, and C. F. Zurlippe, Analysis of
BAW-1421	2	2	Capsule OCI-F from Duke Power Company Oconee Unit 1 Reactor Vessel Materials
BAW-1421	3	3	Surveillance Program, BAW-1421, Babcock & Wilcox, Lynchburg, VA, August 1975.
BAW-1421/R1	1	1	A. L. Lowe, Jr., L. A. Hassler, H. S. Palme, and C. F. Zurlippe, Analysis of
BAW-1421/R1	2	2	Capsule OCI-F from Duke Power Company Oconee Unit 1 Reactor Vessel Materials
BAW-1421/R1	3	3	Surveillance Program, BAW-1421, Rev. 1, Babcock & Wilcox, Lynchburg, VA,
BAW-1421/R1	4	4	September 1975.
BAW-1436	1	1	A. L. Lowe, Jr. et al., Analysis of Capsule OCI-E Duke Power Company Oconee
BAW-1436	2	2	Nuclear Station Unit 1 Reactor Vessel Materials Surveillance Program, BAW-1436,
BAW-1436	3	3	Babcock & Wilcox, Lynchburg, VA, September 1977.
BAW-1437	1	1	Analysis of Capsule OCII-C from Duke Power Company Oconee Nuclear Station,
BAW-1437	2	2	Unit 2, Reactor Vessel Materials Surveillance Program, BAW-1437, Babcock &
BAW-1437	3	3	Wilcox, Lynchburg, VA, May 1977.
BAW-1438	1	1	A. L. Lowe, Jr. et al., Analysis of Capsule OCIII-A from Duke Power Company
BAW-1438	2	2	Oconee Nuclear Station Unit 3, BAW-1438, Babcock & Wilcox, Lynchburg, VA, July
BAW-1438	3	3	1977.
BAW-1439	1	1	A. L. Lowe, Jr. et al., Analysis of Capsule TMI-1E from Metropolitan Edison
BAW-1439	2	2	Company Three Mile Island Nuclear Station - Unit 1, Reactor Vessel Materials
BAW-1439	3	3	Surveillance Program, BAW-1439, Babcock & Wilcox, Lynchburg, VA, January 1977.
BAW-1440	1	1	A. L. Lowe, Jr. et al., Analysis of Capsule ANI-E from Arkansas Power & Light
BAW-1440	2	2	Company Arkansas Nuclear One - Unit 1, Reactor Vessel Materials Surveillance
BAW-1440	3	3	Program, BAW-1440, Babcock & Wilcox, Lynchburg, VA, April 1977.
BAW-1543/R2	1	1	A. L. Lowe, K. E. Moore, and J. D. Aadland, Integrated Reactor Vessel Material
BAW-1543/R2	2	2	Surveillance Program, BAW-1543, Rev. 2, Babcock & Wilcox, Lynchburg, VA,
BAW-1543/R2	3	3	February 1984.
BAW-1638	1	1	A. L. Lowe, Jr., W. A. Pavinich, J. K. Schmotzer, and C. L. Whitmarsh, Analysis
BAW-1638	2	2	of Capsule V Virginia Electric & Power Company North Anna Unit No. 1 Reactor
BAW-1638	3	3	Vessel Materials Surveillance Program, BAW-1638, Babcock & Wilcox, Lynchburg,
BAW-1638	4	4	VA, March 1981.
BAW-1679/R1	1	1	A. L. Lowe, Jr. et al., Analyses of Capsule CR3-B, Florida Power Corporation,
BAW-1679/R1	2	2	Crystal River Unit 3, Reactor Vessel Materials Surveillance Program, BAW-1679,
BAW-1679/R1	3	3	Rev. 1, Babcock & Wilcox, Lynchburg, VA, June 1982.
BAW-1697	1	1	A. L. Lowe, Jr. et al., Analysis of Capsule OCIII-B from Duke Power Company
BAW-1697	2	2	Oconee Nuclear Station Unit 3 Reactor Vessel Materials Surveillance Program,
BAW-1697	3	3	BAW-1697, Babcock & Wilcox, Lynchburg, VA, October 1981.
BAW-1698	1	1	A. L. Lowe, Jr. et al., Analysis of Capsule ANI-B from Arkansas Power & Light
BAW-1698	2	2	Company's Arkansas Nuclear One, Unit 1, Reactor Vessel Materials Surveillance
BAW-1698	3	3	Program, BAW-1698, Babcock & Wilcox, Lynchburg, VA, November 1981.
BAW-1699	1	1	Analysis of Capsule OCII-A from Duke Power Company Oconee Nuclear Station, Unit
BAW-1699	2	2	2, Reactor Vessel Materials Surveillance Program, BAW-1699, Babcock & Wilcox,
BAW-1699	3	3	Lynchburg, VA, December 1981.
BAW-1701	1	1	A. L. Lowe, Jr. et al., Analyses of Capsule TE1-F, The Toledo Edison Company,
BAW-1701	2	2	Davis-Besse Nuclear Power Station Unit 1, Reactor Vessel Material Surveillance
BAW-1701	3	3	Program, BAW-1701, Babcock & Wilcox, Lynchburg, VA, January 1982 (Rev. 1, Toledo
BAW-1701	4	4	Edison, August 1982).
BAW-1702	1	1	A. L. Lowe, Jr. et al., Analyses of Capsule RS1-B, Sacramento Municipal Utility
BAW-1702	2	2	District, Rancho Seco Unit 1, Reactor Vessel Materials Surveillance Program,
BAW-1702	3	3	BAW-1702, Babcock & Wilcox, Lynchburg, VA, February 1982.
BAW-1718	1	1	A. L. Lowe, Jr., J. D. Aadland, W. A. Pavinich, and C. L. Whitmarsh, Fracture
BAW-1718	2	2	Toughness Test Results from Capsule CR3-B Florida Power Corporation Crystal
BAW-1718	3	3	River Unit 3, Reactor Vessel Material Surveillance Program, BAW-1718, Babcock &
BAW-1718	4	4	Wilcox, Lynchburg, VA, March 1982.
BAW-1719	1	1	A. L. Lowe, Jr., J. D. Aadland, J. E. Ewing, and W. A. Pavinich, Fracture
BAW-1719	2	2	Toughness Test Results from Capsule TE1-F, the Toledo Edison Company,
BAW-1719	3	3	Davis-Besse Nuclear Power Station Unit 1, Reactor Vessel Material Surveillance
BAW-1719	4	4	Program, BAW-1719, Babcock & Wilcox, Lynchburg, VA, March 1982.
BAW-1792	1	1	A. L. Lowe, Jr. et al., Analyses of Capsule RS1-D, Sacramento Municipal Utility

Table 27 Continued

REF_TITL.dbf: Page 2

TAG	REF_ID	CONT	REF_TITLE
BAW-1792	2		District, Rancho Seco Unit 1, Reactor Vessel Material Surveillance Program,
BAW-1792	3		BAW-1792, Babcock & Wilcox, Lynchburg, VA, October 1983.
BAW-1794	1		A. L. Lowe, Jr. et al., Analysis of Capsule V Virginia Electric & Power Company
BAW-1794	2		North Anna Unit No. 2 Reactor Vessel Materials Surveillance Program, BAW-1794,
BAW-1794	3		Babcock & Wilcox, Lynchburg, VA, October 1983.
BAW-1803	1		A. S. Heller and A. L. Lowe, Jr., Correlations for Predicting the Effects of
BAW-1803	2		Neutron Radiation on Linde 80 Submerged-Arc Welds, BAW-1803, Babcock & Wilcox,
BAW-1803	3		Lynchburg, VA, January 1984.
BAW-1803/R1	1		A. L. Lowe, Jr., and J. W. Pagram, Correlations for Predicting the Effects of
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SWRI-07-1599	2	2	
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SWRI-07-2892/A	1	1	
SWRI-07-2892/A	2	2	
SWRI-07-2892/A	3	3	
SWRI-07-2892/B	1	1	
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SWRI-07-2892/B	3	3	
SWRI-17-2108	1	1	
SWRI-17-2108	2	2	
SWRI-17-2108	3	3	
SWRI-17-2108	4	4	
SWRI-17-2108/R1	1	1	
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SWRI-7244-001/1	3	3	
SWRI-7244-002/1	1	1	
SWRI-7244-002/1	2	2	
SWRI-7244-002/1	3	3	
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WCAP-8086	1	S. E. Yanichko and D. J. Lege, Northern States Power Co. Prairie Island Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8086, Westinghouse Electric Corporation, Pittsburgh, PA, June 1973.	
WCAP-8086	2	No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8086, Westinghouse Electric Corporation, Pittsburgh, PA, June 1973.	
WCAP-8107	1	S. E. Yanichko, D. J. Lege, and G. C. Zula, Wisconsin Public Service Corporation Kewaunee Nuclear Power Plant Reactor Vessel Radiation Surveillance Program, WCAP-8107, Westinghouse Electric Corporation, Pittsburgh, PA, April 1973.	
WCAP-8107	2	WCAP-8107, Westinghouse Electric Corporation, Pittsburgh, PA, April 1973.	
WCAP-8132	1	S. E. Yanichko and D. J. Lege, Commonwealth Edison Co., Zion Unit No. 2 Reactor Vessel Radiation Surveillance Program, WCAP-8132, Westinghouse Electric Corporation, Pittsburgh, PA, May 1973.	
WCAP-8132	2	Vessel Radiation Surveillance Program, WCAP-8132, Westinghouse Electric Corporation, Pittsburgh, PA, May 1973.	
WCAP-8193	1	S. E. Yanichko and D. J. Lege, Northern States Power Co. Prairie Island Unit No. 2 Reactor Vessel Radiation Surveillance Program, WCAP-8193, Westinghouse Electric Corporation, Pittsburgh, PA, September 1973.	
WCAP-8193	2	No. 2 Reactor Vessel Radiation Surveillance Program, WCAP-8193, Westinghouse Electric Corporation, Pittsburgh, PA, September 1973.	
WCAP-8216	1	S. E. Yanichko and D. J. Lege, Swedish State Power Board Ringhals Unit No. 2 Reactor Vessel Radiation Surveillance Program, WCAP-8216, Westinghouse Electric Corporation, Pittsburgh, PA, November 1973.	
WCAP-8216	2	Reactor Vessel Radiation Surveillance Program, WCAP-8216, Westinghouse Electric Corporation, Pittsburgh, PA, November 1973.	
WCAP-8233	1	S. E. Yanichko, D. J. Lege, and J. H. Phillips, Tennessee Valley Authority Sequoyah Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8233, Westinghouse Electric Corporation, Pittsburgh, PA, December 1973.	
WCAP-8233	2	Sequoyah Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8233, Westinghouse Electric Corporation, Pittsburgh, PA, December 1973.	
WCAP-8249	1	S. E. Yanichko, D. J. Lege, S. L. Anderson, and T. R. Mager, Analysis of Capsule S from Carolina Power and Light Company M. B. Robinson Unit No. 2 Reactor Vessel Radiation Surveillance Program, WCAP-8249, Westinghouse Electric Corporation, Pittsburgh, PA, December 1973.	
WCAP-8249	2	S from Carolina Power and Light Company M. B. Robinson Unit No. 2 Reactor Vessel Radiation Surveillance Program, WCAP-8249, Westinghouse Electric Corporation, Pittsburgh, PA, December 1973.	
WCAP-8249	3	Radiation Surveillance Program, WCAP-8249, Westinghouse Electric Corporation, Pittsburgh, PA, December 1973.	
WCAP-8421	1	S. E. Yanichko, T. R. Mager, and S. Kang, Analysis of Capsule R from the Rochester Gas & Electric Corporation R. E. Ginna Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8421, Westinghouse Electric Corporation, Pittsburgh, PA, November 1974.	
WCAP-8421	2	Rochester Gas & Electric Corporation R. E. Ginna Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8421, Westinghouse Electric Corporation, Pittsburgh, PA, November 1974.	
WCAP-8421	3	Radiation Surveillance Program, WCAP-8421, Westinghouse Electric Corporation, Pittsburgh, PA, November 1974.	
WCAP-8426	1	J. A. Davidson, J. H. Phillips, and S. E. Yanichko, Portland General Electric Company Trojan Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8426, Westinghouse Electric Corporation, Pittsburgh, PA, January 1975.	
WCAP-8426	2	WCAP-8426, Westinghouse Electric Corporation, Pittsburgh, PA, January 1975.	
WCAP-8457	1	J. A. Davidson, J. H. Phillips, and S. E. Yanichko, Duquesne Light Company Beaver Valley Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8457, Westinghouse Electric Corporation, Pittsburgh, PA, October 1974.	
WCAP-8457	2	Westinghouse Electric Corporation, Pittsburgh, PA, October 1974.	
WCAP-8465	1	J. A. Davidson, J. H. Phillips, and S. E. Yanichko, Pacific Gas and Electric Co. Diablo Canyon Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8465, Westinghouse Electric Corporation, Pittsburgh, PA, January 1975.	
WCAP-8465	2	Diablo Canyon Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8465, Westinghouse Electric Corporation, Pittsburgh, PA, January 1975.	
WCAP-8475	1	S. E. Yanichko and J. A. Davidson, Consolidated Edison Co. of New York Indian Point Unit No. 3, Reactor Vessel Radiation Surveillance Program, WCAP-8475, Westinghouse Electric Corporation, Pittsburgh, PA, January 1975.	
WCAP-8475	2	Point Unit No. 3, Reactor Vessel Radiation Surveillance Program, WCAP-8475, Westinghouse Electric Corporation, Pittsburgh, PA, January 1975.	
WCAP-8511	1	J. A. Davidson, J. H. Phillips, and S. E. Yanichko, Public Service Electric and Gas Co. Salem Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8511, Westinghouse Electric Corporation, Pittsburgh, PA, November 1975.	
WCAP-8511	2	Gas Co. Salem Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8511, Westinghouse Electric Corporation, Pittsburgh, PA, November 1975.	
WCAP-8512	1	J. A. Davidson, S. E. Yanichko, and J. H. Phillips, American Electric Power Company Donald C. Cook Unit No. 2 Reactor Vessel Radiation Surveillance Program, WCAP-8512, Westinghouse Electric Corporation, Pittsburgh, PA, November 1975.	
WCAP-8512	2	WCAP-8512, Westinghouse Electric Corporation, Pittsburgh, PA, November 1975.	
WCAP-8513	1	J. A. Davidson, J. H. Phillips, and S. E. Yanichko, Tennessee Valley Authority Sequoyah Unit No. 2 Reactor Vessel Radiation Surveillance Program, WCAP-8513, Westinghouse Electric Corporation, Pittsburgh, PA, November 1975.	
WCAP-8513	2	Sequoyah Unit No. 2 Reactor Vessel Radiation Surveillance Program, WCAP-8513, Westinghouse Electric Corporation, Pittsburgh, PA, November 1975.	
WCAP-8586	1	Korea Electric Company KO-RI Unit 1 Reactor Vessel Radiation Surveillance Program, WCAP-8586, Westinghouse Electric Corporation, Pittsburgh, PA, August 1975 (referenced by QA; no hard copy provided).	
WCAP-8586	2	Program, WCAP-8586, Westinghouse Electric Corporation, Pittsburgh, PA, August 1975 (referenced by QA; no hard copy provided).	
WCAP-8586	3	1975 (referenced by QA; no hard copy provided).	
WCAP-8631	1	S. E. Yanichko, J. H. Phillips, and S. L. Anderson, Analysis of Capsule T from the Florida Power and Light Company Turkey Point Unit No. 3 Reactor Vessel Radiation Surveillance Program, WCAP-8631, Westinghouse Electric Corporation, Pittsburgh, PA, December 1975.	
WCAP-8631	2	the Florida Power and Light Company Turkey Point Unit No. 3 Reactor Vessel Radiation Surveillance Program, WCAP-8631, Westinghouse Electric Corporation, Pittsburgh, PA, December 1975.	
WCAP-8631	3	Radiation Surveillance Program, WCAP-8631, Westinghouse Electric Corporation, Pittsburgh, PA, December 1975.	
WCAP-8739	1	S. E. Yanichko and S. L. Anderson, Analysis of Capsule S from the Wisconsin Electric Power Company and Wisconsin Michigan Power Company Point Beach Nuclear Plant Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8739, Westinghouse Electric Corporation, Pittsburgh, PA, November 1976.	
WCAP-8739	2	Electric Power Company and Wisconsin Michigan Power Company Point Beach Nuclear Plant Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8739, Westinghouse Electric Corporation, Pittsburgh, PA, November 1976.	
WCAP-8739	3	Plant Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8739, Westinghouse Electric Corporation, Pittsburgh, PA, November 1976.	
WCAP-8739	4	Westinghouse Electric Corporation, Pittsburgh, PA, November 1976.	

