ARIES

Least Cost and Ration Analysis Programs
for Beef Cattle
Version Number 2007
Regional Software Dissemination Site: USA

James W. Oltjen, Ph.D., Animal Management Systems Specialist
John R. Dunbar, Livestock Nutrition Specialist
Abbas Ahmadi, Ph.D., Software Development
Department of Animal Science,
University of California
Davis, CA 95616 USA

Contact information:
Extension Software Support
Department of Animal Science
University of California
Davis, CA 95616, USA
Phone: (530) 752-1278
Fax: (530) 752-0175
Email: software@asmail.ucdavis.edu
Web address: http://animalscience.ucdavis.edu/extension/software/Aries/

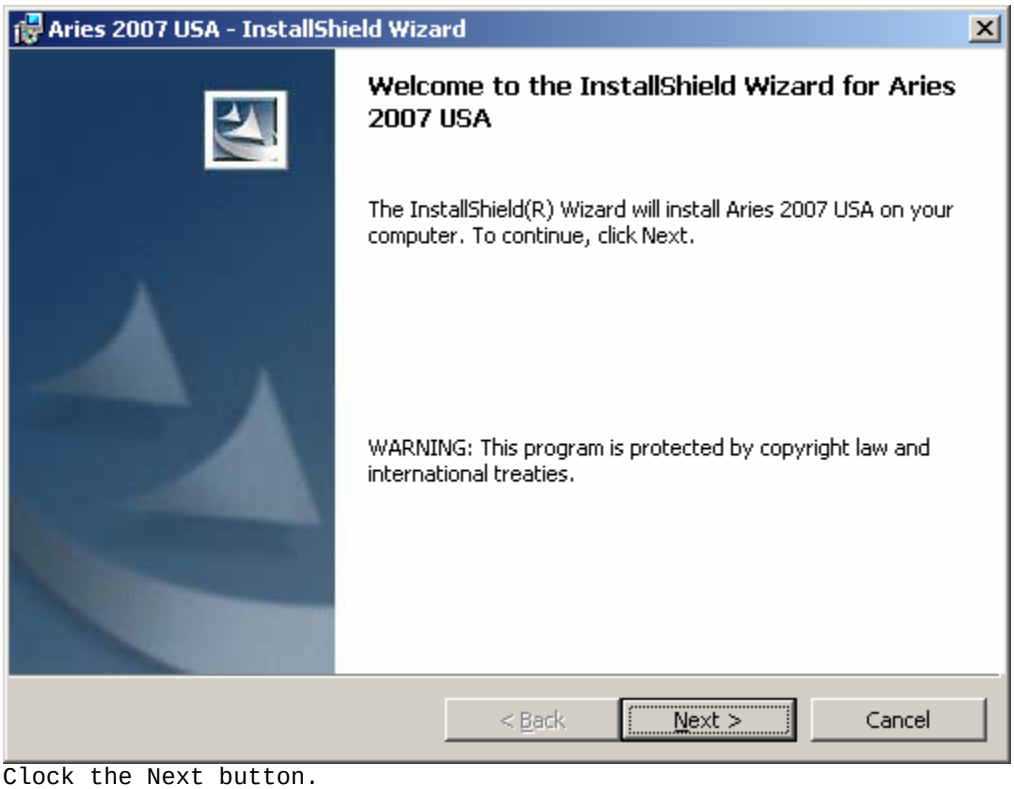
TABLE OF CONTENTS

How to Install?

1. Insert the Aries CD into the CD-Rom drive.
2. Using your Windows Explore, navigate to the CD and you will see a file called Setup.exe:

