**GUIDANCE FOR DEVELOPMENT OF SOFTWARE UTILIZING THE
NND-CNP USING DATA ON MEASURES AND GRAM WEIGHTS
(Prepared 4/95)**

INTRODUCTION

Information about the gram weight of different measures of foods is available through a combination of the data in the GMWT, MDES, FDES and, in future, the FSUBDES files. A software system must combine, interpret and expand this information in order to allow the end user to completely and fully utilize the data. Following the discussion about data fields, links and sample file listings, is additional information about the requirements for data expansion and interpretation by the software developer.

As shown on the attached sample file listings, the NND files follow the principles of a relational database in that redundancy is kept to a minimum. In the GMWT file, foods are identified only by their CNP code and CNP subcode (if present), but their description is not listed. One must go to the FDES and perhaps the FINCL and/or FSUBCD files to find the text description of the food, using the CNP code or CNP subcode as the link between files. Also in the GMWT file, rather than repeating the long text descriptions for the measures of each CNP food, measures codes are used that link to a third file, the MDES file, which contains all of the descriptions for the measure codes. The NND files are set up this way to be most efficient for data storage and transfer, but a School Food Service Software System must tie the data together, so that the end user can make sense of it all. In most cases that means NOT displaying to user the internal codes that are used to link files (like the measure description code). Code numbers are usually meaningless to the user, except perhaps the CNP food code. It is the text descriptions that are important to users.

Many of the data fields in the NND-CNP files are needed by software developers, either in their programming or for updating their database, but users do not need to see the fields.

DATA FIELDS IN THE GRAM WEIGHTS (GMWT) FILE

CNP CODE AND **CNP SUBCODE** are the identifiers for the food and serve as links to the FDES and FSUBDES files which contain the descriptions for the food. (Users need to see the food codes and descriptions.)

SEQUENCE NUMBER was included in Release 1 of the NND-CNP to serve as a unique identifier of a measure/weight value. This field will be deleted from the database in future releases since the MEASURE DESCRIPTION NUMBER serves as a unique identifier for a measure-weight value.

MEASURE DESCRIPTION NUMBER represents a particular measure for the food and serves as a link to the MDES file which contains the text descriptions for each code number. (Users need to see the text description of the measure, but not the measure code number.)

GRAM WEIGHT is the weight in grams for a specific measure of a specific food. (Users need to see this, along with all the universal conversions of this data. See the discussion of <u>Measure Conversions</u>.)

The **DATA ADDED, LAST MODIFIED** and **STATUS** fields identify for software developers the data that has been added, changed or discontinued since the last release of the NND so that the software database can be updated. (Users do not need to see this data.)

DATA FIELDS IN THE MEASURE DESCRIPTION (MDES) FILE
As discussed above, the **MEASURE DESCRIPTION NUMBER** is the link to the GMWT file. (Users do not need to see this code.)

The **DESCRIPTION** of the measure provides the information which is meaningful to the user, and defines the basic unit from which the software developer can calculate universal conversions.

The measure <u>code</u> system is complex and was developed by ARS for multiple purposes; in its current state, it may not be totally appropriate for use by school food service staff, and some interpretation of the data may be necessary in order to make it more useful for school food service analysis of menus and recipes. (See the discussion of <u>Abbreviation of Measure Descriptions</u>.)

DATA COMBINATION FOR FOOD MEASURES AND WEIGHTS
Sample file listings are attached to illustrate the meaningful combination of measure-weight data from the NND files. The first two pages are simply listings of the data in the GMWT and MDES files. The third page shows an example of a data combination that would be meaningful to users of the food service software. This report was developed by collecting information from the following linked files:

FDES file: the descriptive information for a food (DESCRIPTOR or ABBREVIATED DESCRIPTOR) ; linked to the GMWT file by the CNP CODE.

MDES file: the DESCRIPTION of a specific measure, linked to the GMWT file by MEASURE DESCRIPTION NUMBER.