Table 27 Continued

REF_TITL.dbf: Page 14

TAG	REF_ID	CONT	REF_TITLE
WCAP-8771	1		J. A. Davidson and J. M. Phillips, Virginia Electric and Power Company North
WCAP-8771	2		Anna Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8771,
WCAP-8771	3		Westinghouse Electric Corporation, Pittsburgh, PA, September 1976.
WCAP-8772	1		J. A. Davidson, Virginia Electric and Power Company North Anna Unit No. 2
WCAP-8772	2		Reactor Vessel Radiation Surveillance Program, WCAP-8772, Westinghouse Electric
WCAP-8772	3		Corporation, Pittsburgh, PA, November 1976.
WCAP-8783	1		J. A. Davidson and S. E. Yanichko, Pacific Gas and Electric Company Diablo
WCAP-8783	2		Canyon Unit No. 2 Reactor Vessel Radiation Surveillance Program, WCAP-8783,
WCAP-8783	3		Westinghouse Electric Corporation, Pittsburgh, PA, December 1976.
WCAP-8810	1		J. A. Davidson, J. M. Phillips, and S. E. Yanichko, Southern Alabama Power
WCAP-8810	2		Company Joseph M. Farley Nuclear Plant Unit No. 1 Reactor Vessel Radiation
WCAP-8810	3		Surveillance Program, WCAP-8810, Westinghouse Electric Corporation, Pittsburgh,
WCAP-8810	4		PA, December 1976.
WCAP-8824	1		J. M. Phillips et al., Public Service Electric and Gas Company Salem Unit No. 2
WCAP-8824	2		Reactor Vessel Radiation Surveillance Program, WCAP-8824, Westinghouse Electric
WCAP-8824	3		Corporation, Pittsburgh, PA, January 1977.
WCAP-8908	1		S. E. Yanichko, S. L. Anderson, and K. V. Scott, Analysis of Capsule V from the
WCAP-8908	2		Wisconsin Public Service Corporation Kewaunee Nuclear Plant Reactor Vessel
WCAP-8908	3		Radiation Surveillance Program, WCAP-8908, Westinghouse Electric Corporation,
WCAP-8908	4		Pittsburgh, PA, January 1977.
WCAP-8916	1		J. A. Davidson, S. L. Anderson, and K. V. Scott, Analysis of Capsule V from
WCAP-8916	2		Northern States Power Company Prairie Island Unit No. 1, Reactor Vessel
WCAP-8916	3		Radiation Surveillance Program, WCAP-8916, Westinghouse Electric Corporation,
WCAP-8916	4		Pittsburgh, PA, August 1977.
WCAP-8956	1		J. A. Davidson and S. E. Yanichko, Alabama Power Company Joseph M. Farley
WCAP-8956	2		Nuclear Plant Unit No. 2 Reactor Vessel Radiation Surveillance Program,
WCAP-8956	3		WCAP-8956, Westinghouse Electric Corporation, Pittsburgh, PA, August 1977.
WCAP-8957	1		J. A. Davidson and S. E. Yanichko, Furnas-Centrales Electricas S.A. Angra Dos
WCAP-8957	2		Reis Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-8957,
WCAP-8957	3		Westinghouse Electric Corporation, Pittsburgh, PA, May 1977.
WCAP-9195	1		J. A. Davidson and S. E. Yanichko, Duke Power Company William B. McGuire Unit
WCAP-9195	2		No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-9195, Westinghouse
WCAP-9195	3		Electric Corporation, Pittsburgh, PA, November 1977.
WCAP-9212	1		J. A. Davidson, S. E. Yanichko, and S. L. Anderson, Analysis of Capsule V from
WCAP-9212	2		Northern States Power Company Prairie Island Unit No. 2, Reactor Vessel
WCAP-9212	3		Radiation Surveillance Program, WCAP-9212, Westinghouse Electric Corporation,
WCAP-9212	4		Pittsburgh, PA, November 1977.
WCAP-9228	1		P. J. Fields, J. A. Davidson, and S. E. Yanichko, Central Nuclear de Almaraz
WCAP-9228	2		Almaraz Unit No. 2 Reactor Vessel Radiation Surveillance Program, WCAP-9228,
WCAP-9228	3		Westinghouse Electric Corporation, Pittsburgh, PA, December 1977.
WCAP-9234	1		J. A. Davidson and S. E. Yanichko, South Carolina Electric and Gas Company
WCAP-9234	2		Virgil C. Summer Nuclear Plant Unit No. 1 Reactor Vessel Radiation Surveillance
WCAP-9234	3		Program, WCAP-9234, Westinghouse Electric Corporation, Pittsburgh, PA,
WCAP-9234	4		January 1978.
WCAP-9298	1		J. A. Davidson, Tennessee Valley Authority Watts Bar Unit No. 1 Reactor Vessel
WCAP-9298	2		Radiation Surveillance Program, WCAP-9298, Westinghouse Electric Corporation,
WCAP-9298	3		Pittsburgh, PA, July 1978.
WCAP-9308	1		P. J. Fields, J. A. Davidson, and S. E. Yanichko, Fuerzas Electricas de Cataluna
WCAP-9308	2		ASCO Unit No. 1 Reactor Vessel Radiation Surveillance Program, WCAP-9308,
WCAP-9308	3		Westinghouse Electric Corporation, Pittsburgh, PA, July 1978.
WCAP-9329	1		P. J. Fields, J. A. Davidson, and S. E. Yanichko, Iberduero S.A. Lemoniz Unit
WCAP-9329	2		No. 2 Reactor Vessel Radiation Surveillance Program, WCAP-9329, Westinghouse
WCAP-9329	3		Electric Corporation, Pittsburgh, PA, August 1978.
WCAP-9330	1		P. J. Fields, J. A. Davidson, and S. E. Yanichko, Fuerzas Electricas de Cataluna
WCAP-9330	2		ASCO Unit No. 2 Reactor Vessel Radiation Surveillance Program, WCAP-9330,
WCAP-9330	3		Westinghouse Electric Corporation, Pittsburgh, PA, August 1978.
WCAP-9331	1		J. A. Davidson, S. L. Anderson, and R. P. Shogan, Analysis of Capsule T from the
WCAP-9331	2		Wisconsin Electric Power Company Point Beach Nuclear Plant Unit No. 2 Reactor
WCAP-9331	3		Vessel Radiation Surveillance Program, WCAP-9331, Westinghouse Electric
WCAP-9331	4		Corporation, Pittsburgh, PA, August 1978.
WCAP-9339	1		P. J. Fields and S. L. Anderson, Analysis of Capsule H from the Connecticut
WCAP-9339	2		Yankee Reactor Vessel Radiation Surveillance Program, WCAP-9339, Westinghouse
WCAP-9339	3		Electric Corporation, Pittsburgh, PA, September 1978.
WCAP-9357	1		S. E. Yanichko and S. L. Anderson, Analysis of Capsule R from the Wisconsin
WCAP-9357	2		Electric Power Company Point Beach Nuclear Plant Unit No. 1 Reactor Vessel
WCAP-9357	3		Radiation Surveillance Program, WCAP-9357, Westinghouse Electric Corporation,
WCAP-9357	4		Pittsburgh, PA, August 1978.
WCAP-9469	1		J. A. Davidson, S. L. Anderson, and W. T. Kaiser, Analysis of Capsule U from
WCAP-9469	2		Portland General Electric Company Trojan Reactor Vessel Radiation Surveillance
WCAP-9469	3		Program, WCAP-9469, Westinghouse Electric Corporation, Pittsburgh, PA, May 1979.
WCAP-9489	1		K. Koyama and J. A. Davidson, Duke Power Company William B. McGuire Unit No. 2
WCAP-9489	2		Reactor Vessel Radiation Surveillance Program, WCAP-9489, Westinghouse Electric

Table 27 Continued

REF_TITL.dbf: Page 15

TAG	REF_ID	CONT	REF_TITLE
WCAP-9489	3		Corporation, Pittsburgh, PA, May 1979.
WCAP-9491	1		J. A. Davidson, S. L. Anderson, and W. T. Kaiser, Analysis of Capsule T from the
WCAP-9491	2		Indian Point Unit No. 3 Reactor Vessel Radiation Surveillance Program, WCAP-9491
WCAP-9491	3		Westinghouse Electric Corporation, Pittsburgh, PA, April 1979.
WCAP-9520	1		S. E. Yanichko, S. L. Anderson, and W. T. Kaiser, Analysis of Capsule F from the
WCAP-9520	2		Southern California Edison Company San Onofre Reactor Vessel Radiation
WCAP-9520	3		Surveillance Program, WCAP-9520, Westinghouse Electric Corporation, Pittsburgh,
WCAP-9520	4		PA, May 1979.
WCAP-9635	1		S. E. Yanichko, S. L. Anderson, R. P. Shogan, and R. G. Lott, Analysis of
WCAP-9635	2		Capsule R from the Wisconsin Electric Power Company Point Beach Nuclear Plant
WCAP-9635	3		Unit No. 2 Reactor Vessel Radiation Surveillance Program, WCAP-9635,
WCAP-9635	4		Westinghouse Electric Corporation, Pittsburgh, PA, December 1979.
WCAP-9678	1		S. E. Yanichko, S. L. Anderson, and W. T. Kaiser, Analysis of Capsule T from the
WCAP-9678	2		Public Service Electric and Gas Company Salem Unit No. 1 Reactor Vessel
WCAP-9678	3		Radiation Surveillance Program, WCAP-9678, Westinghouse Electric Corporation,
WCAP-9678	4		Pittsburgh, PA, February 1980.
WCAP-9717	1		S. E. Yanichko, S. L. Anderson, and W. T. Kaiser, Analysis of Capsule Y from the
WCAP-9717	2		Alabama Power Company Farley Unit No. 1, Reactor Vessel Radiation Surveillance
WCAP-9717	3		Program, WCAP-9717, Westinghouse Electric Corporation, Pittsburgh, PA, June 1980
WCAP-9734	1		S. E. Yanichko, Duke Power Company Catawba Unit No. 1 Reactor Vessel Radiation
WCAP-9734	2		Surveillance Program, WCAP-9734, Westinghouse Electric Corporation, Pittsburgh,
WCAP-9734	3		PA, July 1980.
WCAP-9794	1		S. E. Yanichko, S. L. Anderson, R. P. Shogan, and R. G. Lott, Analysis of
WCAP-9794	2		Capsule 125 from the Consumers Power Company Big Rock Point Nuclear Plant
WCAP-9794	3		Reactor Vessel Radiation Surveillance Program, WCAP-9794, Westinghouse Electric
WCAP-9794	4		Corporation, Pittsburgh, PA, September 1980.
WCAP-9842	1		L. R. Singer, Union Electric Company Callaway Unit No. 1 Reactor Vessel
WCAP-9842	2		Radiation Surveillance Program, WCAP-9842, Westinghouse Electric Corporation,
WCAP-9842	3		Pittsburgh, PA, May 1981.
WCAP-9860	1		S. E. Yanichko et al., Analysis of Capsule V from the Duquesne Light Company
WCAP-9860	2		Beaver Valley Unit No. 1 Reactor Vessel Radiation Surveillance Program,
WCAP-9860	3		WCAP-9860, Westinghouse Electric Corporation, Pittsburgh, PA, January 1981.
WCAP-9875	1		S. E. Yanichko, S. L. Anderson, R. P. Shogan, and R. G. Lott, Analysis of the
WCAP-9875	2		Maine Yankee Reactor Vessel Second Accelerated Surveillance Capsule, WCAP-9875,
WCAP-9875	3		Westinghouse Electric Corporation, Pittsburgh, PA, March 1981.
WCAP-9877	1		S. E. Yanichko, S. L. Anderson, and W. T. Kaiser, Analysis of Capsule T from
WCAP-9877	2		Northern States Power Company Prairie Island Unit No. 2, Reactor Vessel
WCAP-9877	3		Radiation Surveillance Program, WCAP-9877, Westinghouse Electric Corporation,
WCAP-9877	4		Pittsburgh, PA, March 1981.
WCAP-9878	1		S. E. Yanichko, S. L. Anderson, R. P. Shogan, and R. G. Lott, Analysis of
WCAP-9878	2		Capsule R from the Wisconsin Public Service Corporation Kewaunee Nuclear Plant
WCAP-9878	3		Reactor Vessel Radiation Surveillance Program, WCAP-9878, Westinghouse Electric
WCAP-9878	4		Corporation, Pittsburgh, PA, March 1981.
WCAP-9890	1		S. E. Yanichko, S. L. Anderson, R. P. Shogan, and R. G. Lott, Analysis of
WCAP-9890	2		Capsule U from the Commonwealth Edison Company Zion Nuclear Plant Unit 1 Reactor
WCAP-9890	3		Vessel Radiation Surveillance Program, WCAP-9890, Westinghouse Electric
WCAP-9890	4		Corporation, Pittsburgh, PA, March 1981.
WCAP-9920	1		S. E. Yanichko, S. L. Anderson, R. P. Shogan, and R. G. Lott, Analysis of the
WCAP-9920	2		Third Capsule from the Commonwealth Edison Company Quad Cities Unit 1 Nuclear
WCAP-9920	3		Plant Reactor Vessel Radiation Surveillance Program, WCAP-9920, Westinghouse
WCAP-9920	4		Electric Corporation, Pittsburgh, PA, August 1981.
WENX/76/64	1		T. R. Mager, R. Shogan, and S. Anderson, Analysis of Capsules P and K from Union
WENX/76/64	2		Electric, S.A., Jose Cabrera Reactor Vessel Radiation Surveillance Program,
WENX/76/64	3		WENX/76/64, Westinghouse Nuclear Europe, Brussels, August 1976.
YAEC-1089	1		R. W. Smith, Evaluation of the Fracture Toughness Properties of the Yankee Rowe
YAEC-1089	2		Reactor Vessel, YAEC-1089, Yankee Atomic Electric Company, Westborough, MA,
YAEC-1089	3		September 1975.
YAEC-1853	1		E. C. Biemiller and R. J. Cacciapouti, Analysis of Seabrook Station Unit 1
YAEC-1853	2		Reactor Vessel Surveillance Capsule U, YAEC-1853, Yankee Atomic Electric Co.,
YAEC-1853	3		Bolton, Mass., June 26, 1992.

Table 28. Partial listing of REF_LST.dbf

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REF_LST.dbf: Page 1
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*          ORNL-4313
*    AD1    SWRI-06-8976
*    AD1    WCAP-8957
*    AL2    WCAP-9228
*    AN1    BAW-1440
*    AN1    BAW-1543/R2
*    AN1    BAW-1698
*    AN1    BAW-1803
*    AN1    BAW-1820
*    AN1    BAW-1836
*    AN1    NUREG/CR-3319
*    AN2    BMI-0584
*    AS1    WCAP-9308
*    AS2    WCAP-9330
*    BR     EPRI NP-2428
*    BR     GECR-4442
*    BR     NE&D 11(3)
*    BR     WCAP-9794
*    BV1    DOCKET 50-334
*    BV1    WCAP-10867
*    BV1    WCAP-8457
*    BV1    WCAP-9860
*    BW1    NEDO-24157/R1
*    BW1    NEDO-24161
*    BW2    NEDO-24157/R1
*    BZ1    PB-ME 75/02
*    BZ1    PB-ME 75/03
*    BZ1    PB-ME 78/06
*    BZ2    NUREG/CR-3319
*    BZ2    PB-ME 75/02
*    CAB    EPRI NP-2428
*    CAB    WCAP-10185
*    CAB    WENX/76/64
*    CB1    WCAP-11527
*    CB1    WCAP-9734
*    CC1    BMI-1280
*    CC1    DOCKET 50-317
*    CC2    DOCKET 50-318
*    CC2    SWRI-7524

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APPENDIX A PRELIMINARY SOFTWARE AND PROCESSING

A.1 INTRODUCTION

The software described in this appendix is the current implementation of a system that provides the user of the PR-EDB with the necessary tools to process the data and to create a variety of tables, fits, and graphs for reports and verification of irradiation embrittlement predictions. The present version is far from complete; many important tasks remain which are not yet part of this software package and must be performed through the dBASE or compatible software. In particular, any direct editing of data and the elimination of duplicate records can currently be done only through calls to dBASE. Also, the combination of data from several different files by means of key identifiers needs to be done through dBASE. Software to facilitate these tasks will be part of later updates.

The current version of the software package EDB-Utilities has been written in the Clipper language, which allows compilation of dBASE procedures and has facilities for menu and help screens so that the user can usually run the program without additional instructions. A detailed user's manual will be available in the near future. The program package provides the means for a number of file-manipulation tasks, including the display of data on the computer screen and hardcopy to a printer. The dBASE and related software, such as Clipper, lack the facility for extensive mathematics/statistics calculations and scientific graphs. Some plotting and fitting programs are written in FORTRAN using the IMSL and GRAFMATIC libraries and require ASCII files as input. The ASCII files for the plotting program can be created through the EDB-Utilities file-manipulation feature. Another ASCII file that is needed for input to the fitting of raw Charpy data, RAW_C_PR.dat, has been created from the file RAW_C_PR.dbf and is part of the PR-EDB set of diskettes. Also included is the ASCII file RAW_C_RS.dat, which contains the results of the Monte Carlo uncertainty analysis and can be used as input for the multiple fitting program.

The primary output device for graphic presentations by the EDB-Utilities is the monitor screen in EGA format. (Other formats, e.g., VGA, are considered for future releases.) Utilities are available to transfer the screen picture to the printer, for instance, GRAFPLUS (Sect. A.7). Creating output for plotting devices (e.g., HP plotters) is not part of the current version of the EDB_Utilities but is being considered for future releases.

A.2 EDB-UTILITIES SOFTWARE PACKAGE

The EDB-Utilities package has been designed to provide the end user of the Embrittlement Data Base with convenient means to manipulate, view, plot, and fit the data that are given in dBASE format. There are four major options that can be selected from the first menu (Fig. A.1).

EDB PROGRAM

Fig. A.1. Major options selected from first menu.

1. File-Manipulation Procedures. This option is not restricted to PR-EDB files; any file in dBASE format can be processed. Specifically, the following operations can be performed:

- a. Retrieve a file for manipulation
- b. Add or delete fields
- c. Use numerical data for calculations and place results in user-defined fields
- d. Add or delete records
- e. Reorder records
- f. Display or export data
- g. Save working file

A detailed explanation of the different operations will be given in Sect. A.3.

2. Plot Data Exported from EDB files. Numerical data from dBASE files can be exported to ASCII files, as described in Sect. A.3.7, and can be represented in scatter plots with automatic scaling and labeling. Specific curves can be added to the graph as an option. Details are given in Sect. A.4.

3. Fit and Plot Charpy Impact Data from EDB files. Raw Charpy impact data from the file RAW_C_PR.dbf, once in ASCII format, can be fitted to a hyperbolic tangent curve and the results plotted. A Monte Carlo uncertainty analysis program is included which determines the uncertainties in the fitting parameters given the uncertainties in impact energy and test temperature of the original data. The following options are provided:
 - a. Single-curve fitting and plotting
 - b. Multiple-curve fitting and plotting
 - c. Monte Carlo uncertainty analysis
 - d. Extracting selected Charpy sets

Details are given in Sect. A.5.

4. Run dBASE III PLUS. This option allows the user to run the dBASE program without exiting EDB-Utilities, provided dBASE III PLUS has been properly installed. The user can, in this manner, easily switch between different options and edit or perform other tasks in dBASE for which no provisions are given in the EDB-Utilities package. Note that all fields in the PR-EDB files are character fields, and any numerical manipulation of data must first use the VAL(...) function to obtain numbers, and convert the results back to character strings using STR(...).

A.3 FILE-MANIPULATION PROCEDURES

File-manipulation procedures are shown schematically in Fig. A.2.

A.3.1 General Considerations

The PR-EDB consists of a number of data files in dBASE format. Each file can be considered as a table of data; the columns of the table are called Data Fields and the rows, Records. Each data field has a given length FIELD_LEN, a unique identifier FIELD_NAME, and a FIELD_TYPE, which declares the data as either "character," or "numeric," or "date" fields, and this information is coded in a special manner at the head of the dBASE files.

All data fields in the PR-EDB are of character type; this allows one to use blanks for missing data and also the introduction of scientific notation, for which dBASE III PLUS has no provisions. However, the actual data types must be provided in some way to processing codes in order to perform calculations, comparisons, and orderings. For this reason, a "structure file" is assigned to each data file which has the same name but the extension .str instead of .dbf (e.g., REAC_PR.dbf has the structure file REAC_PR.str). A structure file has the same first five fields as a dBASE structure file, but in addition a field F_T for the actual field type, which can be C for character, N for numeric, S for scientific notation, and D for date. It also has a field DESC which contains a detailed description of the data field plus the type of units used in brackets [...]. This information is displayed in menu screens concerning data fields and is used to label the axes in the plots that are generated in the plotting option of EDB-Utilities.

All file-manipulation procedures, such as changing data fields or records, reordering, and displaying are never performed on the original data file; the input file is first copied to a "working file" WORK.dbf, and the associated structure file, to STRUCT.dbf. A dBASE-type structure file TMP.S.dbf is also needed for some file-manipulation procedures. After performing the desired procedures, the working files may be saved to new files, or the old files may be overwritten. The working files remain in the directory and can be accessed again by the EDB-Utilities, even after the program has been temporarily terminated. The original files remain as they are unless overwritten by the user.

Fig. A.2. EDB-Utilities file-manipulation procedures.

A.3.2 Retrieval of Files for Manipulation

Any dBASE file can be processed by the manipulation option of EDB, including the structure files. The input files need not be PR-EDB files (i.e., containing only character fields), but the working file WORK.dbf has this property. A new structure file is created if an associated structure file is not present or is incompatible with the input file. Field names used in the EDB files are listed in a file STR_ALL.dbf, and this file is used to put information in the new structure file for such field names. Other information must be entered by the user, who can also change the information from STR_ALL.dbf, if necessary. The new structure file is saved if none was previously available, but old files are not overwritten, even if they are incompatible. The working file WORK.dbf has no associated index file. However, an index file can be used with the input file to ensure the proper order in the working file.

A.3.3 Addition or Deletion of Fields

Fields can be added to the working file for storing the results of calculations, and only these fields can be used for this purpose. However, fields added in a previous run to a file that was subsequently saved can still be used for results after later retrieval of the file. Any field can also be deleted including ones that had been added previously. Both additions and deletions become final only after the modification command is given; tentative additions and/or deletions can be aborted, if necessary.

A.3.4 Addition and Deletion of Records

Records can be deleted from the working file according to conditions entered by the user. This step is done using the option "Select Records From Working File." Note that the deletion of records in dBASE is a two-step procedure; first records to be deleted are marked and following that the marked records are completely eliminated. The marked records can be restored as long as the final elimination step has not been executed. Consequently, there are two options in the selection procedure, namely deletion (marking) of records and restoring (unmarking). All records can be deleted if the restoration option is entered before deleting any records. Both procedures are done for records that satisfy conditions that are entered by the user in the menu screens provided. Using suitable sequences of deletions and restorations, practically all selection criteria can be satisfied (see Examples, Sect. A.6). After the selection procedure is completed, all deleted (i.e., marked) records are removed (eliminated) and can no longer be restored. Selections can also be aborted in case of an error.

Records can be added to the working file by appending them from another dBASE file. This file need not be a PR-EDB file or a saved working file and may have numerical or date fields. All data are again converted into character fields before appending. Data are appended according to the field names, which must be the same in the working and the added file.