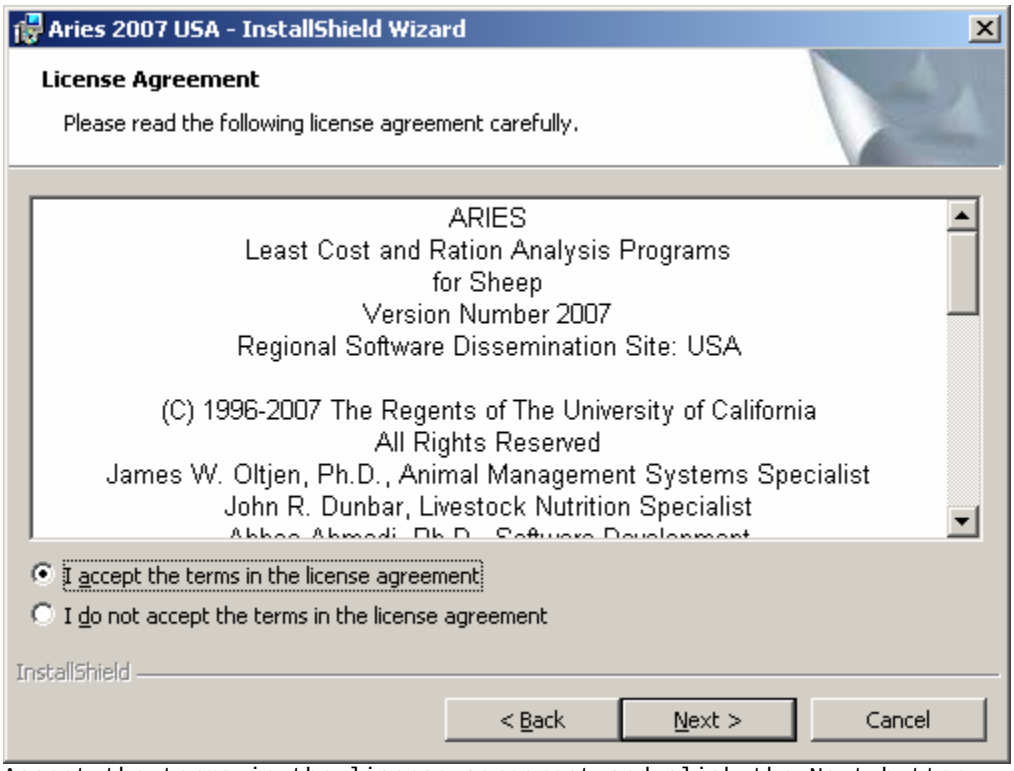
Setup.exe

3. Double click Setup.exe. The Welcome dialog box appears:



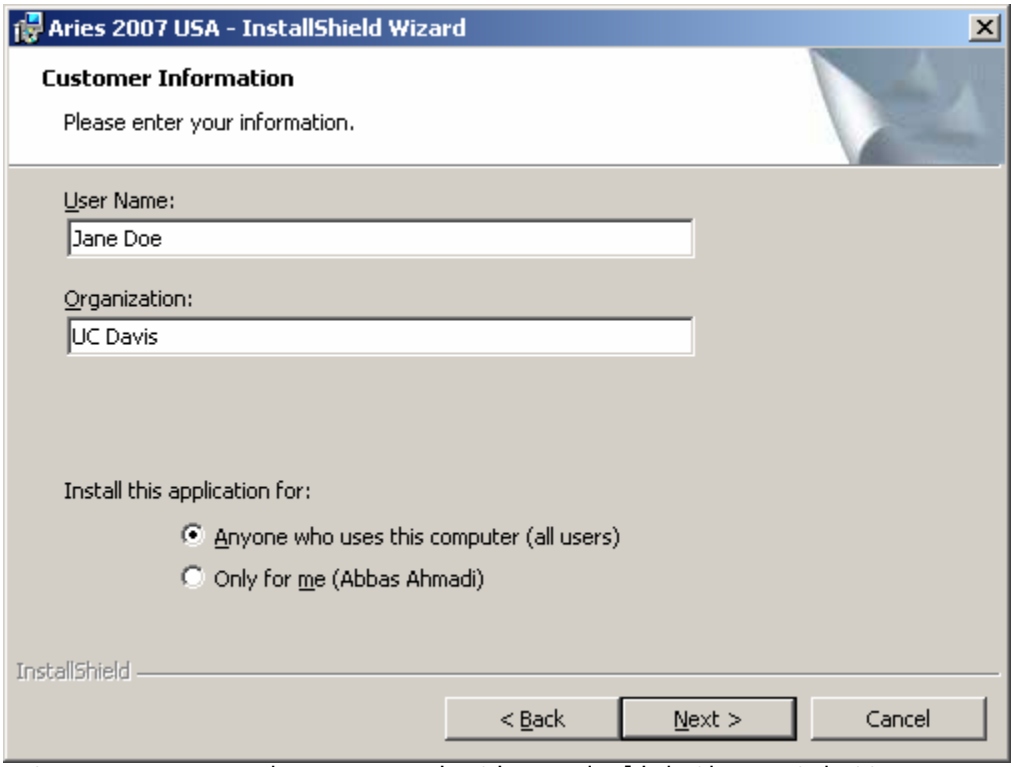
Clock the Next button.