GMWT file: the GRAM WEIGHT for a specific measure of a specific food, linked to the FDES file by the CNP CODE and the MDES file by MEASURE DESCRIPTION NUMBER.

MEASURE CONVERSIONS

For entry of foods into recipes or into menus, the software must provide the user with more than just the measure-to-gram weight conversions contained in the GMWT file. There are certain "Universal" weight-to-weight and volume-to-volume conversions that must be performed by the software. All foods should automatically be available in all standard weights:

> pound (lb)
> ounce (oz)
> gram (g)
> kilogram (kg) is optional

These are universal conversion; they don't have to be taken directly from the GMWT file, but can be easily calculated using standard conversion factors.

If the system is given (through the GMWT file or by local entry) the weight (in grams or ounces) of any one of the following volume measure

> Teaspoon (tsp)
> Tablespoon (tbsp)
> Fluid Ounce (fl oz)
> Cup (c)
> Pint (pt)
> Quart (qt)
> Gallon (gal)
> Liter (L)

then all of these measures should be available in addition to the standard weight measures.

The system must calculate the universal conversions from one weight to any other weight (e.g. 100 g to lb) and from one volume measure to any other volume (e.g. cup to gallon). Conversion tables are available from many sources, including most cookbooks. Since the NND provides nutrient values on a weight basis (per 100 gram of the food), the nutrients can be easily calculated for any other weight. Also, the GMWT file contains data on weight in grams of specific volume measures for many foods. If any volume measure is given in the NND, the gram weights of any volume can be easily calculated, and the nutrients for any volume can be calculated.

If data on additional measures (e.g. 1 serving or 1 slice) are provided in the NND, they must also be available to users for recipe or menu entry.

INPUT AND OUTPUT OF MEASURE QUANTITIES

Users should be able to enter recipe ingredient amounts in either fractional or decimal forms, but the system should print ingredient amounts in fractions rather than decimals (since that format is better understood by most food service staff). For example, a yield-adjusted recipe report to be used in food preparation should express an amount of flour as 1-1/3 cups rather than 1.333 cups.

During menu creation and editing, the user must be able to easily change the software system's set of standard measures for a food to logical and understandable portion sizes as may be used in that school district.

CONVERSION BETWEEN FLUID OUNCES AND OTHER VOLUME MEASURES

The exception to the volume conversion requirement is the conversion TO fluid ounce from another volume measure (i.e., from ½ CUP to 4 FL OZ). Preferably, this should NOT be done. Although it would be mathematically correct it would look awkward for many foods like flour, salt, etc. People do not measure flour or salt in FL OZ, they measure it in fractions of a cup. This is true for volume units, it is probably better not to try to convert cups into fluid ounces; the results are just not right for most foods. Converting in the other direction (fluid ounces to cups) may also look "strange" for some liquid foods (i.e., that 12 FL OZ of cola equals 1-1/2 of cola), but it is less of a problem than stating "4 FL OZ" of solid foods like flour, salt or sugar, etc.

DISPLAY OF AVAILABLE MEASURES

When adding ingredients to recipes, all available measures for that specific food MUST be displayed on screen for the user. Preferably, this could be done as a list from which to select by cursor or mouse, or by number. It a minimum, if text entry of measure units is required, the acceptable measures must be displayed so that the user knows what to enter and any necessary abbreviations MUST be listed on screen.

ABBREVIATION OF MEASURE DESCRIPTIONS

Measure descriptions from the NND must not be simply truncated to fit a too-small data field; ideally, the full NND descriptions should be displayed and printed. Abbreviation or modification of the measure descriptions, if absolutely necessary, must be done very carefully so as not to change the meaning of the measure. Measure descriptions in NND, Release 1, may have contained imbedded quote marks (") causing information to be lost as the data was downloaded and transferred into the software database. Future NND releases will be formatted differently so that the imbedded quote marks do not cause these problems.