A.3.5 Calculations

A variety of numerical operations can be performed on fields of numerical- or scientific-type data, with the results entered into user-defined scientific fields. Only one operation at a time can be performed, namely addition, subtraction, multiplication, division, exponentiation plus exponential function, and logarithm. More complicated formulas can be calculated in a properly chosen sequence of operations using, perhaps, some auxiliary fields for temporary storage. A warning is given for improper operations such as division by zero, and a blank record is given as a result. A blank is also given if one of the operations has a blank record, indicating missing data.

A.3.6 Reordering

No index files are associated with the working file, but records can be sorted in any manner by entering the ordering criteria in the menu screen provided. The chosen arrangement can be saved in an output file, if desired.

A.3.7 Display and Export

The data in the working file can be displayed on the screen or printed. A menu is provided which allows the selection of fields to be displayed or printed in any desired order. For printing, the user must supply the number of characters per line and the number of lines per page. The fields will be distributed over several pages if the width of the output exceeds the number of lines permitted, and, of course, if there are more records than the number of lines per page. The data can also be saved in an output file that is formatted in a manner suitable for subsequent plotting with the EDB-Utilities plotting program.

A.3.8 Save Working File

The working file and the associated structure file can be saved by copying them under a user-specified name. A warning will be given if a file under this name already exists, but overwriting an existing file is permitted, destroying the old file in the process.

A.4 PLOTTING PROGRAM

The data input for the plotting program (Fig. A.3) is prepared by the file-manipulation procedures and exported to special plot files as described in the previous Sect. A.2. Data from up to ten different files can be put in the same plot with different symbols assigned to each data set. Once the plotting program has been called from the main menu, the following information must be given:

1. The name of the structure file that was associated with the working file from which the data set was prepared. The sole purpose of this file is to provide the information about which data fields should be used for the x- and y-coordinates, respectively. Thus, any structure file may be used which has the corresponding numerical data fields in it, even if another working file was used to create the plot input. The field names used for coordinates must be common to all plot files for the same plot but other fields may differ.
2. The plot title. The title will appear in large letters on top of the plot.
3. Data fields for the coordinates. The user selects these fields from an input screen that shows the numerical fields in the structure file. The descriptions and units given in the structure file will be used for labeling the coordinate axes.
4. Names of the plot files and associated descriptions. The data descriptions will be used for (optional) legends that can be placed at any desired location in the plot and will appear in the same sequence as they are entered in the screen. Blanks as descriptions will be ignored in the legend.
5. Curves. Certain types of curves can be placed on the plots in addition to the data points. The user selects the desired type of curves from the menu screen and may also enter legends for these curves.
6. Symbols and colors. An option is provided for selecting symbols and colors (for color monitors and printers) for the different data sets and the curves. Dashes of different densities can be selected for the curves.

Once the input is given, a picture of the plot will appear on the screen. Scaling and labeling of the axes are automatic, using the information from the input data and structure files. The user will be asked to place the legend at some location in the plot where it does not interfere with the data points and curves. The plot may then be sent to the printer if the necessary connections are in place.

All input data for the plot, including information about curves, symbols, and colors, are saved and can be used with subsequent plots. The user can choose to use the same plot data again, with a possible change in curves, symbols, colors, and the placement of the legend. The input information may also be changed selectively or completely erased (this applies only to the information that is generated during the plotting procedure, such as name of input files, title, and legends, but not to the data files which remain intact).

Fig. A.3. Flowchart for EDB-Utilities plotting program.

A.5 CHARPY FITTING AND PLOTTING

Procedures for fitting and plotting of raw Charpy data are shown schematically in Fig. A.4.

Fig. A.4. Procedures for fitting and plotting raw Charpy data.

A.5.1 General Considerations

The EDB-Utilities software allows the creation of fits and plots for any given set of raw Charpy data using the hyperbolic tangent function. Each set of raw Charpy data is uniquely identified by the keys PLANT_ID + CAPSULE + HEAT_ID + SPEC_ORI, and all data points having the same combination of these four identifiers are combined into the same set, unless the sequence of data records is interrupted by a record that contains different key identifiers. The program requires an input file in ASCII format, RAW_C_PR.dat, that was created from the PR-EDB file RAW_C_PR.dbf. All data are converted to U.S. units, the unit fields are removed, and a one-character field is added in front of SPEC_ID. If this field contains an asterisk, the record will be excluded from processing; this feature is useful for removing outliers. No outliers are tagged in this

way in the attached files, but an example is given below (see Figs. A.7 and A.8). The modified file was then converted to ASCII format using the dBASE command "Copy to RAW_C_PR.dat SDF."

The fitting procedure is completely automated. Upper and lower shelf values are restricted by adding a penalty proportional to the deviation from initial estimates to avoid unphysical fits. A first inspection of the points is made to obtain a rough estimate for the initial values of the curve parameters. A nonlinear least-squares fitting program ZSSQ from the IMSL library is used to determine the best fit, which is then plotted and appears on the screen, including data points with automatic scaling and labeling of the axes in both U.S. and international units. The plots can be sent to the printer, including a summary of transition temperatures and upper shelf data (in international units). All internal calculations are done in international units, centigrade and joule. Currently, no options are available to fit and plot lateral expansion or fracture appearance versus test temperature data. A detailed report of the fitting and uncertainty analysis will be available in the near future.

As stated in Sect. A.2, Item 3, there are four options for this part of the program.

A.5.2 Single-Curve Fitting and Plotting

In this option, the selected data sets are fitted and plotted, one at a time, with optional printing of the results. Titles and subtitles for the plots can be either given individually or at the start of the procedure, with the key identifiers serving as subtitles. The user has the option to skip any data set and to terminate the procedure without reading the whole input file.

A.5.3 Multiple-Curve Fitting and Plotting

With this option, up to ten different fits can be placed into one plot which is useful for comparing data before and after irradiation. The user enters the overall title and legends for the individual fits. Default legends can be used which contain the capsule and the total fluence (>1.0 MeV). Legends can be placed by the user at a separate spot in the plot.

A.5.4 Monte Carlo Uncertainty Analysis

Uncertainties for the fitting parameters are needed to determine accuracy and credibility of the transition temperature and upper shelf data. A covariance matrix of the fitting parameters is part of any least-squares procedure, but these covariances are not used for uncertainty analysis in the EDB-Utilities. The unavoidable linearization used for determining the covariances disregards second-order effects, and there is no possibility to account for uncertainties in test temperature. A more reliable procedure is the use of random variations of the input data (Monte Carlo procedure); such variations can be applied to both impact energy and test temperature, and the results reflect more accurately the influences of nonlinearities. The necessary computing time is, of course, increased by a large factor but remains manageable for today's computers. Because this option is completely automated, including printing the plots, a fairly large amount of data sets can be processed overnight or over a weekend. Nonphysical results and results that deviate substantially from the mean are eliminated from the sampling. This has the added advantage that fits can be obtained even after some tries have failed initially.

The user enters the (one-standard deviation) uncertainties for the impact energy and test temperature and the number of iterations. Unsuccessful iterations (i.e., the ones rejected by the program as nonphysical or inconsistent with the rest) are not counted; however, the total number of tries may not exceed five times the specified iteration number. Also needed is the number of sets to be skipped at the beginning of the input data file and the number to be processed. Processing is done, one set at a time, in sequence, starting after the specified number of sets have been skipped. A more specific selection can be obtained by using, as the input data file, the one created by the selection procedure (Sect. A.5.5). Continuous plotting and printing can be chosen as an option, with the user providing the common title and the key identifiers as a subtitle.

Three output files are created by the procedure, the names of which are either entered by the user or assigned by default. The "Summary Output File" (default name FORT15; the 15 in FORT15 is the unit number of the FORTRAN output file) is a list which contains the set number, key identifiers, fluence, irradiation temperature, transition temperature at 41 J and 68 J (30 ft-lb and 50 ft-lb), upper and lower shelf energy (all in international units), the number of specimens in the set, and the number of successful iterations for each processed set. The "Covariance Output File" (default name FORT16) contains mean values, standard deviations, and correlations for all fitting parameters which include the transition temperature at the center of the curve and 1/slope, which is one-half of the impact energy range of the transition region. The "EDB_dBASE Output File" (default name FORT17) is intended for conversion to a dBASE file whose data are an alternative to the file SHFT_PR. This file can also be used as an "auxiliary" input file in the multiple fitting option (Sect. 5.3). Its data are given in U.S. units. A "status report" listing the results from all successful and unsuccessful iterations is placed on the screen during the procedure. The screen output can be redirected to a file as an option.

The complete file RAW_C_PR.dat has been processed with this program, with 10 J and 4°C as input uncertainties for impact energy and test temperature, respectively, and 200 iterations. The summary and dBASE output files, RAW_C_PR.sum and RAW_C_RS.dat, respectively, are included in the data disks. The dBASE version of RAW_C_RS.dat (RAW_C_RS.dbf) is also included in the package. The covariance file, which is very large and of limited usefulness, is not included, but a sample printout is given with the examples.

A.5.5 Extracting Selected Charpy Sets

The raw data files for individual Charpy sets are quite large and thus require long search times in sequential access. It is, therefore, convenient and saves time to copy small subsets from a larger file, if such subsets are processed repeatedly. This is accomplished through the data-selection option. The user specifies the selection criteria and may, in addition, skip certain sets and terminate the procedure without going through the rest of the input file. No processing is done during this option, but the user-specified output file (default FORT20) can now serve as an input file for any subsequent processing step.

A.5.6 Selection of Input Files and Data Sets

The four options require essentially the same input information that is requested in several input screens:

1. Names of input data files, primary and auxiliary. The primary input file is RAW_C_PR.dat which is included in the package and given as default at the menu. The user may change this name to that of any other data file that contains raw Charpy data in the same format, for instance, one obtained from the selection procedure described in Sect. A.5.5. The multiple-fitting option permits the use of an additional, "auxiliary" input file that contains the values of the fitting parameters as generated by the Monte Carlo uncertainty analysis as EDB-dBASE output file. The file RAW_C_RS.dat is included in the package and appears as default. Its use is optional and allows the user to bypass the least-squares fitting, speeding up the process and avoiding problems with convergence. The data sets in the primary and auxiliary files need not be identical or in the same sequence.
2. Selection criteria. Reactors and materials can be selected for processing by entering the selection criteria in the appropriate menu screen. These criteria are not used in Monte Carlo uncertainty analysis. The Monte Carlo uncertainty analysis is designed to process a large number of data sets in sequence without user intervention. Consequently, only the starting number and the number of sets to be processed can be given. The number associated with each set can be found in the (ASCII) file RAW_CPY.SUM. These numbers are entered in the input screen as discussed in Sect. A.5.4.
3. Selection of symbols and colors. This is essentially the same procedure as for plots in Sect. A.4, Item 6. Data points that are excluded from the fitting procedure can be plotted using different symbols. Such points can also be completely eliminated from the plot by using the empty symbol (zero symbol) for rejected data points.

A.6 EXAMPLES

The following examples are intended as exercises for the user of the EDB-Utilities to guide the user through the various options and to show typical applications of these processing steps. It is assumed that the user will try to duplicate the sequence of processing steps which are listed in the following pages and to verify the results. The reader of this report who is only interested in the capabilities of the EDB-Utilities may have difficulty in understanding the listing of processing steps without running the program and may safely skip these parts, concentrating on the general introductions and resulting tables and graphs.

The EDB-Utilities program is started by typing EDB. The user then selects the various options as indicated below.

A.6.1 File-Manipulation Procedures with Plots

In the following example, the relation between shift in transition temperature and upper-shelf energy drop will be investigated. This example was chosen because it makes use of most of the file-manipulation features and needs only one PR-EDB raw data file SHFT_PR.dbf. For more in-depth investigations, chemistry data need to be added which would require additional processing with dBASE software. Also, the proposed manipulation of the data file could be done, perhaps faster, directly in dBASE by someone familiar with the software. However, the creation of the plot file and the actual plotting requires the EDB-Utilities software.

This example compares the values given in DTT30 for the shift of transition temperature at 30 ft-lb with the relative upper-shelf drop given in DUSE_REL in percent. However in many reports, these values are not listed directly and only the transition temperatures, UTT30 and ITT30, and upper shelf energies, UUSE and IUSE, for unirradiated and irradiated conditions are given, from which the shift values can easily be calculated. Thus, two new fields are added to the input file, DTT and DUSE, which will contain either the reported or calculated value, whatever is available, with preference for the directly reported value. The values for base material (plates, forgings, and standard reference materials) and welds will be separated. Heat-affected-zone data will be ignored.

Using the file-manipulation option, the following sequence of procedures will be performed:

Retrieve:	SHFT_PR.dbf
Delete records:	PROD_ID = HAZ
	TEMP_U <> F*
	USE_U <> FT-LB
	(data with non-U.S. units are eliminated; conversion to U.S. units is another possibility)

*The symbol <> (abbreviation for < or >) stands for "not equal". Symbols are listed as they appear on the menu screen (and dBASE commands).

Add two user-defined fields: Name and description as follows

DTT	Shift in Transition Temperature @ 30 ft-lb [degree F]
DUSE	Upper Shelf Drop [Percent] (text in brackets [] are units for the plot)

Save working file: to a temporary file (e.g., TMP0)

Delete records: DUSE_REL <= 0
(use reported USE_REL with positive drop only)

Calculate: DUSE = DUSE_REL + 0 (put DUSE_REL into DUSE)

Save working file: to another temporary file (e.g., TMP01)

Retrieve: TMP0.dbf

Delete records: DUSE_REL <> 0 (retain records without DUSE_REL)
UUSE <= 0
IUSE <= 0 (eliminate missing UUSE and IUSE values)

Calculate: DUSE = UUSE - IUSE
DUSE = DUSE / UUSE
DUSE = DUSE * 100
(put calculated values (UUSE - IUSE)/UUSE * 100 to DUSE)

Delete records: DUSE <= 0 (eliminate negative USE drop)

Add records: From TMP01.dbf

The working file now contains both reported and calculated relative drop values for USE with preference for reported values and negative drop values eliminated. A similar sequence can be performed for shift in transition temperature:

Save working file: to a temporary file (e.g., TMP1)

Delete records: DTT30 <= 0

Calculate: DTT = DTT30 + 0 (puts DTT30 into DTT)

Save working file: to another temporary file (e.g., TMP11)

Retrieve: TMP1.dbf

Delete records: DTT30 <> 0 (eliminate reported DTT30)

Calculate: DTT = ITT30 - UTT30 (put calculated shift into DTT)

Delete records: DTT <= 0 (eliminate negative shift)

Add records: From TMP11.dbf

The working file now contains all the desired values for transition temperature shift and upper shelf drop in the two newly created fields DTT and DUSE. These values are ready for printing and plotting. Through the processes of deleting and adding, the original sequence of records has been destroyed. It may be desirable to put the records in some new order before printing (the order of records is immaterial for plotting), for instance, through:

Reorder records: DTT - ASCENDING

By sending selected fields of the working file to the printer, one obtains the list in Table A.1. For plotting, it may be desirable to have different symbols for base materials and welds. This can be accomplished by selecting subsets of records from the file before exporting them to the plot files. First, the working file must be saved to a permanent file:

Save working file: to DTT_US.dbf

Delete records: PROD_ID = W (for base material)

Export to plot file: to BASE.dat

Retrieve: DTT_US.dbf

Delete records: PROD_ID <> W (for weld material)

Export to plot file: to WELD.dat

The data are now ready for plotting. After selecting the plotting option, the following input must be entered:

Title: Shift in Transition Temperature versus Upper Shelf Drop

Structure File: DTT_US (any of the temporary files will do also)

Coordinates: DTT for x-coordinate, DUSE for y-coordinate

Input files and legends: BASE.dat - Base Material
 WELD.dat - Weld Material

The present plot needs no additional curves, but suitable symbols and colors may be selected. Following that, the plot is created automatically. The last step is to put the legends at an appropriate place after prompting. The finished plot is shown in Fig. A.5. There seems to be a near linear relation between transition temperature shift and upper shelf drop for low shift values, although the USE drop appears to level off at high shift values. No obvious distinctions between base metal and welds can be seen. The data scatter is rather large and suggests further investigation of additional factors which may influence the relation between CVT shift and USE drop.

Table A.1. Transition temperature shifts versus upper shelf drop
from example, Sect. A.6.1. Data are arranged according to
increasing transition temperature shift