4. The License Agreement dialog box appears:



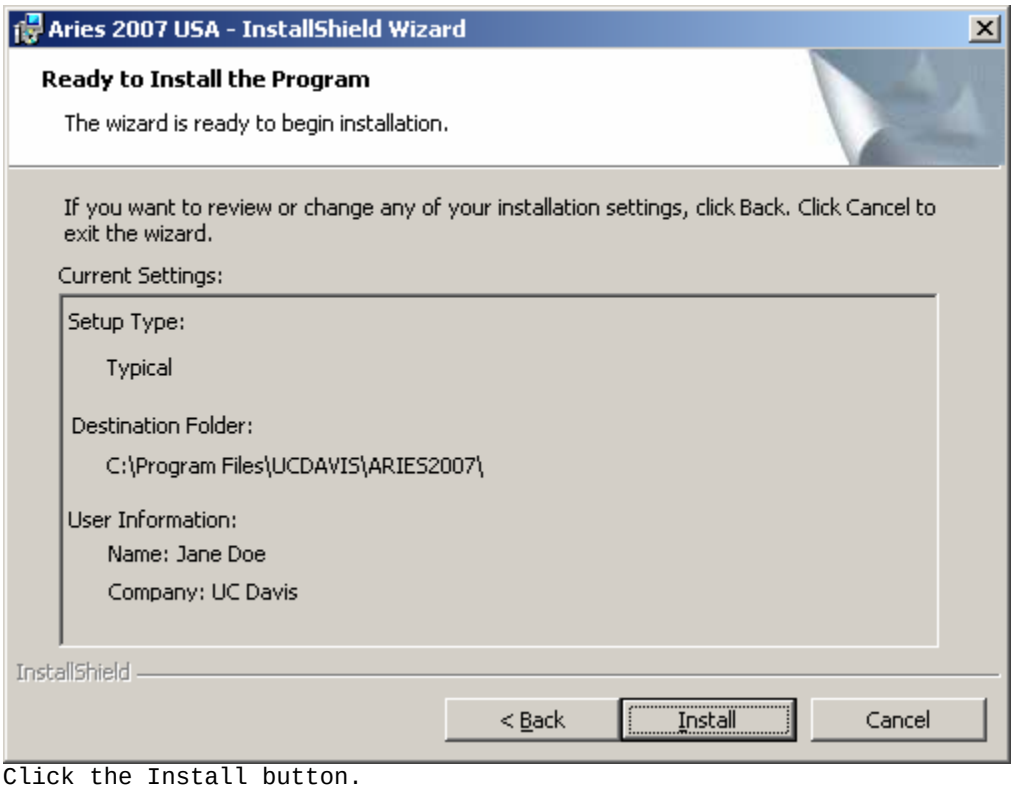
Accept the terms in the license agreement and click the Next button.

5. The Customer Information dialog box appears:



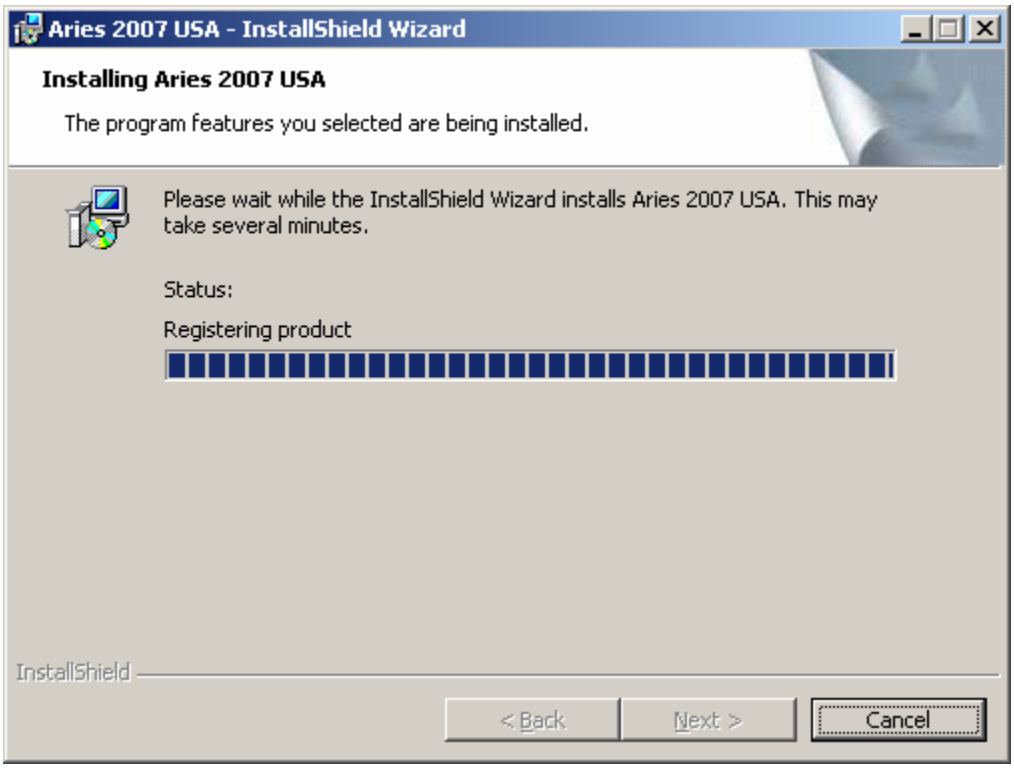
Enter your name and your organization and click the Next button.