EDITING FOOD WEIGHT AND MEASURES DATA

The software system should lock the measurement data (gram weights and measure descriptions) which originates from the NND MDES and GMWT files (so they cannot be edited or deleted) while allowing the user to add/edit other measures for both locally entered and NND ingredients. Measures which originate from the NND files must be marked with a special character or displayed in a different color to distinguish them from locally entered measure/weight data.

Locking the NND measure data is necessary because the capability to change measure data can cause grave errors in nutrient analysis since the measure-to-gram weight conversion is one of the basic building blocks of the nutrient database.

RAW VS COOKED WEIGHTS

The NND contains gram weight data for some foods in terms of both the raw and cooked versions of the food. Specifically for some cooked foods there is information about the "cooked yield from 1 lb raw as purchased" as well information for "1 lb" (which means 1 lb of the cooked food). Any abbreviation of these descriptions must be carefully so as not to lose meaning. Also the concept of "cooked yield from raw weight" vs. "weight of cooked food" needs to be fully explained in the software documentation.

CHANGE TO GMWT FILE INDEX IN SECOND RELEASE OF NND-CNP

In the first release of the NND-CNP, the GRAM WEIGHTS (GMWT) file was indexed on the concatenation of the CNP CODE, CNP SUBCODE, and SEQUENCE NUMBER IN WEIGHT CATEGORY. Another field, the MEASURE DESCRIPTION NUMBER, is used to link the GMWT file to the Measure Description (MDES) files where the (critical) measurement descriptions are stored. In the second release of the NND-CNP, the SEQUENCE NUMBER IN WEIGHT CATEGORY field will be eliminated and the MEASURE DESCRIPTION NUMBER alone will be used to indicate a unique measure-weight entry.

Sample File Listing

CNP code	CNP sub code	Sequence #	Measure description #	Gram Weight	Data added	Last modified	Status
1001		1	10205	227.00	1/31/94		a
1001		2	61631	5.00	1/31/94		a
1001		3	21000	14.20	1/31/94		a
1001		4	62901	113.00	1/31/94		a
1002		1	61631	3.80	1/31/94		a
1002		2	62553	6.00	1/31/94		a
1002		3	62900	76.00	1/31/94		a
1009		1	10297	113.00	1/31/94		a
1009		2	40000	28.35	1/31/94		a
1012		1	40000	28.35	1/31/94		a
1012		2	10206	210.00	1/31/94		a
1015		1	63109	113.00	1/31/94		a
1015		2	10206	226.00	1/31/94		a
1016		1	40000	28.35	1/31/94		a
1016		2	10206	226.00	1/31/94		a
1017		1	40000	28.35	1/31/94		a
1017		2	63170	85.00	1/31/94		a
1017		3	21000	15.00	1/31/94		a
1025		1	61937	28.35	1/31/94		a
1025		2	62545	170.00	1/31/94		a
1025		3	10159	108.00	1/31/94		a
1025		4	21000	7.00	1/31/94		a
1026		1	40000	28.35	1/31/94		a
1026		2	63127	170.00	1/31/94		a
1026		3	10159	112.00	1/31/94		a
1027		1	51000	17.50	1/31/94		a
1027		2	40000	28.35	1/31/94		a
1028		1	40000	28.35	1/31/94		a
1029		1	40000	28.35	1/31/94		a
1029		2	51000	17.60	1/31/94		a
1035		1	62545	170.00	1/31/94		a
1035		2	40000	28.35	1/31/94		a
1036		1	10205	246.00	1/31/94		a
1037		1	10205	248.00	1/31/94	a	
1040		1	40000	28.35	1/31/94	a	
1040		2	51000	15.00	1/31/94	a	
1040		3	61935	28.00	1/31/94	a	
1040		4	10205	108.00	1/31/94	a	