Shift in Transition Temperature vs. Upper Shelf: Page 1													
PLANT_ID	CAPSULE	HEAT_ID	PROD_ID	SPEC_ORI	CSP_F1	UTT30	ITT30	DTT30	DTT	UUSE	IUSE	DUSE_REL	DUSE
DB1	A	FDB101	F	TL	1.290E+19	-26	-24	2	2.000E+00	140	127		9.286E+00
NA2	V	VNA201	M	TL	2.410E+18	-26	-24	2	2.000E+00	115	92		2.000E+01
DR2	3	WDR201	M	TL	1.300E+16	-10	-8	2	2.000E+00	101	96	5	5.000E+00
DB1	D	FDB102	F	TL	9.620E+18	16	19	3	3.000E+00	122	117		4.098E+00
VF3	V97	PVF301	P	LT	6.470E+18	0	3	3	3.000E+00	170	154		9.412E+00
BD2	U	FBD201	F	TL	3.910E+18	-25	-20	5	5.000E+00	153	137		1.046E+01
CB1	Z	WCB101	M	TL	3.080E+18	-35	-30	5	5.000E+00	128	123		3.906E+00
SO2	W97	WSO201	M	LT	5.540E+18	-61	-54	7	7.000E+00	146	140	4	4.000E+00
NA2	V	FNA201	F	TL	2.410E+18	60	69	9	9.000E+00	75	62		1.733E+01
AD1	V	VAD101	M	TL	4.580E+18	-80	-70	10	1.000E+01	171	155		9.357E+00
FA2	U	WFA201	M	TL	5.610E+18	-30	-20	10	1.000E+01	144	132		8.333E+00
ST1	U	PST101	P	LT	2.930E+18	-35	-25	10	1.000E+01	137	132		3.650E+00
AN2	W97	PAN201	M	TL	3.340E+18	0	10	10	1.000E+01	154	147	5	5.000E+00
SB1	U	WSB101	M	TL	3.110E+18	-60	-50	10	1.000E+01	160	129	19	1.900E+01
OC2	E	FOC201	F	LT	1.210E+19	-24	-12	12	1.200E+01	152	136		1.053E+01
TM1	C	PTM101	P	TL	8.660E+18	28	41	13	1.300E+01	98	79		1.939E+01
CL1	Y	PCL101	P	LT	1.290E+19	-5	10	15	1.500E+01	126	118		6.349E+00
BR	119	SHB3	SRM	LT	1.500E+18			15	1.500E+01			27	2.700E+01
BR	119	SHB3	SRM	LT	1.500E+18			15	1.500E+01	96	70	27	2.700E+01
BR	121	WBR_01	M	TS		-70	-55	15	1.500E+01	95	92	3	3.000E+00
PH3	1	PPH301	P	LT	1.600E+17	-14	2	16	1.600E+01	137	123	10	1.000E+01
PH3	1	WPH301	M	LT	1.600E+17	2	18	16	1.600E+01	110	100	9	9.000E+00
OC3	B	FOC302	F	TL	3.120E+18	-9	10	19	1.900E+01	112	100		1.071E+01
VY	300	PVY_01	P	LT	4.300E+16	8	27	19	1.900E+01	148	128	14	1.400E+01
CB2	Z	PCB201	P	LT	3.360E+18	-15	5	20	2.000E+01	138	132		4.348E+00
KVE	R	FKVE02	F	LT	2.070E+19	-50	-30	20	2.000E+01	157	153		2.548E+00
PB2	V	FPB201	F	LT	4.740E+18	-55	-35	20	2.000E+01	145	135		6.897E+00
PI1	P	FPI101	F	LT	1.250E+19	-25	-5	20	2.000E+01	158	142		1.013E+01
WC1	U	WVC101	M	TL	3.390E+18	-50	-30	20	2.000E+01	100	92		8.000E+00
CR3	B	PCR301	P	TL	1.000E+18	16	37	21	2.100E+01	94	89		5.319E+00
NA1	V	FNA101	F	TL	2.490E+18	46	65	21	2.100E+01	85	75		1.176E+01
SL2	W83	PSL201	P	TL	1.630E+18	40	61	21	2.100E+01	117	111		5.128E+00
AN2	W97	PAN201	P	LT	3.410E+18	3	24	21	2.100E+01	159	140	12	1.200E+01
TRO	U	VTRO01	M	TL	3.880E+18	2	24	22	2.200E+01	83	81		2.410E+00
FT2	1	PFT201	P	LT	2.600E+17	-32	-9	23	2.300E+01	130	122	6	6.000E+00
SR1	U	WSR101	M	TL	5.520E+18	-35	-11	24	2.400E+01	94	82		1.277E+01
SR1	U	WSR101	M	TL	5.520E+18	-35	-11	24	2.400E+01	92	82		1.087E+01
AD1	V	FAD101	F	LT	4.580E+18	-25	0	25	2.500E+01	141	127		9.929E+00
AD1	V	FAD101	F	TL	4.580E+18	-22	3	25	2.500E+01	128	119		7.031E+00
BY2	U	WBY201	M	TL	5.990E+18	-35	-10	25	2.500E+01	139	134		3.597E+00
GIN	V	FGIN01	F	LT	4.900E+18	-40	-15	25	2.500E+01	183	160		1.257E+01
KVE	P	FKVE01	F	LT	2.890E+19	-25	0	25	2.500E+01	160	157		1.875E+00
SO2	T	FSO201	F	TL	2.200E+18	0	25	25	2.500E+01	88	82		6.818E+00
SR1	V	WSR101	M	TL	1.320E+19	-35	-10	25	2.500E+01	92	81		1.196E+01
ZM1	T	PZM101	P	TL	1.800E+18	25	50	25	2.500E+01	117	114		2.564E+00
PL1	1	PPL101	P	LT	2.300E+17			25	2.500E+01			10	1.000E+01
CR3	B	WCR301	M	TL	1.170E+18	36	64	28	2.800E+01	79	70		1.139E+01
DB1	A	FDB102	F	TL	1.290E+19	16	44	28	2.800E+01	127	118		7.087E+00
SB1	U	PSB101	P	TL	3.110E+18	10	38	28	2.800E+01	79	72	9	9.000E+00
CL1	U	PCL101	P	TL	3.270E+18	-20	10	30	3.000E+01	104	93		1.058E+01
GIN	T	FGIN01	F	LT	1.750E+19	-40	-10	30	3.000E+01	183	143		2.186E+01
OC2	13	WOC201	M	TL	1.690E+16	-30	0	30	3.000E+01	125	107		1.440E+01
ST1	U	PST101	P	TL	2.930E+18	-5	25	30	3.000E+01	113	105		7.080E+00
TM1	C	PTM101	P	LT	8.660E+18	-27	3	30	3.000E+01	131	114		1.298E+01
VS1	U	WVS101	M	TL	6.390E+18	-55	-25	30	3.000E+01	91	87		4.396E+00
WC1	U	PWC101	P	LT	3.390E+18	-20	10	30	3.000E+01	148	145		2.027E+00
WC1	Y	PWC101	P	LT	1.330E+19	-20	10	30	3.000E+01	148	121		1.824E+01
OC3	D	FOC301	F	TL	1.450E+19	-9	22	31	3.100E+01	144	125		1.319E+01
OC3	B	FOC301	F	TL	3.120E+18	-9	12	32	3.200E+01	148	125		1.554E+01
SO3	W97	WSO301	M	TL	8.000E+18	-27	5	32	3.200E+01	82	70	15	1.500E+01
OC1	A	POC102	P	TL	8.950E+18	5	39	34	3.400E+01	108	106		1.852E+00
AM1	B	PAM102	P	LT	4.280E+18	-13	22	35	3.500E+01	147	123		1.633E+01
ML3	U	PML301	P	TL	4.320E+18	5	40	35	3.500E+01	111	108		2.703E+00
PB2	R	FPB201	F	LT	2.010E+19	-45	-10	35	3.500E+01	145	140		3.448E+00
PI2	T	FPI201	F	TL	1.050E+19	0	35	35	3.500E+01	108	93		1.389E+01
SL2	W83	PSL201	P	LT	1.620E+18	3	38	35	3.500E+01	133	118		1.128E+01
KO1	T	FKO101	F	TL	9.800E+18	-75		35	3.500E+01	168	139	17	1.700E+01
KO1	V	FKO101	F	LT	1.520E+18	-55		35	3.500E+01	175	155	11	1.100E+01
ML1	Z	WML101	M	TS	3.300E+17	-45	-10	35	3.500E+01	112	75	33	3.300E+01
VF3	W97	PVF301	P	TL	6.470E+18	-29	7	36	3.600E+01	141	123		1.277E+01
VF3	W97	WVF301	M	TL	6.470E+18	-80	-44	36	3.600E+01	156	143		8.333E+00
SB1	U	PSB101	P	LT	3.110E+18	-25	11	36	3.600E+01	125	118	6	6.000E+00
PI1	P	FPI101	F	TL	1.250E+19	-27	10	37	3.700E+01	143	136		4.895E+00
SR1	V	WSR101	P	TL	1.320E+19	65	102	37	3.700E+01	70	64		8.571E+00
AN1	C	PAN101	P	TL	1.460E+19	17	55	38	3.800E+01	96	80		1.667E+01

Table A.1 (continued)

Shift in Transition Temperature vs. Upper Shelf: Page 2													
PLANT_ID	CAPSULE	HEAT_ID	PRCD_ID	SPEC_ORI	CSP_F1	UTT30	ITT30	DTT30	DTT	UUSE	IUSE	DUSE_REL	DUSE
ZN2	U	PZH201	P	LT	2.000E+18	37	75	38	3.800E+01	128	121		5.469E+00
NA1	V	FNA101	F	LT	2.490E+18	-6	33	39	3.900E+01	135	122		9.630E+00
OC1	C	POC102	P	TL	9.860E+19	18	94	39	3.900E+01	108	96		1.111E+01
OC3	B	SHSS02	SRM	LT	3.120E+18	56	95	39	3.900E+01	130	96		2.615E+01
DR2	4	PDR201	P	LT	9.500E+18	0	39	39	3.900E+01	153	117	24	2.400E+01
CL1	Y	WCL101	W	TL	1.290E+19	-55	-15	40	4.000E+01	112	97		1.339E+01
ML3	U	WML301	W	LT	4.320E+18	-35	5	40	4.000E+01	143	135		5.594E+00
OC2	12	POC201	P	LT	1.270E+19	-15	25	40	4.000E+01	135	123		8.889E+00
VS1	U	PVS101	P	LT	6.390E+18	-20	20	40	4.000E+01	133	131		1.504E+00
BR	127	SHM3	SRM	LT	7.100E+18			40	4.000E+01			15	1.500E+01
BR	127	SHM3	SRM	LT	7.100E+18	0	40	40	4.000E+01	96	82	15	1.500E+01
CK2	T	WCK201	W	TL	1.800E+18			40	4.000E+01			3	3.000E+00
SR1	V	PSR101	P	LT	1.320E+19	60	101	41	4.100E+01	86	80		6.977E+00
DAC	1	PDAC01	P	LT	4.900E+17	-35	7	42	4.200E+01	164	160	3	3.000E+00
DR1	4-1	WDR101	W	TS	1.000E+19	0	43	43	4.300E+01	110	91	17	1.700E+01
OC2	18	WOC201	W	TL	6.600E+16			43	4.300E+01			27	2.700E+01
CL1	Y	PCL101	P	TL	1.290E+19	-20	25	45	4.500E+01	104	91		1.250E+01
NC1	U	PMC101	P	LT	4.140E+18	5	50	45	4.500E+01	140	133		5.000E+00
NC1	X	PMC101	P	LT	1.380E+19	5	50	45	4.500E+01	140	133		5.000E+00
OC2	C	WOC201	W	TL	1.020E+18	4	49	45	4.500E+01	67	54		1.940E+01
OC3	D	FOC302	F	TL	1.450E+19	-9	36	45	4.500E+01	112	93		1.696E+01
SR1	U	PSR101	P	TL	5.520E+18	65	110	45	4.500E+01	70	69		1.429E+00
SR1	U	PSR101	P	TL	5.520E+18	65	110	45	4.500E+01	70	69		1.429E+00
SU2	X	PSU201	P	TL	3.020E+18	5	50	45	4.500E+01	105	95		9.524E+00
TRO	V	VTRO01	W	TL	2.370E+19	2	47	45	4.500E+01	83	62		2.530E+01
VS1	V	JVS101	W	TL	1.470E+19	-60	-15	45	4.500E+01	91	85		6.593E+00
SO2	W97	PSO201	P	TL	5.540E+18	21	65	45	4.500E+01	126	105	17	1.700E+01
PB2	S	FPB201	F	LT	3.470E+19	-45	2	47	4.700E+01	145	134		7.586E+00
AN1	A	PAN101	P	LT	1.030E+19	-31	17	48	4.800E+01	132	108		1.818E+01
OC3	A	WOC301	W	TL	8.100E+17	45	93	48	4.800E+01	66	54		1.818E+01
NC1	U	PMC101	P	TL	4.140E+18	0	50	50	5.000E+01	101	100		9.901E-01
SA2	T	PSA201	P	LT	2.560E+18	30	80	50	5.000E+01	122	115		5.738E+00
SU1	T	PSU101	P	LT	2.500E+18	-10	40	50	5.000E+01	125	120		4.000E+00
WC1	Y	WCL101	W	TL	1.330E+19	-50	0	50	5.000E+01	100	94		6.000E+00
ZN2	U	SHSS02	SRM	LT	2.000E+18	50	100	50	5.000E+01	124	111		1.048E+01
AN2	W97	PAN201	P	TL	3.530E+18	10	60	50	5.000E+01	134	120	10	1.000E+01
CK2	Y	WCK201	W	TL	5.550E+18			50	5.000E+01			9	9.000E+00
DR2	S	PDR201	P	LT	1.900E+19	0	50	50	5.000E+01	139	127	9	9.000E+00
KO1	V	FKO101	F	TL	3.120E+18	-75		50	5.000E+01	168	140	16	1.600E+01
SO3	W97	PSO301	P	LT	8.000E+18	80	130	50	5.000E+01	92	70	24	2.400E+01
SO2	W97	PSO201	P	LT	5.540E+18	15	66	51	5.100E+01	151	134	11	1.100E+01
CTY	H	PCTY07	P	LT	1.790E+19	-30	23	53	5.300E+01	120	117		2.500E+00
IP2	T	PIP201	P	LT	2.020E+18			54	5.400E+01	118	100	15	1.500E+01
P12	T	FPI201	F	LT	1.050E+19	-25	30	55	5.500E+01	150	133		1.133E+01
SU2	X	PSU201	P	LT	3.020E+18	-5	50	55	5.500E+01	125	120		4.000E+00
BR	119	WBR_01	W	TS	1.500E+18			55	5.500E+01			16	1.600E+01
BR	119	WBR_01	W	TS	1.500E+18	-70	-15	55	5.500E+01	95	80	16	1.600E+01
CK2	T	PCK201	P	LT	2.300E+18			55	5.500E+01			12	1.200E+01
CPR	1	WCPR01	W	TL	2.300E+17	-10	45	55	5.500E+01	112	85	24	2.400E+01
PL1	1	WPL101	W	TL	2.300E+17			55	5.500E+01			18	1.800E+01
OC2	3	POC201	P	LT	4.140E+19	-15	40	55	5.500E+01	135	119	12	1.200E+01
SO3	W97	PSO301	P	TL	8.000E+18	50	105	55	5.500E+01	92	76	17	1.700E+01
CTY	H	PCTY02	P	LT	1.790E+19	-50	7	57	5.700E+01	135	130		3.704E+00
ML2	W104	WML201	W	TL	8.840E+18	-30	28	58	5.800E+01	132	108		1.818E+01
RS1	D	PRS101	P	TL	6.600E+18	4	62	58	5.800E+01	90	88		2.222E+00
DR2	2	WDR202	W	TL	1.870E+19	-13	45	58	5.800E+01	71	70	1	1.000E+00
DR3	12	PDR301	P	LT	9.250E+18	-10	48	58	5.800E+01	135	115	15	1.500E+01
NA1	1	PHA101	P	LT	2.400E+17	-70	-12	58	5.800E+01	139	131	6	6.000E+00
ML1	2	PHL101	P	LT	3.300E+17	15	73	58	5.800E+01	106	88	17	1.700E+01
CC1	W263	WCC101	W	TL	6.100E+18	-50	9	59	5.900E+01	160	119		2.563E+01
CC1	W263	PCC103	P	LT	6.000E+18	8	68	60	6.000E+01	138	115		1.667E+01
DR3	14	PDR301	P	LT	1.020E+19	-10	50	60	6.000E+01	135	112		1.704E+01
OC1	A	POC102	P	LT	8.950E+18	-5	55	60	6.000E+01	141	137		2.837E+00
P12	T	WPI201	W	TL	1.050E+19	-75	-15	60	6.000E+01	103	92		1.068E+01
P12	V	WPI201	W	TL	5.490E+18	-75	-15	60	6.000E+01	103	100		2.913E+00
SA1	T	SHSS02	SRM	LT	2.560E+18	50	110	60	6.000E+01	123	115		6.504E+00
SO2	T	FSO201	F	LT	2.200E+18	-70	-10	60	6.000E+01	134	118		1.194E+01
SU2	X	SHSS02	SRM	LT	3.020E+18	40	100	60	6.000E+01	125	115		8.000E+00
VS1	V	PVS101	P	LT	1.470E+19	-25	35	60	6.000E+01	132	122		7.576E+00
ZN1	T	PZN101	P	LT	1.800E+18	-5	55	60	6.000E+01	140	132		5.714E+00
ZN1	U	PZN101	P	TL	8.920E+18	25	85	60	6.000E+01	117	102		1.282E+01
BR	127	PBR_01	P	TL	7.100E+18			60	6.000E+01			11	1.100E+01
BR	127	PBR_01	P	TL	7.100E+18	-5	55	60	6.000E+01	82	73	11	1.100E+01
CK1	T	PCKT01	P	LT	1.800E+18	5	65	60	6.000E+01	130	108	16	1.600E+01
CK1	T	SHSS02	SRM	LT	1.800E+18	45	105	60	6.000E+01	120	102	15	1.500E+01

Table A.1 (continued)

Shift in Transition Temperature vs. Upper Shelf: Page 3

PLANT_ID	CAPSULE	HEAT_ID	PROD_ID	SPEC_ORI	CSP_F1	UT130	IT130	DT130	DTT	UUSE	IUSE	DUSE_REL	DUSE
FC1	W225	PFC101	P	LT	4.500E+18	22	82	60	6.000E+01	141	122	13	1.300E+01
SQ2	U	FSQ201	F	TL	6.430E+18	0	62	62	6.200E+01	88	80		9.091E+00
DR2	4	WDR202	W	TL	6.400E+18	-13	50	63	6.300E+01	71	51	28	2.800E+01
AX1	C	PAX101	P	LT	1.460E+19	-31	33	64	6.400E+01	132	109		1.742E+01
OC3	B	WOC301	W	TL	3.120E+18	45	109	64	6.400E+01	66	49		2.576E+01
OC3	B	WOC301	W	TL	3.120E+18	45	109	64	6.400E+01	66	49		2.576E+01
MC2	V	FMC201	F	LT	3.060E+18	-75	-10	65	6.500E+01	156	134		1.410E+01
DC2	U	PDC201	P	LT	3.510E+18	5	70	65	6.500E+01	144	124	15	1.500E+01
AX1	A	PAX101	P	TL	1.030E+19	17	83	66	6.600E+01	96	83		1.354E+01
DC1	S	SHSS02	SRM	LT	2.980E+18	46	112	66	6.600E+01	124	123		8.065E-01
ZN1	T	SHSS02	SRM	LT	1.800E+18	42	108	66	6.600E+01	124	106		1.452E+01
CTY	H	PCTY04	P	LT	1.790E+19	-24	43	67	6.700E+01	126	122		3.175E+00
SL1	W104	PSL101	P	LT	7.160E+18	8	75	67	6.700E+01	139	116		1.655E+01
CAB	P	PCAB02	P	LT	1.430E+19	-24	44	68	6.800E+01	125	123		1.600E+00
RS1	F	PRS101	P	TL	1.420E+19	4	72	68	6.800E+01	90	79		1.222E+01
SL1	W97	PSL101	P	LT	5.400E+18	8	76	68	6.800E+01	139	107	23	2.300E+01
CC2	W263	WCC201	W	TL	7.970E+18	-50	19	69	6.900E+01	137	105	23	2.300E+01
CL1	U	WCL101	W	TL	3.270E+18	-55	15	70	7.000E+01	112	101		9.821E+00
MC2	V	FMC201	F	TL	3.060E+18	-25	45	70	7.000E+01	94	85		9.574E+00
SA2	T	PSA201	P	TL	2.560E+18	10	80	70	7.000E+01	97	89		8.247E+00
SA2	U	PSA201	P	LT	5.700E+18	30	100	70	7.000E+01	122	112		8.197E+00
SQ1	T	FSQ101	F	LT	2.740E+18	-35	35	70	7.000E+01	116	98		1.552E+01
SU1	T	SHSS02	SRM	LT	2.500E+18	45	115	70	7.000E+01	123	105		1.463E+01
BR	122	PBR_01	P	TL	2.300E+19			70	7.000E+01			24	2.400E+01
BR	122	PBR_01	P	TL	2.300E+19	-5	65	70	7.000E+01	82	62	24	2.400E+01
CK1	T	PCK101	P	TL	1.800E+18	20	90	70	7.000E+01	94	84	10	1.000E+01
CK2	X	WCK201	W	TL	8.530E+18			70	7.000E+01			15	1.500E+01
FC1	W265	PFC101	P	TL	9.000E+18	36	106	70	7.000E+01	120	93	23	2.300E+01
ML2	W97	PML201	P	LT	3.750E+18	38	108	70	7.000E+01	131	94	28	2.800E+01
SL1	W97	PSL101	P	TL	5.400E+18	16	86	70	7.000E+01	103	78	24	2.400E+01
IP2	T	SASTM	SRM	LT	2.020E+18			72	7.200E+01	78	68	13	1.300E+01
SL1	W104	WSL101	W	TL	7.160E+18	-53	20	73	7.300E+01	144	108		2.500E+01
DC2	U	PDC201	P	TL	3.510E+18	26	99	73	7.300E+01	95	94	1	1.000E+00
CPR	I	PCPR01	P	LT	2.300E+17	-66	8	74	7.400E+01	129	112	13	1.300E+01
FC1	W265	PFC101	P	LT	9.000E+18	22	96	74	7.400E+01	141	109	23	2.300E+01
SL1	W97	WSL101	W	TL	5.300E+18	-53	21	74	7.400E+01	144	100	31	3.100E+01
HB2	T	PHB203	P	LT	4.110E+19	30	105	75	7.500E+01	114	105		7.895E+00
NA1	U	WNA101	W	TL	8.280E+18	-26	49	75	7.500E+01	95	92		3.158E+00
SQ1	U	FSQ101	F	TL	1.080E+19	45	120	75	7.500E+01	72	58		1.944E+01
SU2	V	PSU201	P	LT	1.880E+19	-5	70	75	7.500E+01	125	121		3.200E+00
SU2	V	PSU201	P	TL	1.880E+19	5	80	75	7.500E+01	105	94		1.048E+01
DR1	4-1	SHMS O	SRM	TS	1.000E+19	10	85	75	7.500E+01	67	58	13	1.300E+01
ZN2	T	PZN201	P	LT	8.700E+18			75	7.500E+01			19	1.900E+01
OC1	C	POC102	P	LT	9.860E+19	-5	34	76	7.600E+01	141	117		1.702E+01
PB2	S	FPB202	F	LT	3.470E+19	-80	-4	76	7.600E+01	180	163		9.444E+00
ML2	W97	WML201	W	TL	3.770E+18	-30	46	76	7.600E+01	132	98	26	2.600E+01
CTY	D	PCTY04	P	LT	2.220E+19	-24	54	78	7.800E+01	126	110		1.270E+01
FA1	U	WFA101	W	TL	1.650E+19	-80	0	80	8.000E+01	149	108		2.752E+01
FA1	Y	WFA101	W	TL	5.830E+18	-80	0	80	8.000E+01	149	130		1.275E+01
OC1	E	WOC101	W	TL	1.500E+18	-5	75	80	8.000E+01	64	55		1.406E+01
P11	R	FP1101	F	LT	4.030E+19	-25	55	80	8.000E+01	158	145		8.228E+00
SA2	X	PSA201	P	LT	1.160E+19	30	110	80	8.000E+01	122	120		1.639E+00
SQ2	T	WSQ201	W	TL	2.200E+18	-75	5	80	8.000E+01	112	110		1.786E+00
CK1	T	WCK101	W	TL	1.800E+18	-90	-10	80	8.000E+01	110	80	27	2.700E+01
CK2	T	PCK201	P	TL	2.300E+18			80	8.000E+01			14	1.400E+01
CK2	Y	PCK201	P	LT	7.010E+18			80	8.000E+01			19	1.900E+01
QC1	I	WQC101	W	TL	8.910E+18	10	90	80	8.000E+01	100	85	15	1.500E+01
ZN1	X	PZN101	P	TL	1.500E+19			80	8.000E+01			21	2.100E+01
TP3	T	SASTM	SRM	LT	5.680E+18			82	8.200E+01	78	72		7.692E+00
CC2	W263	PCC202	P	LT	8.060E+18	9	93	84	8.400E+01	146	115	21	2.100E+01
FA1	Y	PFA101	P	LT	5.830E+18	-30	55	85	8.500E+01	140	128		8.571E+00
P12	R	FP1201	F	TL	4.420E+19	0	85	85	8.500E+01	108	98		9.259E+00
ZN1	U	PZN101	P	LT	8.920E+18	-5	80	85	8.500E+01	140	120		1.429E+01
CK2	X	PCK201	P	LT	1.05E+19			85	8.500E+01			33	3.300E+01
P11	R	FP1101	F	TL	4.030E+19	-27	60	87	8.700E+01	143	129		9.790E+00
CC1	W263	SHSS01	SRM	LT	5.900E+18	39	127	88	8.800E+01	135	109		1.926E+01
ZN2	Y	PZN201	P	LT	1.480E+19	37	125	88	8.800E+01	128	111		1.328E+01
IP3	T	PIP301	P	LT	2.920E+18	-2	87	89	8.900E+01	132	119		9.848E+00
FA1	U	PFA101	P	TL	1.650E+19	15	105	90	9.000E+01	90	82		8.889E+00
GIN	V	SASTM	SRM	LT	4.900E+18	40	130	90	9.000E+01	78	65		1.667E+01
PB1	S	PPB101	P	LT	7.050E+18	-45	45	90	9.000E+01	107	92		1.402E+01
PB2	V	SHSS02	SRM	LT	4.740E+18	45	135	90	9.000E+01	125	95		2.400E+01
TP4	T	SHSS02	SRM	LT	6.050E+18			90	9.000E+01	123	92		2.520E+01
TRO	V	PTROO1	P	LT	2.370E+19	-15	75	90	9.000E+01	116	106		8.621E+00
TRO	X	PTROO1	P	LT	1.770E+19	-15	75	90	9.000E+01	116	102		1.207E+01