6. The “Ready to Install the Program” dialog box appears:

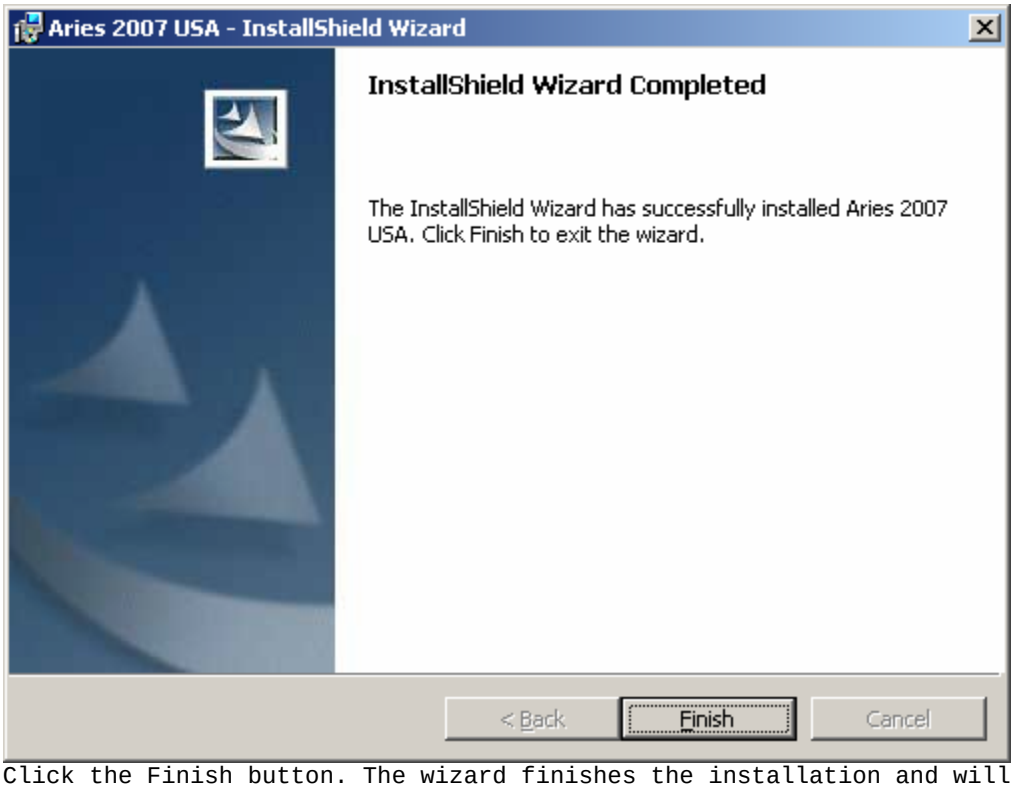


Click the Install button.

7. The wizard will install the Aries program on your computer. It may take SEVERAL minutes:



8. Finally, the final dialog box appears:



Click the Finish button. The wizard finishes the installation and will place a shortcut to Aries on your desktop. It also adds the Aries to your program menu.

9. It will create a folder called **"C:\Program Files\UCDAVIS\ARIES2007\"** and will place the **Aries.exe** file plus the **demo.Ari** ration file in that folder

Aries folder

All Aries files are stored in the following folder:
C:\Program Files\UCDAVIS\ARIES2007

Ration Files

All Aries ration files have the .ARI extension and are stored, by default, in the above folder.

Feed Library Files

There are four feed library files: (1) ARISTD.DBF, standard feed library; (2) ARIALT.DBF, alternate feed library; (3) ARIGRP.DBF, feed group library; (4)ARIINF.DBF, infeasible feed library. These files are stored in the **C:\Program Files\UCDAVIS\ARIES2007** folder.