1042	1	51000	17.50	1/31/94	a
1042	2	40000	28.35	1/31/94	a
1042	3	61935	28.00	1/31/94	a
1042	4	21000	6.50	1/31/94	a
1042	5	10159	104.00	1/31/94	a
1044	1	40000	28.35	1/31/94	a
1044	2	51000	17.90	1/31/94	a
1046	1	40000	28.35	1/31/94	a
1046	2	62559	227.00	1/31/94	a
1046	3	10205	113.00	1/31/94	a
1047	1	40000	28.35	1/31/94	a
1047	2	62559	227.00	1/31/94	a
1049	1	10205	242.00	1/31/94	a
1049	2	21000	15.00	1/31/94	a

Sample File Listing

Measure Description #	Description
10010	1 cup, NFS
10023	1 cup, bite size
10036	1 cup, chopped
10037	1 cup, chopped or diced
10043	1 cup, cooked
10060	1 cup, crumbs
10063	1 cup, cubes
10066	1 cup, diced
10099	1 cup, ground
10105	1 cup, halves
10118	1 cup, mashed
10126	1 cup, packed
10129	1 cup, pieces
10140	1 cup, pureed
10159	1 cup, shredded
10161	1 cup, sliced
10166	1 cup, slices
10187	1 cup, unpacked
10192	1 cup, whole
10193	1 cup, whole or halves
10200	1 cup, with pits, yields
10205	1 cup
10206	1 cup (not packed)
10215	1 cup (8 fl oz)
10240	1 cup boneless, chopped or diced
10242	1 cup, sifted
10244	1 cup, without pits
10245	1 cup whole kernels
10246	1 cup, (1" slices)
10248	1 cup, unsifted
10249	1 cup, thawed
10250	1 cup (1/8" slices)
10256	1 cup (unprepared)
10262	1 cup chunks, tidbits
10263	1 cup chunks, tidbits, crushed
10268	1 cup diced pieces
10269	1 cup diced, boneless

10271	1 cup halves or slices
10277	1 cup pieces or chips
10278	1 cup sections with juice
10282	1 cup slices, thawed
10284	1 cup tidbits
10287	1 cup whipped
10289	1 cup, (1" cubes)
10291	1 cup, (1/2" slices)
10294	1 cup, fluid
10297	1 cup, shredded, not packed
10299	1 cup, unthawed
10300	1 cup, without refuse
10302	1 cup sections, without membranes
10303	1 cup (1 oz)
10304	1 cup (6 oz package) chips

Sample File Listing

Food group = 1

CNP code: 1001
Short Description: BUTTER, W/SALT
Long Description: BUTTER; w/salt

Measure	Wt (gm)
1 cup	227.00
1 pat	5.00
1 tablespoon	14.20
1 stick, (net weight, 4 oz)	113.00

CNP code: 1002
Short Description: BUTTER. WHIPPED
Long Description: Butter; whipped

Measure	Wt (gm)
1 pat	3.80
2 teaspoons	6.00
1 stick (1/2 cup)	76.00

CNP code: 1009
Short Description: CHEESE, CHEDDAR, AMERICAN
Long Description: Cheese; cheddar, American domestic

Measure	Wt (gm)
1 cup, shredded, not packed	113.00
1 oz	28.35

CNP code: 1012
Short Description: CHEESE, COTTAGE, GRMD
Long Description: Cheese; cottage, creamed, large or small curd

Measure	Wt (gm)

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1 oz                                                    28.35
1 cup (not packed)                                     210.00
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        CNP code:   1015
Short Description:  CHEESE, COTTAGE, 2% FAT
Long Description:  Cheese; cottage, low fat, 2% fat

Measure                                              Wt  (gm)
-------------------------------------------------    -----------
4 oz                                                   113.00
1 cup (not packed)                                     226.00
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Note: This document was originally distributed as part of a packet of seven guidance documents for software developers. The original was dated May 17, 1995 and signed by Ron Vogel. A copy of the original packet is included in the packet of materials sent to new software developers. The letter and packet are available upon request. This Word document was created on February 25, 2005.