Table A.1 (continued)

Shift in Transition Temperature vs. Upper Shelf: Page 4													
PLANT_ID	CAPSULE	HEAT_ID	PROD_ID	SPEC_ORI	CSP_F1	UT130	LT130	DT130	DTT	UUSE	IUSE	DUSE_REL	DUSE
DR2	2	PDR201	P	LT	2.980E+19	0	90	90	9.000E+01	153	109	29	2.900E+01
ZH1	X	PZH101	P	LT	1.200E+19			90	9.000E+01			23	2.300E+01
ZH2	T	PZH201	P	TL	1.100E+19			90	9.000E+01			15	1.500E+01
ZH1	Y	PZH101	P	LT	1.560E+19	-5	87	92	9.200E+01	140	114		1.857E+01
MY	V263	PHY_01	P	TL	6.600E+18	15	108	93	9.300E+01	115	96		1.652E+01
SG2	U	FSG201	F	LT	6.430E+18	-70	23	93	9.300E+01	134	110		1.791E+01
ZH1	Y	PZH101	P	TL	1.560E+19	25	119	94	9.400E+01	117	96		1.795E+01
IP2	T	PIP202	P	LT	2.020E+18			94	9.400E+01	116	103	11	1.100E+01
KVE	V	SHSS02	SRM	LT	5.590E+18	45	140	95	9.500E+01	123	109		1.138E+01
NA1	U	FNA101	F	LT	8.280E+18	-6	89	95	9.500E+01	135	110		1.852E+01
PB1	S	SASTM	SRM	LT	7.050E+18	40	135	95	9.500E+01	78	68		1.282E+01
QC2	12	WQC201	W	TL	1.250E+19	-30	65	95	9.500E+01	125	89		2.880E+01
SA2	U	PSA201	P	TL	5.700E+18	10	105	95	9.500E+01	97	84		1.340E+01
SU2	X	VSU201	W	TL	3.020E+18	-20	75	95	9.500E+01	90	70		2.222E+01
TRO	X	PTRO01	P	TL	1.770E+19	8	103	95	9.500E+01	84	76		9.524E+00
GIN	R	SASTM	SRM	LT	7.600E+18			96	9.600E+01	78	60		2.308E+01
ML2	W97	PML201	P	TL	3.670E+18	17	113	96	9.600E+01	108	79	27	2.700E+01
CR3	D	PCR301	P	TL	7.500E+18	16	113	97	9.700E+01	94	72		2.340E+01
MY	V263	PHY_01	P	TL	6.600E+18	0	97	97	9.700E+01	140	113		1.929E+01
TRO	V	PTRO01	P	TL	2.370E+19	8	105	97	9.700E+01	84	70		1.667E+01
ML2	W104	PML201	P	LT	8.840E+18	38	137	99	9.900E+01	131	94		2.824E+01
RS1	B	WRS101	W	TL	3.990E+18	-14	85	99	9.900E+01	68	51		2.500E+01
RS1	B	WRS101	W	TL	3.990E+18	-14	85	99	9.900E+01	68	51		2.500E+01
FA1	X	WFA101	W	TL	2.800E+19	-80	20	100	1.000E+02	149	115		2.282E+01
MC2	X	FMC201	F	LT	1.450E+19	-75	25	100	1.000E+02	156	136		1.282E+01
PB1	T	PPB101	P	LT	2.110E+19	-45	55	100	1.000E+02	107	95		1.121E+01
PI2	R	FPI201	F	LT	4.420E+19	-25	75	100	1.000E+02	150	127		1.533E+01
PI2	R	WPI201	W	TL	4.420E+19	-75	25	100	1.000E+02	103	91		1.165E+01
SA1	T	PSA101	P	LT	2.560E+18	-20	80	100	1.000E+02	108	89		1.759E+01
SA1	T	PSA102	P	LT	2.560E+18	-25	75	100	1.000E+02	116	103		1.121E+01
CK1	X	PCK101	P	LT	7.700E+18	5	105	100	1.000E+02	130		22	2.200E+01
CK1	X	SHSS02	SRM	LT	6.900E+18			100	1.000E+02	120		34	3.400E+01
CK2	Y	PCK201	P	TL	7.010E+18			100	1.000E+02			20	2.000E+01
ZH2	T	SHSS02	SRM	LT	1.000E+19			100	1.000E+02			29	2.900E+01
ZH1	T	WZH101	W	TL	1.800E+18	7	108	101	1.010E+02	68	56		1.765E+01
FA2	U	PFA201	P	LT	5.610E+18	-23	80	103	1.030E+02	130	94		2.769E+01
CK2	X	PCK201	P	TL	1.050E+19			103	1.030E+02			27	2.700E+01
DR2	4	WDR201	W	TL	9.500E+18	-10	93	103	1.030E+02	101	80	21	2.100E+01
AN1	E	WAN101	W	TL	7.270E+17	5	110	105	1.050E+02	73	58		2.055E+01
FA1	X	PFA101	P	TL	2.800E+19	15	120	105	1.050E+02	90	80		1.111E+01
NB2	V	SASTM	SRM	TL	4.510E+18			105	1.050E+02	69	38		4.493E+01
MC2	X	FMC201	F	LT	1.450E+19	-25	80	105	1.050E+02	94	77		1.809E+01
PB1	R	PPB101	P	LT	2.220E+19	-45	60	105	1.050E+02	107	100		6.542E+00
PB2	T	SHSS02	SRM	LT	9.450E+18	49	154	105	1.050E+02	124	109		1.210E+01
CK1	Y	PCK101	P	LT	1.340E+19			105	1.050E+02	130		20	2.000E+01
DR3	4	PDR301	P	LT	2.060E+19	-10	95	105	1.050E+02	135	106	22	2.200E+01
CAB	K	WCAB01	W	TL	1.400E+19	-20	90	110	1.100E+02	102	85		1.667E+01
CTY	D	WCTY01	W	TL	2.220E+19	-50	60	110	1.100E+02	105	83		2.095E+01
DC1	S	WDC101	W	TL	2.980E+18	-67	43	110	1.100E+02	98	87		1.122E+01
PB1	V	WPB101	W	TL	3.500E+18	-45	65	110	1.100E+02	65	54		1.692E+01
PI1	V	SHSS02	SRM	LT	5.210E+18	49	159	110	1.100E+02	124	91		2.661E+01
SA1	Y	PSA103	P	LT	8.910E+18	-50	60	110	1.100E+02	130	113		1.308E+01
SL1	W104	SHSS01	SRM	LT	7.160E+18	39	149	110	1.100E+02	134	87		3.507E+01
SU1	V	PSU101	P	LT	1.940E+19	-10	100	110	1.100E+02	125	116		7.200E+00
CK1	X	PCK101	P	TL	6.200E+18			110	1.100E+02	94		18	1.800E+01
CK1	Y	SHSS02	SRM	LT	1.200E+19			110	1.100E+02	120		28	2.800E+01
ZH1	T	WZH101	W	TL	3.060E+18	4	116	112	1.120E+02	64	56		1.250E+01
OC2	A	WOC201	W	TL	3.370E+18	4	118	114	1.140E+02	67	48		2.836E+01
OC2	A	WOC201	W	TL	3.370E+18	4	118	114	1.140E+02	67	47		2.985E+01
CK1	U	PCK101	P	LT	1.880E+19	5	120	115	1.150E+02	130	113		1.308E+01
CK1	U	PCK101	P	TL	1.880E+19	15	130	115	1.150E+02	96	95		1.042E+00
FA1	U	PFA101	P	LT	1.650E+19	-30	85	115	1.150E+02	140	110		2.143E+01
CK1	Y	PCK101	P	TL	1.060E+19			115	1.150E+02	94		19	1.900E+01
PI1	R	WPI101	W	TL	4.030E+19	-57	60	117	1.170E+02	79	75		5.063E+00
IP3	T	PIP304	P	TL	2.920E+18	60	178	118	1.180E+02	67	58		1.343E+01
CR3	D	WCR301	W	TL	7.500E+18	36	155	119	1.190E+02	79	68		1.392E+01
BV1	U	PBV101	P	LT	6.540E+18	-5	115	120	1.200E+02	134	99		2.612E+01
CAB	P	WCAB01	P	LT	1.430E+19	-50	70	120	1.200E+02	103	85		1.748E+01
CK1	U	SHSS02	SRM	LT	1.880E+19	45	165	120	1.200E+02	120	110		8.533E+00
CR3	F	WCR301	W	TL	1.080E+19	36	156	120	1.200E+02	79	64		1.899E+01
MY	W252	PHY_01	P	LT	1.250E+19	0	120	120	1.200E+02	140	105		2.500E+01
PB1	T	SASTM	SRM	LT	2.110E+19	40	160	120	1.200E+02	78	69		1.154E+01
SO1	F	PSO102	P	LT	5.140E+19	10	130	120	1.200E+02	97	71		2.680E+01
SU2	V	SHSS02	SRM	LT	1.880E+19	45	165	120	1.200E+02	125	102		1.840E+01
DR3	12	WDR301	W	TL	8.640E+18	40	160	120	1.200E+02	70	60	14	1.400E+01

Table A.1 (continued)

Shift in Transition Temperature vs. Upper Shelf: Page 5													
PLANT_ID	CAPSULE	HEAT_ID	PROD_ID	SPEC_ORI	CSP_F1	UTT30	ITT30	DTT30	DTT	LUSE	IUSE	DUSE_REL	DUSE
IP2	T	PIP203	P	LT	2.020E+18			120	1.200E+02	113	88	22	2.200E+01
MY	A25	PMY_01	P	LT	1.300E+19	0	120	120	1.200E+02	140	96	31	3.100E+01
SQ1	X	FSQ101	F	TL	1.600E+19	45	165	120	1.200E+02	72	56	22	2.200E+01
ZN1	X	SKSS02	SRM	LT	1.400E+19			120	1.200E+02			32	3.200E+01
CR3	C	WCR301	W	TL	6.560E+18	36	158	122	1.220E+02	79	63		2.025E+01
TM1	E	WTM101	W	TL	1.080E+18	-56	68	124	1.240E+02	81	64		2.099E+01
PC1	W225	SHSS01	SRM	LT	4.800E+18	27	151	124	1.240E+02	128	102	21	2.100E+01
DB1	B	WDB101	W	TL	5.920E+18	-11	114	125	1.250E+02	70	57		1.857E+01
PI2	V	SHSS02	SRM	LT	5.490E+18	45	170	125	1.250E+02	123	102		1.707E+01
SA1	Y	SHSS02	SRM	LT	8.910E+18	50	175	125	1.250E+02	123	103		1.626E+01
SA1	Z	PSA103	P	LT	1.330E+19	-50	75	125	1.250E+02	130	108		1.692E+01
SA2	X	PSA201	P	TL	1.160E+19	10	135	125	1.250E+02	97	89		8.247E+00
TP3	V	SASTM	SRM	LT	1.229E+19	35	160	125	1.250E+02	76	60		2.105E+01
QC1	I	POC101	P	LT	1.190E+19	-30	95	125	1.250E+02	105	85	19	1.900E+01
DB1	F	WDB101	W	TL	2.290E+18	-11	116	127	1.270E+02	72	65		9.722E+00
DB1	F	WDB101	W	TL	2.290E+18	-11	116	127	1.270E+02	70	64		8.571E+00
DR1	Z	PDR1010	P	TS	1.200E+19	85	212	127	1.270E+02	70	56	20	2.000E+01
CR3	F	PCR301	P	TL	1.080E+19	16	144	128	1.280E+02	94	71		2.447E+01
ZN2	U	VZN201	W	LT	2.000E+18	-10	118	128	1.280E+02	69	50		2.754E+01
CC2	W263	SHSS01	SRM	LT	8.140E+18	25	153	128	1.280E+02	142	90	37	3.700E+01
ZN1	Y	SHSS02	SRM	LT	1.560E+19	42	171	129	1.290E+02	124	98		2.097E+01
BV1	V	PBV101	P	LT	2.550E+18	-5	125	130	1.300E+02	134	114		1.493E+01
SO1	F	SASTM	SRM	LT	5.140E+19	40	170	130	1.300E+02	78	62		2.051E+01
SO1	U	FSQ101	F	LT	1.080E+19	-35	95	130	1.300E+02	116	92		2.049E+01
SO2	U	VSQ201	W	TL	6.430E+18	-75	55	130	1.300E+02	112	109		2.679E+00
ZN1	U	SHSS02	SRM	LT	8.920E+18	42	172	130	1.300E+02	124	88		2.903E+01
DR3	4	WDR301	W	TL	1.780E+19	40	170	130	1.300E+02	70	59	16	1.600E+01
FA2	U	PFA201	P	TL	5.610E+18	-13	120	133	1.330E+02	95	69		2.737E+01
DR1	Z	PDR1010	P	LS	1.200E+19	60	194	134	1.340E+02	110	80	27	2.700E+01
BV1	U	PBV101	P	TL	6.540E+18	20	155	135	1.350E+02	80	78		2.500E+00
DB1	D1	WHSS66	W	TL	6.630E+18	45	180	135	1.350E+02	56	43		2.321E+01
FA1	X	PFA101	P	LT	2.800E+19	-30	105	135	1.350E+02	140	114		1.857E+01
SA1	Z	SHSS02	SRM	LT	1.330E+19	50	185	135	1.350E+02	123	98		2.033E+01
ZN2	T	SHSS02	SRM	LT	1.480E+19	50	185	135	1.350E+02	124	110		1.129E+01
BR	127	WBR_01	W	TS	7.100E+18			135	1.350E+02			26	2.600E+01
BR	127	WBR_01	W	TS	7.100E+18	-70	65	135	1.350E+02	95	70	26	2.600E+01
IP3	T	PIP304	P	LT	2.920E+18	33	170	137	1.370E+02	105	96		8.571E+00
CAB	P	SASTM	SRM	LT	1.430E+19	40	178	138	1.380E+02	65	62		4.615E+00
BV1	V	PBV101	P	TL	2.550E+18	20	160	140	1.400E+02	80	75		6.250E+00
CAB	K	PCAB01	P	LT	1.400E+19	-50	90	140	1.400E+02	103	89		1.359E+01
CTY	D	SASTM	SRM	LT	2.220E+19	40	180	140	1.400E+02	78	61		2.179E+01
GIN	T	SASTM	SRM	LT	1.750E+19	40	180	140	1.400E+02	78	61		2.179E+01
GIN	V	UGIN01	W	TL	4.900E+18	-25	115	140	1.400E+02	80	51		3.625E+01
GIN	V	UGIN01	W	TL	5.980E+18	-25	115	140	1.400E+02	80	53		3.375E+01
IP3	Y	SHSS02	SRM	LT	8.050E+18	50	190	140	1.400E+02	123	98		2.033E+01
KVE	R	SHSS02	SRM	LT	2.070E+19	45	185	140	1.400E+02	123	95		2.276E+01
OC3	D	WOC301	W	LT	1.450E+19	45	185	140	1.400E+02	66	42		3.636E+01
SO1	T	VSQ101	W	TL	2.740E+18	-85	55	140	1.400E+02	111	78		2.973E+01
SQ1	X	FSQ101	F	LT	1.610E+19	-35	105	140	1.400E+02	116	107	8	8.000E+00
ML2	W104	SHSS01	SRM	LT	8.840E+18	24	165	141	1.410E+02	142	94		3.380E+01
DB1	D1	WHSS67	W	TL	1.030E+19	-39	103	142	1.420E+02	76	55		2.763E+01
IP3	T	WIP301	W	TL	2.920E+18	-55	88	143	1.430E+02	120	91		2.417E+01
PB2	S	SHSS02	SRM	LT	3.470E+19	49	194	145	1.450E+02	124	84		3.226E+01
PB2	T	WPB201	W	TL	9.450E+18	0	145	145	1.450E+02	65	56		1.385E+01
SO1	F	VSQ101	W	TL	5.140E+19	-20	125	145	1.450E+02	99	80		1.919E+01
SO1	V	SHSS02	SRM	LT	1.940E+19	45	190	145	1.450E+02	123	100		1.870E+01
SU2	V	VSU201	W	TL	1.880E+19	-20	125	145	1.450E+02	90	60		3.333E+01
ZN2	U	VZN201	W	LT	2.820E+18	-23	122	145	1.450E+02	68	48		2.941E+01
IP2	Y	PIP203	P	LT	4.720E+18			145	1.450E+02			29	2.900E+01
CR3	C1	WHSS65	W	TL	5.100E+18	-27	121	148	1.480E+02	77	55		2.857E+01
BV1	V	WBV101	W	TL	2.550E+18	-60	90	150	1.500E+02	112	88		2.143E+01
BV1	W	PBV101	P	LT	9.490E+18	-5	145	150	1.500E+02	134	114		1.493E+01
DB1	D	WDB101	W	TL	9.620E+18	-11	139	150	1.500E+02	70	54		2.286E+01
GIN	T	UGIN01	W	TL	1.750E+19	-25	125	150	1.500E+02	80	55		3.125E+01
GIN	T	UGIN01	W	TL	1.750E+19	-25	125	150	1.500E+02	80	53		3.375E+01
NR2	T	SASTM	SRM	TL	4.110E+19	65	215	150	1.500E+02	40	37		7.500E+00
IP3	Y	PIP304	P	TL	8.050E+18	60	210	150	1.500E+02	67	57		1.493E+01
IP3	Z	PIP303	P	LT	1.070E+19	-25	125	150	1.500E+02	130	108		1.692E+01
PB2	T	WPB201	W	TL	9.470E+18	0	150	150	1.500E+02	66	56		1.515E+01
BR	124	PBR_01	P	TL	1.070E+20			150	1.500E+02			15	1.500E+01
BR	124	PBR_01	P	TL	1.070E+20	-5	145	150	1.500E+02	82	70	15	1.500E+01
MY	A25	SHSS01	SRM	LT	1.300E+19	15	165	150	1.500E+02	130	100	23	2.300E+01
AN1	A	WAN101	W	TL	1.030E+19	5	156	151	1.510E+02	73	45		3.836E+01
PB2	R	SHSS02	SRM	LT	2.010E+19	49	200	151	1.510E+02	124	98		2.097E+01
RS1	D	WRS101	W	TL	6.600E+18	-14	138	152	1.520E+02	68	53		2.206E+01