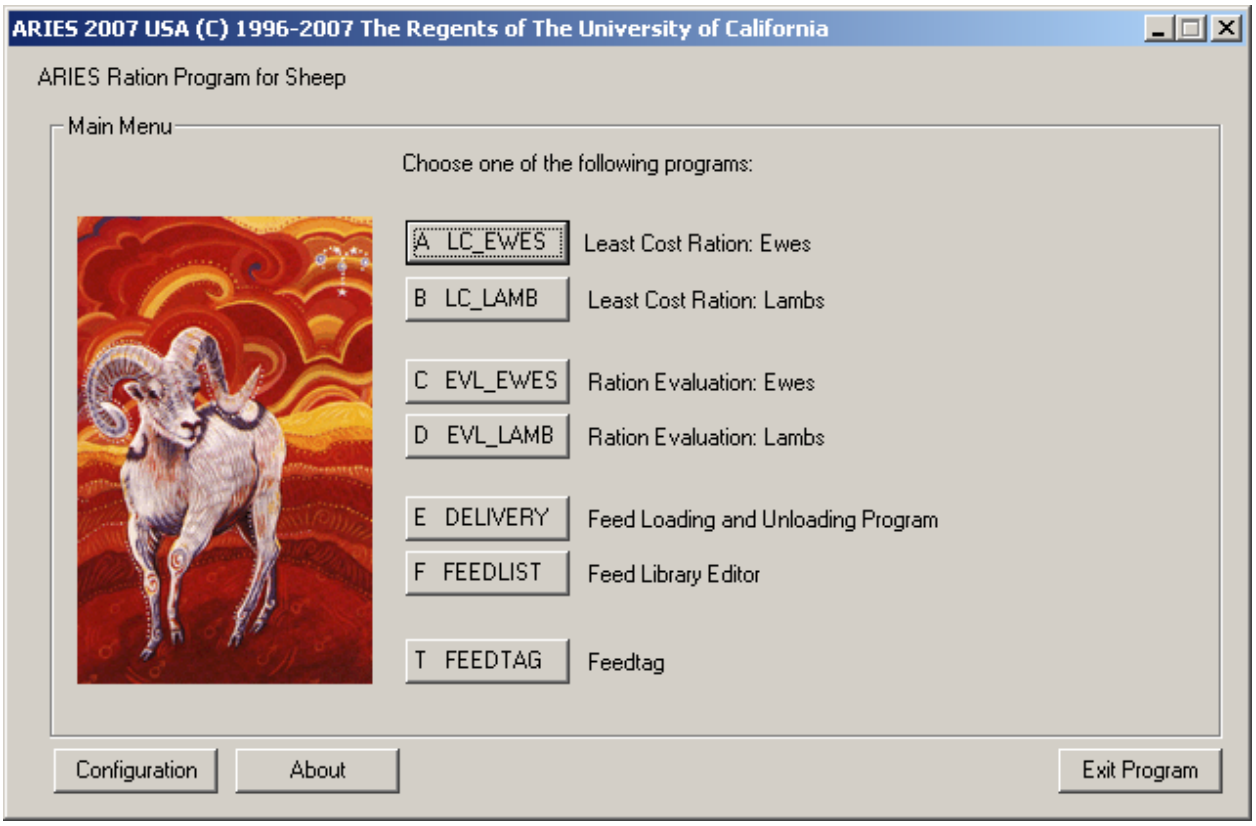
Aries Manual

The Aries manual, Aries.pdf, is stored in the Aries folder. To view and print this file, you need Adobe Acrobat Reader. You can get a free copy of this software by visiting the following web site:
http://www.adobe.com/products/acrobat/readstep2.html

The Aries order form, OrderForm.pdf, is also in the same folder

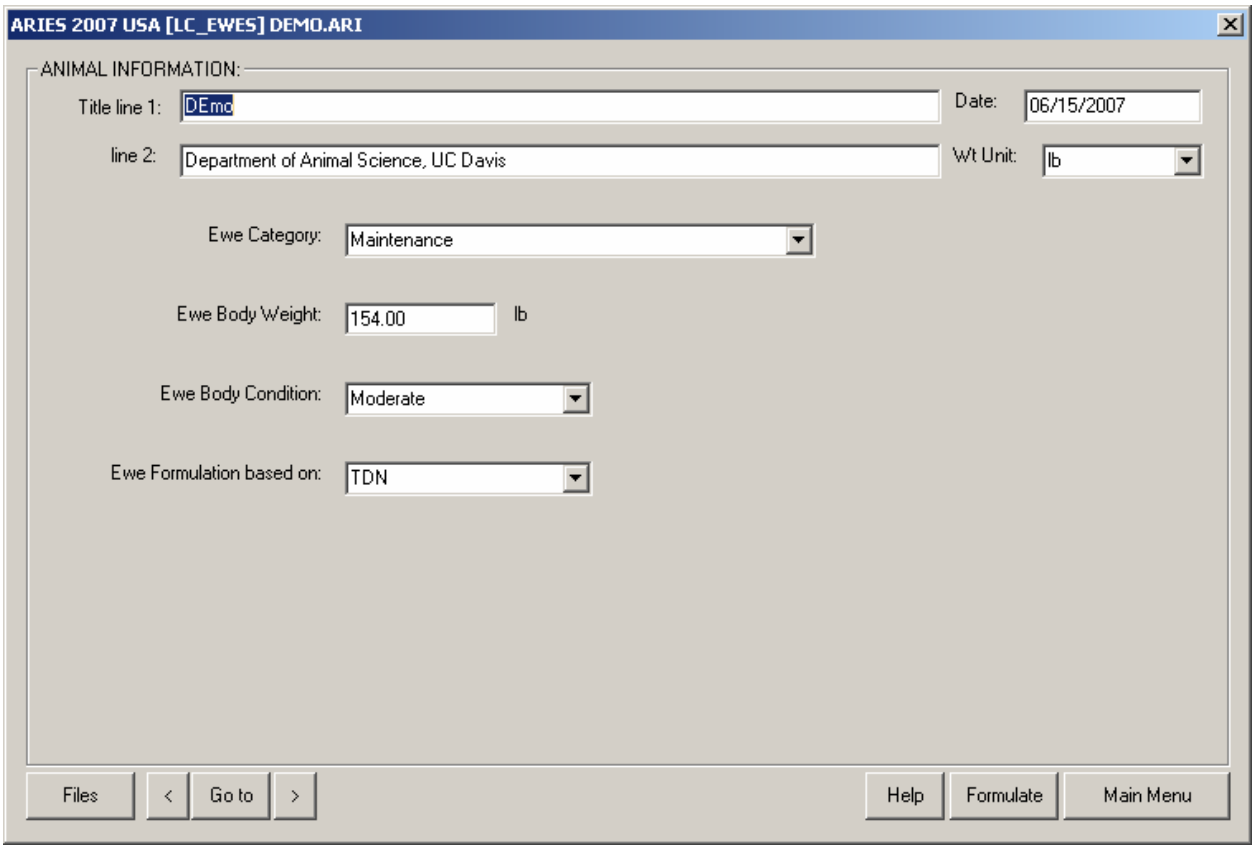
How to Run?