Table A.1 (continued)

Shift in Transition Temperature vs. Upper Shelf: Page 6													
PLANT_ID	CAPSULE	HEAT_ID	PROD_ID	SPEC_ORI	CSP_F1	UTT30	ITT30	OTT30	OTT	UUSE	IUSE	DUSE_REL	DUSE
RS1	D	WRS101	W	TL	6.600E+18	-14	138	152	1.520E+02	68	53		2.206E+01
BV1	U	VBV101	W	TL	6.540E+18	-60	95	155	1.550E+02	112	83		2.589E+01
CAB	N	PCAB01	P	LT	3.680E+19	-50	105	155	1.550E+02	105	83		2.095E+01
CAB	N	SASTM	SRM	LT	3.680E+19	40	195	155	1.550E+02	78	55		2.949E+01
DR3	14	WDR301	W	TL	7.710E+18	40	195	155	1.550E+02	70	64		8.571E+00
IP3	Z	PIP304	P	TL	1.070E+19	60	215	155	1.550E+02	67	56		1.642E+01
KVE	P	SKSS02	SRM	LT	2.890E+19	45	200	155	1.550E+02	123	101		1.789E+01
PAL	W290	PPAL01	P	TL	1.130E+19	25	180	155	1.550E+02	102	84		1.765E+01
SA2	T	WSA201	W	TL	2.560E+18	-30	125	155	1.550E+02	111	79		2.883E+01
TP3	T	WTP301	W	TL	5.680E+18			155	1.550E+02	65	59		9.231E+00
QC1	I	WQC102	W	TL	7.200E+18	-30	125	155	1.550E+02	72	52	28	2.800E+01
P11	P	SKSS02	SRM	LT	1.250E+19	49	205	156	1.560E+02	124	85		3.143E+01
CR3	C1	WKSSCR	W		6.090E+18	13	173	160	1.600E+02	72	57		2.083E+01
MC1	U	WMC101	W	TL	4.140E+18	-5	155	160	1.600E+02	112	75		3.304E+01
MY	W253	SKSS01	SRM	LT	1.250E+19	15	175	160	1.600E+02	130	96		2.615E+01
P12	T	SKSS02	SRM	LT	1.050E+19	45	205	160	1.600E+02	123	88		2.846E+01
SQ1	U	WSQ101	W	TL	1.080E+19	-85	75	160	1.600E+02	111	82		2.613E+01
SQ1	X	WSQ101	W	TL	1.610E+19	-85	75	160	1.600E+02	111	88	21	2.100E+01
TP3	T	WTP301	W	TL	7.050E+18	12	176	164	1.640E+02	66	62		6.061E+00
FA2	W	PFA201	P	LT	1.540E+19	-23	142	165	1.650E+02	130	102		2.154E+01
FA2	W	PFA201	P	TL	1.540E+19	-13	152	165	1.650E+02	95	76		2.000E+01
GIN	R	WGIN01	W	TL	1.170E+19	-25	140	165	1.650E+02	80	51		3.625E+01
MC1	X	WMC101	W	TL	1.380E+19	-5	160	165	1.650E+02	112	83		2.589E+01
PB1	R	WPB101	W	TL	2.220E+19	-45	120	165	1.650E+02	65	51		2.154E+01
PB1	R	WPB101	W	TL	2.170E+19	-65	120	165	1.650E+02	65	53		1.846E+01
PB1	S	WPB101	W	TL	7.050E+18	-45	120	165	1.650E+02	65	52		2.000E+01
PB1	S	WPB101	W	TL	8.510E+18	-45	120	165	1.650E+02	65	54		1.692E+01
PB2	V	WPB201	W	TL	4.740E+18	0	165	165	1.650E+02	65	42		3.538E+01
PB2	V	WPB201	W	TL	7.330E+18	0	165	165	1.650E+02	66	42		3.636E+01
SA1	Y	WSA101	W	TL	8.910E+18	-135	30	165	1.650E+02	104	75		2.788E+01
SA1	Z	PSA102	P	LT	1.330E+19	-25	140	165	1.650E+02	116	102		1.207E+01
SU1	T	WSU101	W	TL	2.500E+18	-15	150	165	1.650E+02	70	53		2.429E+01
CK1	X	WCK101	W	TL	6.200E+18			165	1.650E+02	110		34	3.400E+01
RS1	F	WRS101	W	TL	1.420E+19	-14	152	166	1.660E+02	68	48		2.941E+01
SU1	T	WSU101	W	TL	2.880E+18	-15	152	167	1.670E+02	70	53		2.429E+01
IP3	Z	PIP304	P	LT	1.070E+19	33	203	170	1.700E+02	105	82		2.190E+01
SA1	Z	PSA101	P	LT	1.330E+19	-20	150	170	1.700E+02	108	90		1.667E+01
BR	124	WBR_01	W	TS	1.070E+20			170	1.700E+02			32	3.200E+01
QC2	J	WQC201	W	TL	3.820E+19	-30	140	170	1.700E+02	125	80	36	3.600E+01
QC2	U	WQC201	W	TL	3.510E+19	-13	160	174	1.740E+02	121	85	30	3.000E+01
DB1	A	WDB101	W	TL	1.290E+19	-11	164	175	1.750E+02	72	62		1.389E+01
KVE	V	WKVE01	W	TL	5.590E+18	-50	125	175	1.750E+02	126	82		3.492E+01
PAL	W290	PPAL01	P	LT	1.100E+19	0	175	175	1.750E+02	155	112		2.774E+01
QC1	J	WQC101	W	TL	3.560E+19	10	185	175	1.750E+02	100	75		2.500E+01
ZN2	T	WZN201	W	LT	1.100E+19			175	1.750E+02			36	3.600E+01
QC2	E	WQC201	W	TL	1.210E+19	4	183	179	1.790E+02	67	44		3.433E+01
FA2	X	PFA201	P	LT	3.110E+19	-23	157	180	1.800E+02	130	94		2.769E+01
IP3	T	WIP301	W	TL	8.050E+18	-55	125	180	1.800E+02	120	68		4.333E+01
PB1	T	WPB101	W	TL	2.110E+19	-45	135	180	1.800E+02	65	55		1.538E+01
P12	R	SKSS02	SRM	LT	4.420E+19	45	225	180	1.800E+02	123	77		3.740E+01
QC1	J	WQC101	P	LT	4.040E+19	-30	150	180	1.800E+02	106	73		3.113E+01
QC2	12	WQC202	W	TL	8.970E+18	15	195	180	1.800E+02	90	51		4.333E+01
TP3	V	WTP301	W	TL	1.229E+19	10	190	180	1.800E+02	65	48		2.615E+01
AM1	C	WAM101	W	TL	1.460E+19	5	190	185	1.850E+02	73	47		3.562E+01
BV1	W	VBV101	P	TL	9.490E+18	20	205	185	1.850E+02	80	59		2.625E+01
BV1	W	VBV101	W	TL	9.490E+18	-60	125	185	1.850E+02	112	78		3.036E+01
MY	A35	PMY_01	P	LT	8.390E+19	0	185	185	1.850E+02	140	85		3.929E+01
OC1	C	WOC101	W	TL	9.860E+19	-5	180	185	1.850E+02	64	52		1.875E+01
P11	R	SKSS02	SRM	LT	4.030E+19	49	235	186	1.860E+02	124	86		3.065E+01
ZN1	U	WZN101	W	TL	8.920E+18	7	195	188	1.880E+02	68	49		2.794E+01
FA2	X	PFA201	P	TL	3.110E+19	-13	177	190	1.900E+02	95	69		2.737E+01
SA2	U	WSA201	W	TL	5.700E+18	-30	160	190	1.900E+02	111	74		3.333E+01
BR	122	WBR_01	W	TS	2.300E+19			190	1.900E+02			40	4.000E+01
BR	122	WBR_01	W	TS	2.300E+19	-70	120	190	1.900E+02	95	57	40	4.000E+01
OC1	A	WOC101	W	TL	8.950E+18	-5	186	191	1.910E+02	64	52		1.875E+01
MY	A35	PMY_01	P	TL	8.520E+19	15	210	195	1.950E+02	115	71		3.826E+01
SA2	X	WSA201	W	TL	1.160E+19	-30	165	195	1.950E+02	111	86		2.252E+01
IP2	Y	WIP201	W	TL	5.890E+18			195	1.950E+02			42	4.200E+01
KO1	T	WKO101	W	TL	9.800E+18	-10		195	1.950E+02	66	47	29	2.900E+01
KO1	V	WKO101	W	TL	3.950E+18	-10		195	1.950E+02	66	48	27	2.700E+01
ZN1	X	WZN101	W	TL	1.500E+19			195	1.950E+02			31	3.100E+01
ZN1	U	WZN101	W	TL	1.020E+19	4	203	199	1.990E+02	64	52		1.875E+01
CK1	Y	WCK101	W	TL	1.060E+19			200	2.000E+02	110		36	3.600E+01
TM1	C	WTM101	W	TL	8.660E+18	-56	147	203	2.030E+02	81	50		3.827E+01
DB1	D1	WNSS08	W		8.210E+18	-52	152	204	2.040E+02	79	50		3.671E+01

Table A.1 (continued)

Shift in Transition Temperature vs. Upper Shelf: Page 7

PLANT_ID	CAPSULE	HEAT_ID	PROD_ID	SPEC_ORI	CSP_F1	UTT30	ITT30	DTT30	DTT	WUSE	IUSE	DUSE_REL	DUSE
CK1	U	WCK101	W		1.880E+19	-90	115	205	2.050E+02	110	94		1.455E+01
DR3	14	WOR302	W	TL	6.150E+18	-45	160	205	2.050E+02	65	45		3.077E+01
PAL	A240	PPAL01	P	LT	4.500E+19	0	205	205	2.050E+02	155	92		4.065E+01
PAL	A240	PPAL01	P	TL	4.400E+19	25	230	205	2.050E+02	102	68		3.333E+01
ZH1	Y	VZN101	W	TL	1.560E+19	4	209	205	2.050E+02	64	44		3.125E+01
QC2	3	WQC202	W	TL	2.430E+19	15	220	205	2.050E+02	87	41	53	5.300E+01
DR2	5	WOR202	W	TL	4.650E+19	-13	195	208	2.080E+02	71	52	27	2.700E+01
DR3	12	WOR302	W	TL	2.060E+19	-45	163	208	2.080E+02	65	42	35	3.500E+01
CR3	C1	WVSS63	W		7.790E+18	-20	194	214	2.140E+02	73	48		3.425E+01
CAB	N	WCAB01	W	TL	3.680E+19	-20	200	220	2.200E+02	102	62		3.922E+01
1P3	Z	W1P301	W	TL	1.070E+19	-55	165	220	2.200E+02	120	76		3.667E+01
ZH2	Y	VZN201	W	LT	1.480E+19	-10	210	220	2.200E+02	69	51		2.609E+01
FC1	W265	WFC101	W	TL	9.000E+18	-28	193	221	2.210E+02	104	59	43	4.300E+01
MY	W263	WMY_01	W	TL	6.800E+18	-30	192	222	2.220E+02	105	59		4.381E+01
TP4	T	WTP401	W		7.580E+18	0	224	224	2.240E+02	68	43		3.676E+01
TP4	T	WTP401	W		6.050E+18	0	225	225	2.250E+02	64	44		3.333E+01
YR	08	SASTM S1	SRM		5.000E+19	15	240	225	2.250E+02	87	46		4.713E+01
KVE	P	WKVE01	W	TL	2.890E+19	-50	180	230	2.300E+02	126	76		3.968E+01
PB2	R	WPB201	W	TL	2.010E+19	0	230	230	2.300E+02	65	47		2.769E+01
BR	124	WBR_01	W	TS	1.070E+20	-70	160	230	2.300E+02	95	65	32	3.200E+01
PB2	S	WPB201	W	TL	3.470E+19	0	231	231	2.310E+02	66	44		3.333E+01
KVE	R	WKVE01	W	TL	2.070E+19	-50	185	235	2.350E+02	126	78		3.810E+01
PB2	R	WPB201	W	TL	2.540E+19	0	235	235	2.350E+02	66	48		2.727E+01
FC1	W225	WFC101	W	TL	4.200E+18	-28	210	238	2.380E+02	104	65	37	3.700E+01
SU1	V	WSU101	W	TL	1.940E+19	-15	225	240	2.400E+02	70	50		2.857E+01
DR3	4	WOR302	W	TL	1.200E+19	-45	205	250	2.500E+02	65	41	37	3.700E+01
MY	W253	WMY_01	W	TL	1.250E+19	-30	230	260	2.600E+02	105	66		3.714E+01
YR	06	SASTM S1	SRM		7.000E+19	15	275	260	2.600E+02	87	44		4.943E+01
QC1	3	WQC102	W	TL	2.370E+19	-30	235	265	2.650E+02	72	49		3.194E+01
MY	A25	WMY_01	W	TL	1.300E+19	-30	240	270	2.700E+02	105	57	45	4.500E+01
PAL	W290	WPAL01	W	TL	1.030E+19	-85	205	290	2.900E+02	118	64		4.576E+01
YR	01	SASTM S1	SRM		9.000E+19	15	325	310	3.100E+02	87	42		5.172E+01
YR	02	SASTM S1	SRM		9.000E+19	15	325	310	3.100E+02	87	42		5.172E+01
YR	08	PYR_01	P	LT	5.000E+19	10	330	320	3.200E+02	76	46		3.947E+01
MY	A35	WMY_01	W	TL	8.690E+19	-30	315	345	3.450E+02	105	50		5.238E+01
PAL	A240	WPAL01	W	TL	4.600E+19	-85	265	350	3.500E+02	118	52		5.593E+01
YR	06	PYR_01	P	LT	7.000E+19	10	370	360	3.600E+02	76	45		4.079E+01
YR	01	PYR_01	P	LT	9.000E+19	10	410	400	4.000E+02	76	45		4.079E+01
YR	02	PYR_01	P	LT	9.000E+19	10	410	400	4.000E+02	76	45		4.079E+01

Fig. A.5. Graph of transition temperature shift versus upper shelf drop from example, Sect. A.6.1.

A.6.2 Charpy Fitting and Plotting

In this example, the Charpy fitting and plotting procedures will be applied to the weld data for the Zion Unit 2 reactor. The corresponding raw Charpy data are at the end of the file RAW_C_PR.dat, resulting in long waiting times when these sets are processed. For this reason - and, of course, to demonstrate this feature - these sets are first copied to a file ZN2.dat with the aid of the option "Extracting Selected Charpy Sets." After choosing this option, the output file name ZN2.DAT is entered, followed by entering, in the menu screen for selecting sets, the key ZN2 for PLANT_ID and the letter W for PROD_ID (or HEAT_ID). During the run of the program, the three sets baseline (CAPSULE is blank) and capsules T and U appear on the screen for confirmation. The output file (with a modification, see below) is listed in Table A.2.

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Table A.2. File ZN2.dat obtained from RAW_C_PR.dat.
Note the added asterisk at the front of
specimen W40 tagging it as an outlier

WZN2		WZN201 W LT	-100.0	10.0	17	7		
WZN2		WZN201 W LT	-100.0	11.0	13	8		
WZN2		WZN201 W LT	-60.0	17.0	23	14		
WZN2		WZN201 W LT	-60.0	20.0	33	16		
WZN2		WZN201 W LT	-60.0	14.0	23	12		
WZN2		WZN201 W LT	-25.0	35.0	58	32		
WZN2		WZN201 W LT	-25.0	25.0	47	23		
WZN2		WZN201 W LT	-25.0	32.0	42	27		
WZN2		WZN201 W LT	10.0	37.0	55	33		
WZN2		WZN201 W LT	10.0	40.0	61	38		
WZN2		WZN201 W LT	10.0	41.0	71	40		
WZN2		WZN201 W LT	40.0	47.0	65	43		
WZN2		WZN201 W LT	40.0	51.0	71	48		
WZN2		WZN201 W LT	40.0	76.0	100	63		
WZN2		WZN201 W LT	40.0	43.5	57	40		
WZN2		WZN201 W LT	75.0	60.0	95	58		
WZN2		WZN201 W LT	75.0	62.0	97	57		
WZN2		WZN201 W LT	75.0	56.5	97	53		
WZN2		WZN201 W LT	210.0	69.0	100	69		
WZN2		WZN201 W LT	210.0	69.5	100	70		
WZN2		WZN201 W LT	210.0	62.0	100	61		
WZN2		WZN201 W LT	300.0	68.0	100	65		
WZN2		WZN201 W LT	300.0	72.0	100	68		
WZN2		WZN201 W LT	300.0	70.0	100	61		
WZN2	T	WZN201 W LT W34	71.0	12.5	15	13	1.100E+19	579
WZN2	T	WZN201 W LT W33	135.0	22.0	35	18	1.100E+19	579
WZN2	T	WZN201 W LT *W40	180.0	88.0	100	76	1.100E+19	579
WZN2	T	WZN201 W LT W35	185.0	40.0	80	38	1.100E+19	579
WZN2	T	WZN201 W LT W39	235.0	36.5	80	34	1.100E+19	579
WZN2	T	WZN201 W LT W38	300.0	43.5	100	43	1.100E+19	579
WZN2	T	WZN201 W LT W37	350.0	44.5	100	47	1.100E+19	579
WZN2	T	WZN201 W LT W36	400.0	42.5	100	45	1.100E+19	579
WZN2	U	WZN201 W LT W45	50.0	16.5	10	13	2.800E+18	550
WZN2	U	WZN201 W LT W47	73.0	20.5	20	21	2.800E+18	550
WZN2	U	WZN201 W LT W42	125.0	31.0	65	30	2.800E+18	550
WZN2	U	WZN201 W LT W41	200.0	45.0	99	42	2.800E+18	550
WZN2	U	WZN201 W LT W44	285.0	48.0	100	51	2.800E+18	550
WZN2	U	WZN201 W LT W43	345.0	50.0	100	49	2.800E+18	550
WZN2	U	WZN201 W LT W46	350.0	46.5	100	71	2.800E+18	550
WZN2	U	WZN201 W LT W48	400.0	50.0	100	53	2.800E+18	550

The user can now test the other three options using the newly created file as an input file instead of the given default RAW_C_PR.dat. Figures A.6, A.7, and A.8 show the resulting plots for the three sets, with appropriate titles and subtitles entered by the user on prompts from the screen. Note that the fit for capsule T is very poor; inspection shows an outlier of 88-ft-lb impact energy at 180°F, which is inconsistent with the rest of the data. This point can be eliminated from the fitting by placing an asterisk in front of the specimen identifier W40, as shown in Table A.2. This can be done with any editor that works on ASCII files (e.g., EDLIN, if no better is available). Figure A.9 shows the resulting fit after this change. Note that the excluded point appears as a black square at the top of the graph.

Fig. A.6. Charpy fit for Zion Unit 2 weld material - baseline.

Fig. A.7. Charpy fit for Zion Unit 2 weld material - Capsule T. Poor fit due to an outlier.

Fig. A.8. Charpy fit for Zion Unit 2 weld material - Capsule U.