1. Click the Start button and then choose the “All Programs”. A menu list appears.
2. Choose the “UCDAVIS” option. A sub-menu appears.
3. Choose the “ARIES2007” option. Another sub-menu appears. Choose the “Launch Aries.exe” option. The sign-on banner of Aries appears. Click the OK button. The main menu of Aries appears:



Choose the “Least Cost Ration: Ewes” option. The Animal Information dialog box appears:

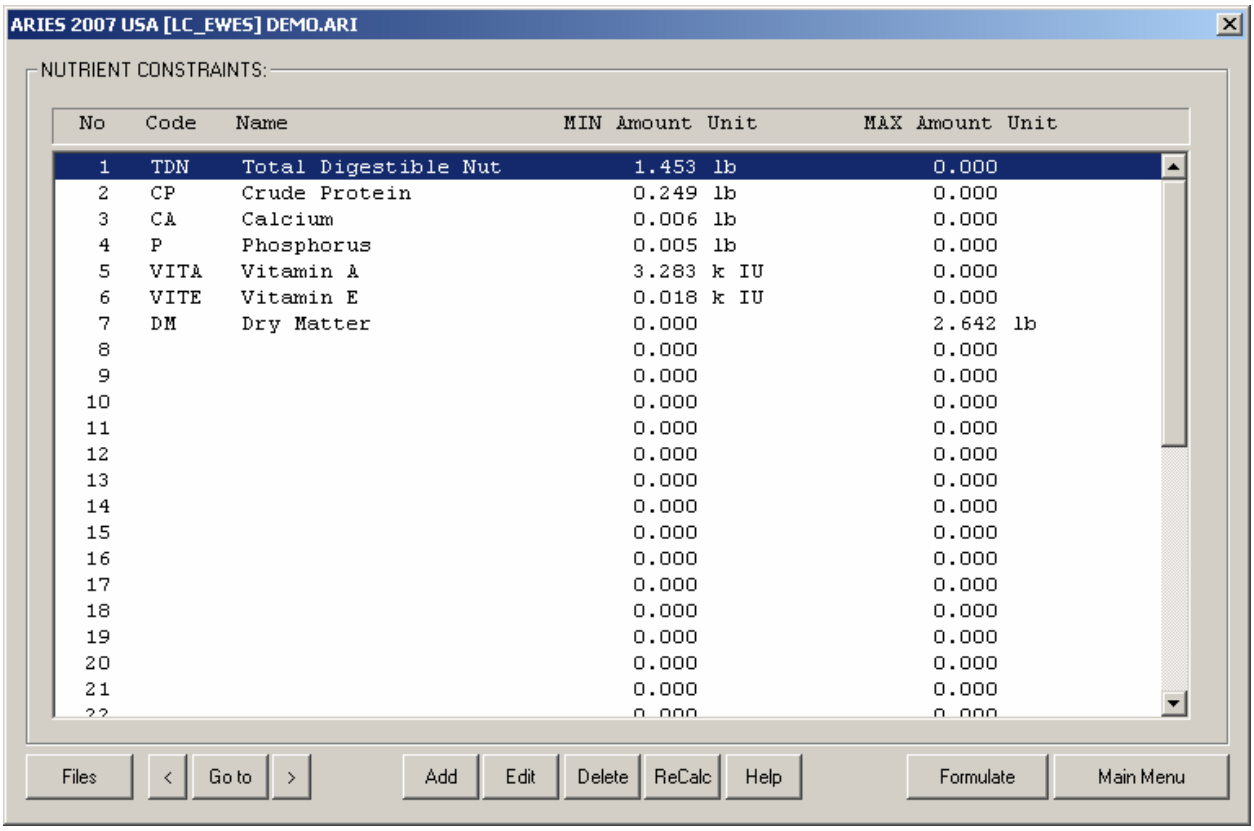
4. Animal Information dialog box:



From the “Files” menu, choose the “Open” option. Navigate to C:\Program Files\UCDAVIS\ARIES2007\ folder. Open the Demo.Ari ration file.

Click the [>] (Next Button). The Nutrient Constraints dialog box appears.