ZN2 T WZN201 W LT: Fluence = 1.100E+19 , Irr. Temp. = 304. C
CVT(41J) = 70. C, CVT(68J) = ***** C, USE = 58. J

Fig. A.9. Data from Fig. A.7 after the outlier at the top of the graph is eliminated.

The modified input file can now be used for the two other options. On the input screens for the Monte Carlo uncertainty analysis, several default options are already provided including the input file, title, input uncertainties, number of iterations, and output files. To process all the sets, the number of skipped sets must, of course, be 0 and the number of processed sets 3. Please make sure that the correct input file ZN2.dat is chosen. During the run of the program, a summary of each single fit appears on the screen including a parameter "INFO" which indicates whether the fit was successful or not and the reason for failing. A list explaining the different INFO values is given in Table A.3. Sample screen outputs are shown in Tables A.4 and A.5. The first output at the start for the set in capsule T shows the failure to determine CVT at 50 ft-lb. Such data are first rejected for 20% of the prescribed iterations; once it becomes established that this is due to the low upper shelf, CVT at 50 ft-lb is ignored, as shown in the subsequent screen output; there is still a high failure rate due to other causes, as indicated in Table A.5. The three output files are listed in Tables A.6, A.7, and A.8. The EDB-dBASE file may be used as an auxiliary file for the multiple-curve fitting and plotting procedure. The user may choose to obtain a plot for each processed set. A sample is shown in Fig. A.10.

Table A.3. Key to the information tag INFO in the screen output for Monte Carlo uncertainty analysis

INFO > 0 : Regular Output

- = 0 : Fitting did not converge
 - = -1 : Inconsistent with previous values, skipped
 - = -2 : Inconsistent with first value, first value ignored
 - = -3 : CVT @ 30 ft-lb or 50 ft-lb could not be determined
(ignored after failure in 20% of the iterations)
 - = -4 : Failure to find initial value for fitting, fitting aborted
 - = -5 : Fit not physically possible, rejected
-

Table A.4. Sample screen output from the Monte Carlo uncertainty analysis - start.

The first 20 fits are rejected because of failure to obtain transition temperature at 68 J (50 ft-lb), INFO = -3

ZN2 T WZN201 W LT: Fluence = 1.100E+19 , Irr. Temp. = 304.

LSE= 3., USE= 59., SLOPE= 0.0211, TMID= 52., CVT41= 70., CVT68=*****	-3
LSE= 3., USE= 59., SLOPE= 0.0209, TMID= 52., CVT41= 70., CVT68=*****	-3
LSE= 3., USE= 59., SLOPE= 0.0209, TMID= 52., CVT41= 70., CVT68=*****	-3
LSE= 3., USE= 69., SLOPE= 0.0177, TMID= 75., CVT41= 83., CVT68= 184.	2
LSE= 3., USE= 64., SLOPE= 0.0211, TMID= 84., CVT41= 96., CVT68=*****	-3
LSE= 3., USE= 59., SLOPE= 0.0577, TMID= 69., CVT41= 76., CVT68=*****	-3
LSE= 3., USE= 60., SLOPE= 0.0125, TMID= 36., CVT41= 63., CVT68=*****	-3
LSE= 3., USE= 68., SLOPE= 0.0177, TMID= 53., CVT41= 62., CVT68= 218.	-3
LSE= 3., USE= 68., SLOPE= 0.0162, TMID= 68., CVT41= 79., CVT68=*****	-3
LSE= 3., USE= 74., SLOPE= 0.0093, TMID= 90., CVT41= 98., CVT68= 217.	2
LSE= 3., USE= 62., SLOPE= 0.0668, TMID= 71., CVT41= 76., CVT68=*****	-3
LSE= 3., USE= 58., SLOPE= 0.0968, TMID= 64., CVT41= 68., CVT68=*****	-3
LSE= 3., USE= 60., SLOPE= 0.0570, TMID= 41., CVT41= 47., CVT68=*****	-3
LSE= 3., USE= 61., SLOPE= 0.0117, TMID= 48., CVT41= 76., CVT68=*****	-3
LSE= 3., USE= 59., SLOPE= 0.0391, TMID= 63., CVT41= 72., CVT68=*****	-3
LSE= 3., USE= 60., SLOPE= 0.2339, TMID= 52., CVT41= 53., CVT68=*****	-5

ZN2 T WZN201 W LT : Iteration number 0 out of 100

Table A.5. Sample screen output from the Monte Carlo uncertainty analysis - continuation. Failure to obtain transition temperatures at 68 J (50 ft-lb) is now ignored

LSE= 3., USE= 65., SLOPE= 0.0233, TMID= 62., CVT41= 72., CVT68=*****	2
LSE= 3., USE= 59., SLOPE= 0.0152, TMID= 55., CVT41= 80., CVT68=*****	2
LSE= 3., USE= 52., SLOPE= 0.0180, TMID= 43., CVT41= 77., CVT68=*****	2
LSE= 3., USE= 52., SLOPE= 0.0245, TMID= 32., CVT41= 77., CVT68=*****	0
LSE= 3., USE= 59., SLOPE= 0.0126, TMID= 42., CVT41= 73., CVT68=*****	2
LSE= 3., USE= 66., SLOPE= 0.0138, TMID= 40., CVT41= 55., CVT68=*****	2
LSE= 3., USE= 60., SLOPE= 0.0197, TMID= 68., CVT41= 85., CVT68=*****	2
LSE= 3., USE= 56., SLOPE= 0.0259, TMID= 36., CVT41= 54., CVT68=*****	2
LSE= 3., USE= 72., SLOPE= 0.0220, TMID= 59., CVT41= 64., CVT68= 121.	2
LSE= 3., USE= 52., SLOPE= 0.0358, TMID= 47., CVT41= 65., CVT68=*****	2
LSE= 3., USE= 77., SLOPE= 0.0128, TMID= 70., CVT41= 73., CVT68= 148.	2
LSE= 3., USE= 68., SLOPE= 0.0110, TMID= 63., CVT41= 80., CVT68=*****	2
LSE= 3., USE= 58., SLOPE= 0.0309, TMID= 53., CVT41= 66., CVT68=*****	2
LSE= 3., USE= 72., SLOPE= 0.0126, TMID= 78., CVT41= 86., CVT68= 188.	2
LSE= 3., USE= 61., SLOPE= 0.0177, TMID= 47., CVT41= 64., CVT68=*****	2
LSE= 3., USE= 99., SLOPE= 0.0061, TMID= 125., CVT41= 91., CVT68= 187.	-1
LSE= 3., USE= 67., SLOPE= 0.3619, TMID= 58., CVT41= 59., CVT68=*****	-5
LSE= 3., USE= 48., SLOPE= 0.0304, TMID= 33., CVT41= 61., CVT68=*****	2
LSE= 3., USE= 79., SLOPE= 0.0060, TMID= 124., CVT41= 125., CVT68= 275.	-1
LSE= 3., USE= 53., SLOPE= 0.0303, TMID= 26., CVT41= 46., CVT68=*****	2
LSE= 3., USE= 56., SLOPE= 0.0198, TMID= 62., CVT41= 85., CVT68=*****	2

ZN2 T WZN201 W LT : Iteration number 28 out of 100

Table A.6. Sample output of the summary file

PR-EDB - Hyperbolic Tangent Fits of Raw Charpy Data
Impact Energy Uncertainty = 10.0 J
Test Temperature Uncertainty = 4.0 Degree C
Number of Successful Iterations = 10, Maximum = 50

Set Reactor Caps	Material	Fluence	Irr.Temp.	CVT(41J)	CVT(68J)	USE	LSE	Spec.	Iter
No.	ID	Type Or.	Deg.C	Deg.C	Deg.C	Joule	Joule	No.	No.
1 ZN2	WZN201	W LT	0.000E-01	0.	-30.6 ± 4.1	1.3 ± 4.4	93.0 ± 4.1	3.0 ± 0.0	24 100
2 ZN2	T WZN201	W LT	1.100E+19	304.	71.2 ± 14.1	0.0 ± 1.0	61.4 ± 6.6	3.0 ± 0.0	7 100
3 ZN2	U WZN201	W LT	2.800E+18	288.	49.0 ± 13.1	0.0 ± 1.0	70.0 ± 6.8	3.0 ± 0.0	8 100

Table A.7. Sample output of the covariance file

PR-EDB - Hyperbolic Tangent Fits of Raw Charpy Data

Impact Energy Uncertainty = 10.0 J

Test Temperature Uncertainty = 4.0 Degree C

Number of Successful Iterations = 100, Maximum = 500

ZN2 WZN201 W LT: Fluence = 0.000E-01 , Irr. Temp. = 0. C
No. of Specimen = 24, No. of Iterations = 100

Parameter	Mean	Std.Dev.	Correlation Coefficients					
Lower Shelf Energy	3.0	0.0						
Upper Shelf Energy	93.0	4.1	-0.186					
CVT at Midpoint	-22.7	4.2	-0.084	0.521				
1/slope (degree C)	50.1	8.3	-0.270	0.479	0.074			
CVT at 41 Joule	-30.6	4.1	0.092	-0.092	0.764	-0.482		
CVT at 68 Joule	1.3	4.4	-0.136	-0.005	0.543	0.511	0.403	

ZN2 T WZN201 W LT: Fluence = 1.100E+19 , Irr. Temp. = 304. C
No. of Specimen = 7, No. of Iterations = 100

Parameter	Mean	Std.Dev.	Correlation Coefficients					
Lower Shelf Energy	3.0	0.0						
Upper Shelf Energy	61.4	6.6	-0.025					
CVT at Midpoint	52.5	15.2	0.073	0.580				
1/slope (degree C)	57.7	21.7	-0.112	0.334	0.082			
CVT at 41 Joule	71.2	14.1	0.050	0.022	0.652	0.390		
CVT at 68 Joule	0.0	-1.0	0.000	0.000	0.000	0.000	0.000	

ZN2 U WZN201 W LT: Fluence = 2.800E+18 , Irr. Temp. = 288. C
No. of Specimen = 8, No. of Iterations = 100

Parameter	Mean	Std.Dev.	Correlation Coefficients					
Lower Shelf Energy	3.0	0.0						
Upper Shelf Energy	70.0	6.8	0.012					
CVT at Midpoint	39.4	16.3	-0.014	0.645				
1/slope (degree C)	76.0	27.9	-0.236	0.538	0.312			
CVT at 41 Joule	49.0	13.1	-0.097	0.211	0.851	0.270		
CVT at 68 Joule	0.0	-1.0	0.000	0.000	0.000	0.000	0.000	

Table A.8. Sample output of the EDB-dBASE file

ZN2	WZN201	W	LT	0.000E-01	0	-22	7	34	8	69	3	2.	-9.0.0111	24	100	
ZN2	T	WZN201	W	LT	1.100E+19	579	160	25	0	-1	45	5	2.	127.0.0096	7	100
ZN2	U	WZN201	W	LT	2.800E+18	550	120	24	0	-1	52	5	2.	103.0.0073	8	100

ZN2 T WZN201 W LT: Fluence = 1.100E+19 , Irr. Temp. = 304. C
CVT(41J) = 72. C, CVT(68J) = 0. C, USE = 62. J

Fig. A.10. Same data as in Fig. A.7. Note the slight difference in the fitting curve as a result of the Monte Carlo Procedure.

All three fitting curves and the corresponding data points can be combined in one plot with the multiple fitting and plotting procedure. Figure A.11 shows a sample output for appropriately chosen text in title and legends. No auxiliary input file was used for this example.

ZN2		WZN201	W	LT: Fluence = 0.000E+01 , Irr. Temp. = 0. C CVT(41J) = -29. C, CVT(68J) = 0. C, USE = 93. J
ZN2	T	WZN201	W	LT: Fluence = 1.100E+19 , Irr. Temp. = 304. C CVT(41J) = 70. C, CVT(68J) = ***** C, USE = 58. J
ZN2	U	WZN201	W	LT: Fluence = 2.800E+18 , Irr. Temp. = 288. C CVT(41J) = 48. C, CVT(68J) = ***** C, USE = 66. J

Fig. A.11. Combination graph of Zion Unit 2 weld material, baseline plus Capsules T and U.

A.7 INSTALLATION

The EDB-Utility with data files will run on any IBM/PC-AT or later personal computers that use the IBM/PC Disk Operation System (PC-DOS) or the Microsoft Disk Operation System (MS-DOS) Ver. 3.1 or higher. A minimum of 250-KB of Random Access Memory (RAM) is required, and a full 640 KB is recommended. A matching co-processor is also required. The graphics programs are written for an EGA screen with 640 × 350 pixel or VGA with 640 × 480 pixel resolution. For hardcopy of the graphics, a utility is necessary, which transfers the EGA screen to the printer on the Shift-PrtScr command. (This command is part of the software, and it does not need to be given externally.) The GRAFPLUS utility by Jewell Technologies, Inc., is used in our installation.

The distribution diskette of PR-EDB, Version 2, is in compressed format. It can be retrieved and loaded into the subdirectory where EDB is located by using the following commands:

First, enter the subdirectory where the EDB is located;

C:>CD EDB

then, type

C:\EDB>B:EDBVER2

to decompress the data files and to overwrite the existing data file, which has the same filename as the decompressed file.

Also the dBASE program should be loaded or a path specified so that dBASE can be reached from the P-T directory. About 10 Mb of disk space should be available for running the EDB-Utilities plus data, but less may be needed if only part of the data files are used.

APPENDIX B SUMMARY OF PR-EDB DATA NOT VERIFIED

Not all data that are currently in the PR-EDB have been verified by EPRI. These include:

- all data from the Allis-Chalmers reactors, Elk River and LaCrosse;
- data from two independent studies that were not under the vendor's control, namely, the review of fluence calculations in NUREG/CR-3319 by HEDL and the report on Babcock & Wilcox welds in BAW-1803; and
- several reports (primarily Southwest Research) whose data could not be verified by EPRI (see Table B.1).

Unverified data are detailed in Table B.1 that is grouped by (1) file name, (2) reactor, and (3) capsule. A description column is given that identifies the material(s), gives the verifier's comment, and provides the associated REF_ID.

Table B.1. Unverified Data in the PR-EDB

Reactor	Capsule	File	Description
Westinghouse files			
FA2	None	CHEM_W	PFA201: <u>W</u> cannot verify accuracy of data (WCAP-11438)
ZN2	None	CHEM_W	WZN201: <u>W</u> cannot verify accuracy of data (BAW-1803)
AD1	V	CV_RF_W*	FAD101, HAD101, WAD101: Unable to verify (SWRI-06-8976)
AL2	None	CV_RF_W*	HAL201, PAL201, WAL201: Post Irradiation Surveillance Capsules not tested by Westinghouse, cannot verify information (WCAP-9228)
AS1	None	CV_RF_W*	HAS101, PAS101, WAS101: Post Irradiation Surveillance Capsules not tested by Westinghouse, cannot verify information (WCAP-9308)
AS2	None	CV_RF_W*	HAS201, PAS201, WAS201: Westinghouse cannot verify data (WCAP-9330)
BZ1	R	CV_RF_W*	HBZ101, PBZ101, PBZ102, SASTM, WBZ101: Unable to verify (PB-ME 75/03)
BZ1	S	CV_RF_W*	HBZ101, PBZ101, PBZ102, WBZ101: Unable to verify (PB-ME 78/06)
BZ1	V	CV_RF_W*	HBZ101, PBZ101, PBZ102, SASTM, WBZ101: Unable to verify (PB-ME 75/02)
CAB	K	CV_RF_W*	HCAB02, PCAB01, SASTM, WCAB01: Unable to verify (WENX/76/64)
CAB	P	CV_RF_W*	PCAB01, PCAB02, SASTM: Unable to verify (WENX/76/64)
CK1	None	CV_RF_W*	HCK101, PCK101, WCK101: Unable to verify (SWRI-02-4770)
CK1	T	CV_RF_W*	HCK101, PCK101, SHSS02, WCK101: Unable to verify (SWRI-02-4770)
CK1	Y	CV_RF_W*	HCK101, PCK101, SHSS02, WCK101: Unable to verify (SWRI-7244-001/1)
CK2	X	CV_RF_W*	HCK201, PCK201, WCK201: Unable to verify (SWRI-06-8888)

Table B.1 (continued)

Reactor	Capsule	File	Description
Westinghouse files (continued)			
CK2	Y	CV_RF_W*	HCK201, PCK201, WCK201: Unable to verify (SWRI-7244-002/1)
CTY	A	CV_RF_W*	HCTY04, PCTY02, SASTM, WCTY01: Unable to verify (BMI-1070)
CTY	F	CV_RF_W*	PCTY02, PCTY04, PCTY07, SASTM: Unable to verify (BMI-0372)
KO1	T	CV_RF_W*	FKO101, HKO101, WKO101: Unable to verify (SWRI-17-7517-219)
KO1	V	CV_RF_W*	FKO101, HKO101, WKO101: Unable to verify (SWRI-17-5759-201)
SA2	None	CV_RF_W*	HSA201, PSA201, WSA201: Unable to verify (EPRI NP-2428)
SO1	None	CV_RF_W*	PSO101 (TL), PSO102 (TL), PSO103 (TL): Delete this data, cannot verify that this is SCE data (SWRI-07-2892/A)
SO1	A	CV_RF_W*	HSO101, PSO103, SASTM, WSO101: Unable to verify (SWRI-07-2892/A)
SO1	D	CV_RF_W*	PSO101, PSO102, PSO103, SASTM: Unable to verify (SWRI-07-2892/B)
SU1	None	CV_RF_W*	PSU101 (TL), PSU102 (TL): Cannot identify; Westinghouse cannot verify accuracy of these data (WCAP-7723)
TP4	None	CV_RF_W*	FTP401, HTP401, WTP401: Unable to verify (SWRI-02-4221)
TP4	S	CV_RF_W*	FTP401, FTP402, SHSS02: Unable to verify (SWRI-02-5380)
TP4	T	CV_RF_W*	FTP401, HTP401, SHSS02, WTP401: Unable to verify (SWRI-02-4221)

Table B.1 (continued)

Reactor	Capsule	File	Description
Westinghouse files (continued)			
TRO	None	CV_RF_W*	HTRO01, PTRO01, WTRO01: Unable to verify (EPRI NP-2428)
GIN	None	HEAT_L_W	WGIN01: Cannot verify accuracy (WCAP-7254)
YR	None	HEAT_L_W	PYR_01: <u>W</u> cannot verify accuracy of data (JBE 12)
YR	None	HEAT_L_W	SASTM S1: <u>W</u> cannot verify accuracy of data (JBE 12)
BV1	None	HEAT_W	WBV101: Unable to verify (DOCKET 50-334)
CAB	None	HEAT_W	PCAB01, PCAB02, SASTM: Unable to verify (WENX/76/64)
CK1	None	HEAT_W	PCK101, SHSS02, WCK101: Unable to verify (SWRI-02-4770)
CK2	None	HEAT_W	PCK201, WCK201: Unable to verify (SWRI-06-8888)
HB2	None	HEAT_W	PHB201, PHB202, PHB203, WHB201: Unable to verify (DOCKET 50-261)
IP2	None	HEAT_W	PIP201, PIP202, PIP203, WIP201: Unable to verify (DOCKET 50-247)
IP2	None	HEAT_W	PIP201, PIP202, PIP203, SASTM, WIP201: Unable to verify (SWRI-17-2108)
KO1	None	HEAT_W	FKO101, WKO101: Unable to verify (SWRI-17-5759-201)
KO1	None	HEAT_W	FKO101, WKO101: Unable to verify (SWRI-17-7517-219)
KWE	None	HEAT_W	FKWE01, FKWE02, WKWE01: Unable to verify (DOCKET 50-305/A)
KWE	None	HEAT_W	FKWE01, FKWE02, WKWE01: Unable to verify (DOCKET 50-305/C)

Table B.1 (continued)

Reactor	Capsule	File	Description
Westinghouse files (continued)			
PI1	None	HEAT_W	FPI101, WPI101: Unable to verify (DOCKET 50-282)
PI2	None	HEAT_W	FPI201, WPI201: Unable to verify (DOCKET 50-306)
SA1	None	HEAT_W	PSA101, PSA102, PSA103, WSA101: Unable to verify (DOCKET 50-272)
SQ1	None	HEAT_W	FSQ101, WSQ101: Unable to verify (SWRI-06-8851)
SU1	None	HEAT_W	WSU101: Unable to verify (DOCKET 50-280/1)
SU2	None	HEAT_W	PSU201, WSU201: Unable to verify (DOCKET 50-281)
TP3	None	HEAT_W	FTP301, FTP302, SASTM, WTP301: Unable to verify (SWRI-06-8575)
TP4	None	HEAT_W	FTP401, SHSS02, WTP401: Unable to verify (SWRI-02-4221)
TRO	None	HEAT_W	PTRO01, WTRO01: Unable to verify (DOCKET 50-344)
YR	None	HEAT_W	PYR_01: Unable to verify (JBE 12)
YR	None	HEAT_W	PYR_01: Unable to verify (YAEC-1089)
ZN1	None	HEAT_W	PZN101, WZN101: Unable to verify (DOCKET 50-295)
ZN2	None	HEAT_W	PZN201, WZN201: Unable to verify (DOCKET 50-304)
AD1	V	REAC_W	<u>W</u> cannot verify the accuracy of this data (SWRI-06-8976)
BZ1	S	REAC_W	<u>W</u> cannot verify the accuracy of this data (PB-ME 78/06)
CAB	K	REAC_W	<u>W</u> cannot verify the accuracy of this data (WENX/76/64)

Table B.1 (continued)

Reactor	Capsule	File	Description
Westinghouse files (continued)			
CAB	P	REAC_W	<u>W</u> cannot verify the accuracy of this data (WENX/76/64)
IP2	T	REAC_W	<u>W</u> cannot verify the accuracy of this data (SWRI-02-4531/S)
KO1	T	REAC_W	<u>W</u> cannot verify the accuracy of this data (SWRI-17-7517-219)
KO1	V	REAC_W	<u>W</u> cannot verify the accuracy of this data (SWRI-17-5759-201)
AD1	V	SHFT_W	FAD101, HAD101, WAD101: No comments/changes were made (previously stated that <u>W</u> cannot verify accuracy of AD1 data)
IP2	T	SHFT_W	PIP201, PIP202, PIP203, SASTM: <u>W</u> cannot verify the data in SWRI-02-4531/S
KO1	T	SHFT_W	FKO101, WKO101: <u>W</u> cannot verify data in report SWRI-17-7517-219
KO1	V	SHFT_W	FKO101, WKO101: <u>W</u> cannot verify correctness of data in report SWRI-17-5759-201
YR	None	SHFT_W	PYR_01: <u>W</u> cannot verify correctness of data (YAEC-1089)
YR	02	SHFT_W	PYR_01: <u>W</u> cannot verify correctness of this data (JBE 12)
YR	06	SHFT_W	SASTM S1: <u>W</u> cannot verify data (YAEC-1089)
YR	W1	SHFT_W	PYR_01: <u>W</u> cannot verify correctness of this data (YAEC-1089)
YR	W1	SHFT_W	SASTM S1: <u>W</u> cannot verify correctness of this data (YAEC-1089)
YR	W2	SHFT_W	PYR_01: <u>W</u> cannot verify correctness of this data (YAEC-1089)

Table B.1 (continued)

Reactor	Capsule	File	Description
Westinghouse files (continued)			
YR	W2	SHFT_W	SASTM S1: <u>W</u> cannot verify correctness of this data (YAEC-1089)
BZ1	None	SPEC_L_W	PBZ101, PBZ102, WBZ101: Unable to verify (PB-ME 78/06)
BZ1	R	SPEC_L_W	HBZ101, PBZ101, PBZ102, SASTM, WBZ101: Unable to verify (PB-ME 75/03)
BZ1	S	SPEC_L_W	HBZ101, PBZ101, PBZ102, WBZ101: Unable to verify (PB-ME 78/06)
BZ1	V	SPEC_L_W	HBZ101, PBZ101, PBZ102, SASTM, WBZ101: Unable to verify (PB-ME 75/02)
CAB	None	SPEC_L_W	HCAB02, PCAB01, PCAB02, WCAB01: Unable to verify (WENX/76/64)
CAB	K	SPEC_L_W	HCAB02, PCAB01, SASTM, WCAB01: Unable to verify (WENX/76/64)
CAB	P	SPEC_L_W	PCAB01, PCAB02, SASTM: Unable to verify (WENX/76/64)
CK1	None	SPEC_L_W	HCK101, PCK101, WCK101: Unable to verify (SWRI-02-4770)
CK1	T	SPEC_L_W	HCK101, PCK101, SHSS02, WCK101: Unable to verify (SWRI-02-4770)
CK1	Y	SPEC_L_W	HCK101, PCK101, SHSS02, WCK101: Unable to verify (SWRI-7244-001/1)
KO1	T	SPEC_L_W	FKO101, HKO101, WKO101: Unable to verify (SWRI-17-7517-219)
KO1	V	SPEC_L_W	FKO101, HKO101, WKO101: Unable to verify (SWRI-17-5759-201)
SA2	None	SPEC_L_W	HSA201, PSA201, WSA201: Unable to verify (EPRI NP-2428)

Table B.1 (continued)

Reactor	Capsule	File	Description
Westinghouse files (continued)			
TP4	None	SPEC_L_W	FTP401, HTP401, WTP401: Unable to verify (SWRI-02-4221)
TP4	S	SPEC_L_W	FTP401, FTP402, SHSS02: Unable to verify (SWRI-02-5380)
TP4	T	SPEC_L_W	FTP401, HTP401, SHSS02, WTP401: Unable to verify (SWRI-02-4221)
TRO	None	SPEC_L_W	HTRO01, PTRO01, WTRO01: Unable to verify (EPRI NP-2428)
YR	None	SPEC_L_W	PYR_01, SASTM S1: Unable to verify (YAEC-1089)
YR	01	SPEC_L_W	PYR_01, SASTM S1: Unable to verify (YAEC-1089)
YR	02	SPEC_L_W	PYR_01, SASTM S1: Unable to verify (YAEC-1089)
YR	06	SPEC_L_W	PYR_01, SASTM S1: Unable to verify (YAEC-1089)
YR	08	SPEC_L_W	PYR_01, SASTM S1: Unable to verify (YAEC-1089)
YR	W1	SPEC_L_W	PYR_01, SASTM S1: Unable to verify (YAEC-1089)
YR	W2	SPEC_L_W	PYR_01, SASTM S1: Unable to verify (YAEC-1089)
AD1	V	TEN_W	FAD101, WAD101: Unable to verify (SWRI-06-8976)
BZ1	None	TEN_W	PBZ101, PBZ102, WBZ101: Unable to verify (PB-ME 78/06)
BZ1	R	TEN_W	PBZ101, PBZ102, WBZ101: Unable to verify (PB-ME 75/03)

Table B.1 (continued)

Reactor	Capsule	File	Description
Westinghouse files (continued)			
BZ1	S	TEN_W	PBZ101, PBZ102, WBZ101: Unable to verify (PB-ME 78/06)
BZ1	V	TEN_W	PBZ101, PBZ102, WBZ101: Unable to verify (PB-ME 75/03)
CAB	K	TEN_W	PCAB01, WCAB01: Unable to verify (WENX/76/64)
CAB	P	TEN_W	PCAB01, PCAB02: Unable to verify (WENX/76/64)
CK1	T	TEN_W	PCK101, WCK101: Unable to verify (SWRI-02-4770)
CK1	Y	TEN_W	PCK101, WCK101: Unable to verify (SWRI-7244-001/1)
CTY	None	TEN_W	PCTY02, PCTY04, PCTY07, WCTY01: Unable to verify (BMI-1070)
CTY	A	TEN_W	PCTY02, WCTY01: Unable to verify (BMI-1070)
CTY	F	TEN_W	PCTY02, PCTY04, PCTY07: Unable to verify (BMI-0372)
GIN	V	TEN_W	FGIN01, FGIN02, WGIN01: Unable to verify (FP-RA-1)
HB2	V	TEN_W	PHB202, WHB201: Unable to verify (SWRI-02-4397)
IP2	T	TEN_W	PIP201, PIP202, PIP203: Unable to verify (SWRI-02-4531)
IP2	V	TEN_W	PIP202, WIP201: Unable to verify (SWRI-17-2108)
IP2	Y	TEN_W	PIP203, WIP201: Unable to verify (SWRI-02-5212)
IP2	Z	TEN_W	PIP201, PIP202, PIP203: Unable to verify (SWRI-7379-001/3)
KO1	T	TEN_W	FKO101, WKO101: Unable to verify (SWRI-17-7517-219)

Table B.1 (continued)

Reactor	Capsule	File	Description
Westinghouse files (continued)			
KO1	V	TEN_W	FKO101, WKO101: Unable to verify (SWRI-17-5759-201)
NA1	V	TEN_W	FNA101, WNA101: Unable to verify (BAW-1638)
NA2	None	TEN_W	FNA201, WNA201: Unable to verify (BAW-1794)
NA2	V	TEN_W	FNA201, WNA201: Unable to verify (BAW-1794)
PB1	V	TEN_W	PPB101, PPB102: Unable to verify (BMI-0673)
PB2	V	TEN_W	FPB201, FPB202, WPB201: Unable to verify (BMI-0675)
RI2	X	TEN_W	FRI201, WRI201: Unable to verify (STUDSVIK/MS-78/226)
SO1	A	TEN_W	PSO103, WSO101: Unable to verify (SWRI-07-2892/A)
SO1	D	TEN_W	PSO102, WSO101: Unable to verify (SWRI-07-2892/B)
SU1	T	TEN_W	PSU101, WSU101: Unable to verify (DOCKET 50-280)
SU2	X	TEN_W	PSU201, WSU201: Unable to verify (BMI-0975/SU2)
TP3	S	TEN_W	FTP301, FTP302: Unable to verify (SWRI-02-5131)
TP3	V	TEN_W	FTP302, WTP301: Unable to verify (SWRI-06-8575)
TP4	None	TEN_W	FTP401, WTP401: Unable to verify (SWRI-02-4221)
TP4	S	TEN_W	FTP401, FTP402: Unable to verify (SWRI-02-5380)
TP4	T	TEN_W	FTP401, WTP401: Unable to verify (SWRI-02-4221)

Table B.1 (continued)

Reactor	Capsule	File	Description
Westinghouse files (continued)			
YR	None	TEN_W	PYR_01: Unable to verify (YAEC-1089)
ZN1	T	TEN_W	PZN101, WZN101: Unable to verify (BCL-585-4)
ZN1	X	TEN_W	PZN101, WZN101: Unable to verify (SWRI-06-7484-001)
ZN2	T	TEN_W	PZN201, WZN201: Unable to verify (SWRI-06-6901-001)
ZN2	U	TEN_W	PZN201, WZN201: Unable to verify (BCL-585-4)
General Electric files			
BR	None	RAW_C_G	HBR_01, PBR_01, WBR_01: Could not verify (EPRI NP-2428)
BR	119	RAW_C_G	HBR_01, PBR_01, WBR_01: Could not verify (EPRI NP-2428)
BR	122	RAW_C_G	HBR_01, PBR_01, WBR_01: Could not verify (EPRI NP-2428)
BR	124	RAW_C_G	HBR_01, PBR_01, WBR_01: Could not verify (EPRI NP-2428)
BR	127	RAW_C_G	HBR_01, PBR_01, WBR_01: Could not verify (EPRI NP-2428)
HM3	01	RAW_C_G	HHM301, SHM3, WHM301: Could not verify (DOCKET 50-133)
HM3	01	REAC_G	Not verified
NM1	None	SHFT_G	Could not verify, material in question

*CV_RF_W corresponds to the RAW_C_W file.

APPENDIX C CONTENTS OF PR-EDB, VERSION 2

C.1 Data in PR-EDB, Version 2

A total of 958 shift data points are given in PR-EDB, Version 2, which include 227 welds, 297 plates, 119 forgings, 108 correlation monitor materials, and 207 HAZ materials.

The overall distribution charts of fluence, chemistry composition, and 30 ft-lb transition temperature shift for base and weld materials are discussed as below (the HAZ materials are excluded from the study):

Fluence: The ranges of fluence spanned from $1.0\text{E}+16$ to $5.0\text{E}+20$ n/cm², and 90% fluences data are within the range of $1.0\text{E}+18$ and $1.0\text{E}+20$ n/cm² (see Fig. C.1).

Chemistry: The overall distribution of the copper and nickel contents are demonstrated in Fig. C.2 and C.3, respectively. Copper contents ranged from 0.01 to 0.40 wt %, and the copper content of 55% data are between 0.1 and 0.2 wt % ranges. Nickel contents ranged from 0.02 to 1.00 wt %, and the nickel content of 70% data fall between 0.50 to 0.85 wt % range; little data are within the ranges of 0.2 to 0.5 wt % nickel contents. Fig. C.4 and Fig. C.5 illustrate the distribution of copper vs. nickel and copper vs. phosphorous, respectively.

30 ft-lb shift vs. fluence: Data plots of 30-ft-lb shift vs. fluence for base and weld materials are illustrated in Fig. C.6 and Fig. C.7, respectively. Plots of residual (measured shift minus Reg.Guide 1.99 Rev.2's shift) for base and weld materials are illustrated in Fig. C.8 and Fig. C.9, respectively.

C.2 Contents of New Data to PR-EDB, Version 1, Revision 1

There are 53 materials that were not previously included in PR-EDB, Version 1, Revision 1; in addition, there are data for 6 HSST welds which were irradiated in Crystal River and Davis Besse, and one HSST plate material in Maine Yankee reactor. A total of 185 new shift data points were added to the PR-EDB (48 welds, 57 plates, 23 forgings, 15 correlation monitor, 42 heat-affected-zones). The new reactors and the references of the new data points added into the PR-EDB are listed as below:

New Reactors:

Braidwood Unit 1
Braidwood Unit 2
Beaver Valley Unit 2
Byron Unit 1
Byron Unit 2
Catawba Unit 2
Comanche Peak Unit 2
Millstone Nuclear Power Station Unit 3
Seabrook Unit 1

San Onofre Unit 2
San Onofre Unit 3
Shearon Harris Unit 1
South Texas Unit 1
Vogtle Unit 2
Waterford Generating Station Unit 3

New Reports:

BAW-2075/R1, Arkansas Nuclear One, Unit 1, Capsule C
WCAP-12685, Braidwood Unit 1, Capsule U
WCAP-12845, Braidwood Unit 2, Capsule U
WCAP-12406, Beaver Valley Unit 2, Capsule U
WCAP-11651, Byron Unit 1, Capsule U
WCAP-12431, Byron Unit 2, Capsule U
WCAP-11941, Catawba Unit 2, Capsule Z
WCAP-12483, Donald C. Cook Unit 1, Capsule U
SWRI-02-6159, Donald C. Cook Unit 1, Capsule X
SWRI-02-5928, Donald C. Cook Unit 2, Capsule T
WCAP-12946, Callaway Unit 1, Capsule Y
WCAP-10684, Comanche Peak Unit 2
BAW-1803/R1, Crystal River Unit 3, Capsule C1
BAW-2125, Davis-Besse Nuclear Power Station Unit 1, Capsule D
BAW-1803/R1, Davis-Besse Nuclear Power Station Unit 1, Capsule D1
DOCKET 50-275/3, Diablo Canyon Unit 1, Supplemental Surveillance Capsule
WCAP-12471, Joseph M. Farley Unit 2, Capsule X
SWRI-17-2108/R1, Indian Point Unit 2, Capsule V
WCAP-12556, W. B. McGuire Unit 2, Capsule X
BAW-2142, Millstone Nuclear Power Station Unit 2, Capsule W104
WCAP-11878, Millstone Nuclear Power Station Unit 3, Capsule U
WCAP-12819, Maine Yankee Nuclear Plant, Capsule W253
WCAP-12497, North Anna Unit 2, Capsule U
BAW-2050, Oconee Nuclear Station Unit 1, Capsule C
BAW-2051, Oconee Nuclear Station Unit 2, Capsule E
BAW-2128, Oconee Nuclear Station Unit 3, Capsule D
BAW-2140, Point Beach Nuclear Plant Unit 2, Capsule S
BAW-2074, Rancho Seco Unit 1, Capsule F
WCAP-13366, Salem Unit 2, Capsule X
YAEC-1853, Seabrook Unit 1, Capsule U
BAW-2157, Seabrook Unit 1, Capsule U
WCAP-12751, St. Lucie Unit 1, Capsule W104
BMI-1288, San Onofre Unit 2, Capsule W97
WCAP-12920, San Onofre Unit 3, Capsule W97
WCAP-13333, Sequoyah Unit 1, Capsule X
SWRI-17-8851, Sequoyah Unit 2, Capsule U
BAW-2083, Shearon Harris Unit 1, Capsule U
BAW-2154, Shearon Harris Unit 1, Capsule V
WCAP-12629, South Texas Unit 1, Capsule U

BAW-1901, Three Mile Island Nuclear Station Unit 1, Capsule C
WCAP-8426, Trojan Reactor
WCAP-12868, Trojan Reactor, Capsule V
WCAP-13007, Vogtle Unit 2, Capsule U
WCAP-13365, Wolf Creek Unit 1, Capsule Y
BAW-2177, Waterford Generating Station Unit 3, Capsule W97
BAW-2082, Zion Nuclear Plant Reactor Unit 1, Capsule Y
WCAP-12396, Zion Nuclear Plant Reactor Unit 2, Capsule Y

C.3 Updating of the EDB Software

Several changes have been made for internal use of the EDB software that was distributed with the first version of the PR-EDB. Any user familiar with the old software will have no difficulty to use the new one, even without any additional explanation. The changes are listed below:

1. An option is provided to convert the raw Charpy file RAW_C_PR.dbf to a corresponding ASCII file, RAW_C_PR.dat, that can be used in the Charpy fitting programs. This option is embedded in the "Display and Export Data" option of the file manipulation feature. This option must be activated upon receiving PR-EDB, Version 2, in order to overwrite the existing RAW_C_PR.dat from the previous version. The input file is WORK.dbf (i.e., RAW_C_PR.dbf must be retrieved in the same manner as any other file used for processing with the EDB software). The program performs all necessary conversions and checking automatically, informs the user of any problems, and provides appropriate options.
2. The graphic output for both plotting and Charpy fitting programs has been extended to accommodate the VGA in addition to the EGA display. This choice is automatic; the VGA display is more aesthetically pleasing and will be used whenever possible.
3. Both graphic programs have an additional option that allows the user to define the boundaries of the coordinates in the plotting window. For the plotting program, this option includes a choice of logarithmic coordinates. For the Charpy fitting program, the range of test temperatures and the maximum impact energy may be specified. All data points and pieces of the curves that fall outside the specified ranges will not be displayed. This feature is especially useful for creating overlays that must be plotted in the same scale.
4. Some choice of parameters that have been previously lost after exiting the program will be retained for subsequent runs. A typical example is the number of characters and number of lines on a page for the printing program. Any setting used for one printout will be retained as default for future runs until changed instead of reverting to the initial default setting after exit. The same is true for the user settings in the Charpy fitting programs.
5. The feature in the Clipper language that allows shelling out to DOS does not appear to work in the newer DOS or the newer (486) machines. All commands referring to this feature have been replaced and recompiled.

Fig. C.1. Fluence Distribution Chart of Base and Weld Materials from PR-EDB, Version 2.

Fig. C.2. Copper Distribution of Base and Weld Materials from PR-EDB, Version 2.

Fig. C.3. Nickel Distribution of Base and Weld Materials from PR-EDB, Version 2.

Fig. C.4. Copper vs. Nickel of Base and Weld Materials from PR-EDB, Version 2.

Fig. C.5. Copper vs. Phosphorous of Base and Weld Materials from PR-EDB, Version 2.

Fig. C.6. 30-ft-lb Shift vs. Fluence of Base Materials from PR-EDB, Version 2.

Fig. C.7. 30-ft-lb Shift vs. Fluence of Weld Materials from PR-EDB, Version 2.

Fig. C.8. Residual vs. Fluence of Base Materials from PR-EDB, Version 2, per Reg. Guide 1.99, Revision 2.

Fig. C.9. Residual vs. Fluence of Weld Materials from PR-EDB, Version 2, per Reg. Guide 1.99, Version 2.

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