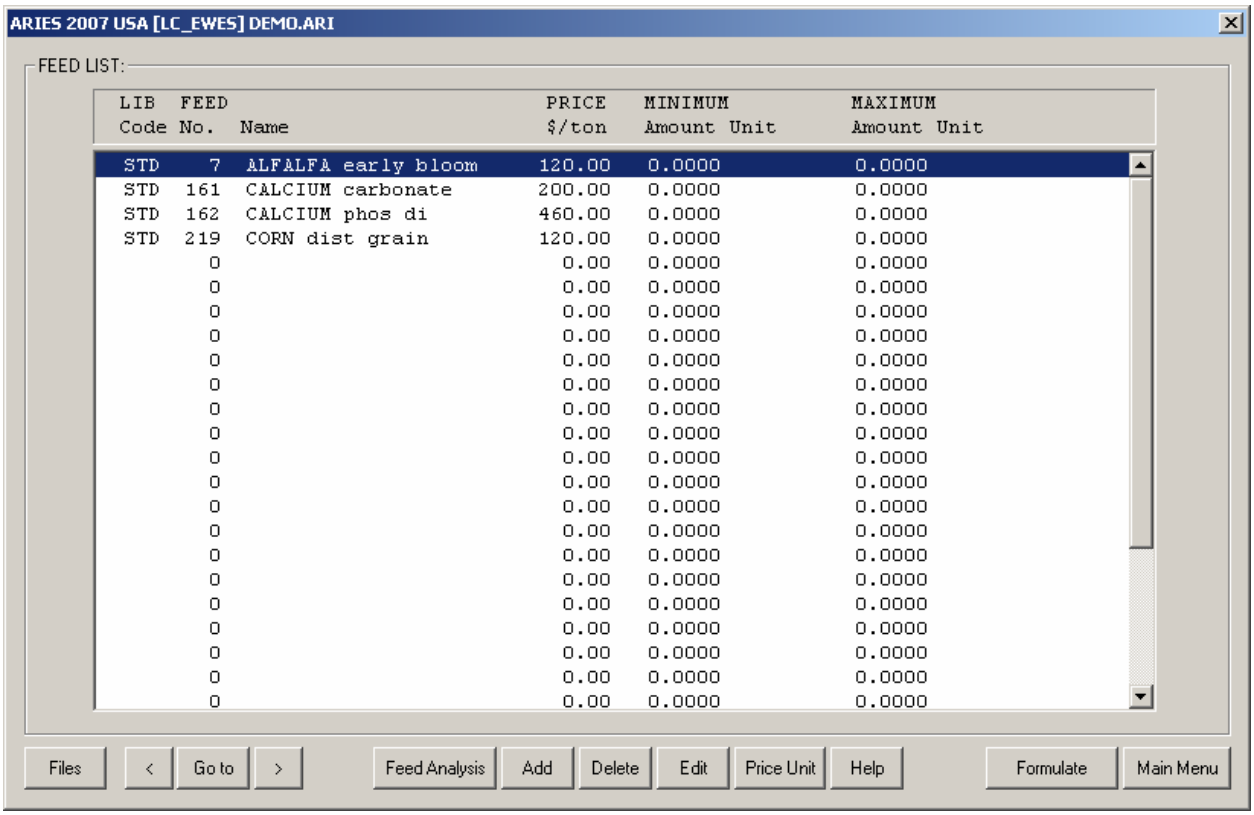
5. The Nutrient Constraints dialog box:



Here you can click the "ReCalc" button to populate this dialog box with a set of default constraints. You can add, delete or modify any or all of these constraints.

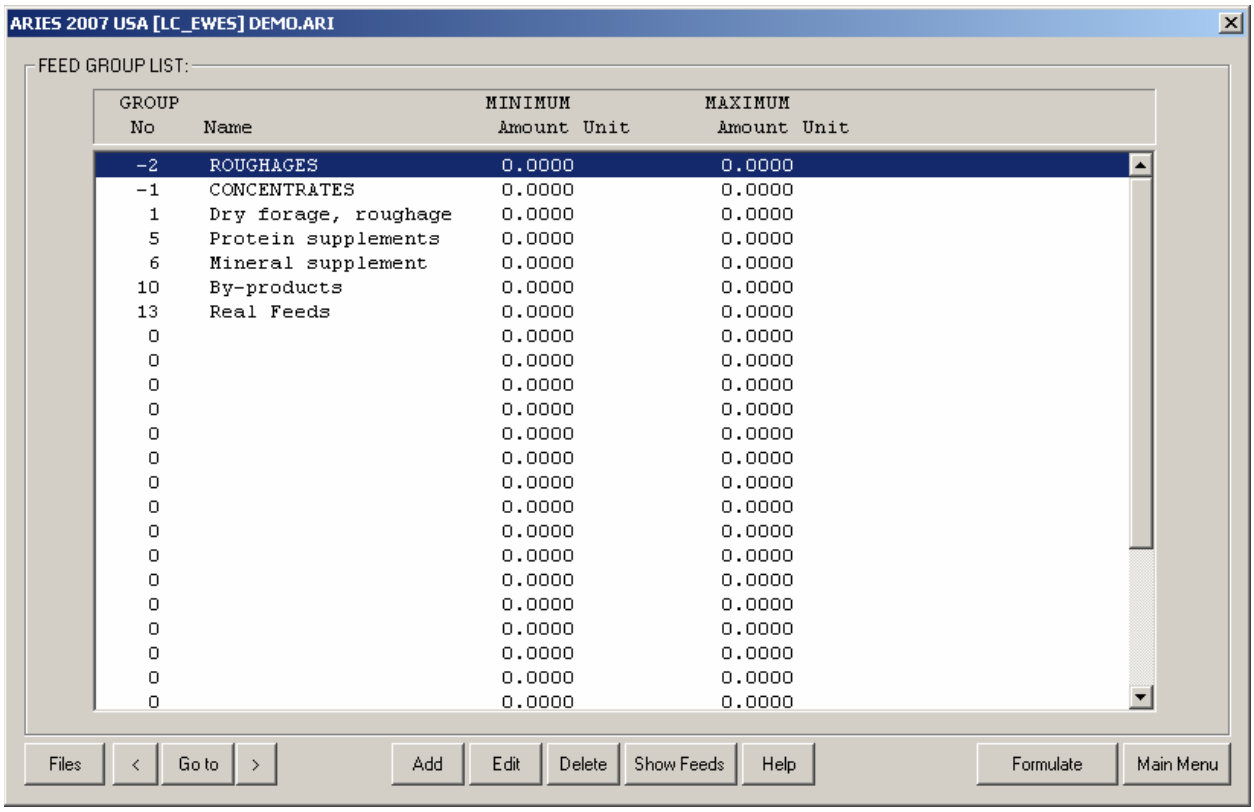
After you are done. Click the Next button. The Feed List Dialog box appears.

6. The Feed List dialog box:



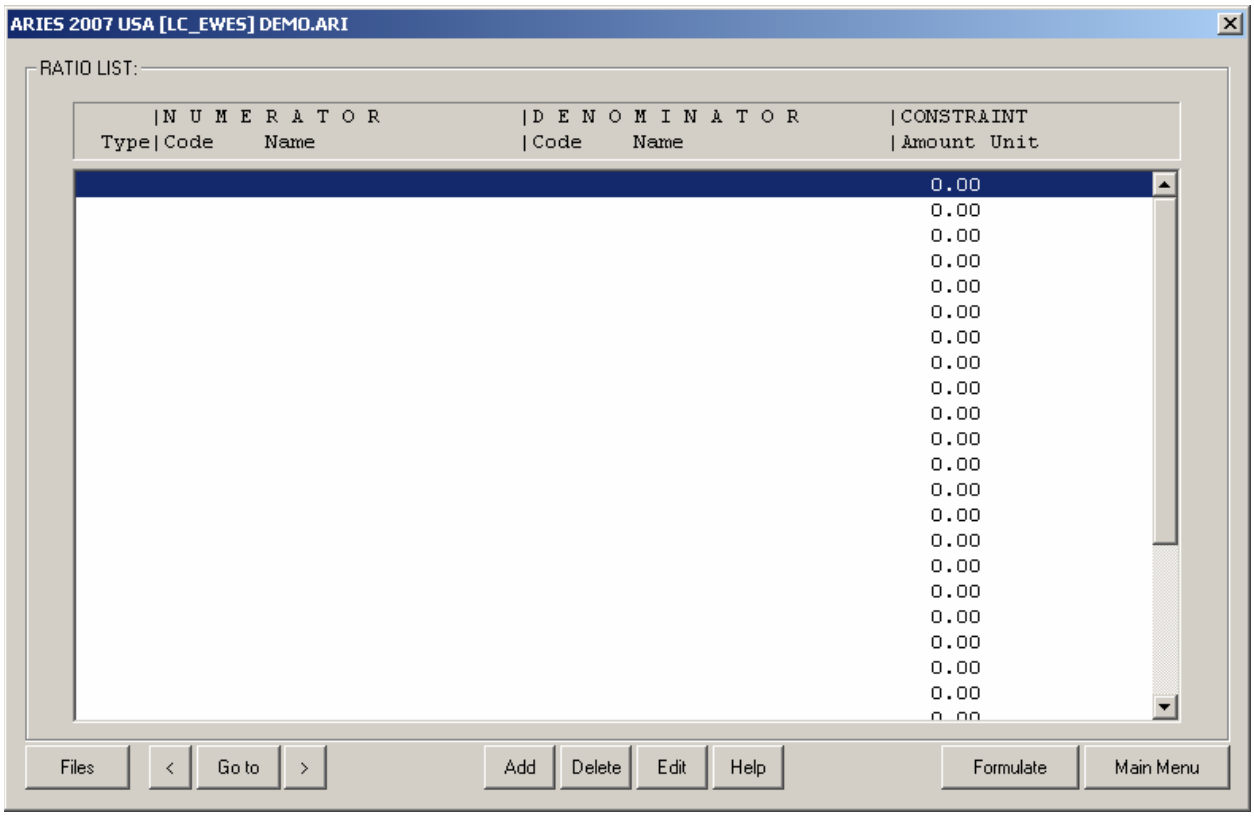
You can add, edit, or delete feeds. You can specify feed price and assign a min or max amount on a feed. You cam also edit the nutrient analysis of a feed. These changes remain local to this ration file and will not reflect back to feed libraries. After you are done, click the Next button. The Group Constraints dialog box appears.

7. The Group Constraints dialog box:



you can specify a min or max for feed groups. When you are done, click the next button. The Ratio Constraints dialog box appears. .

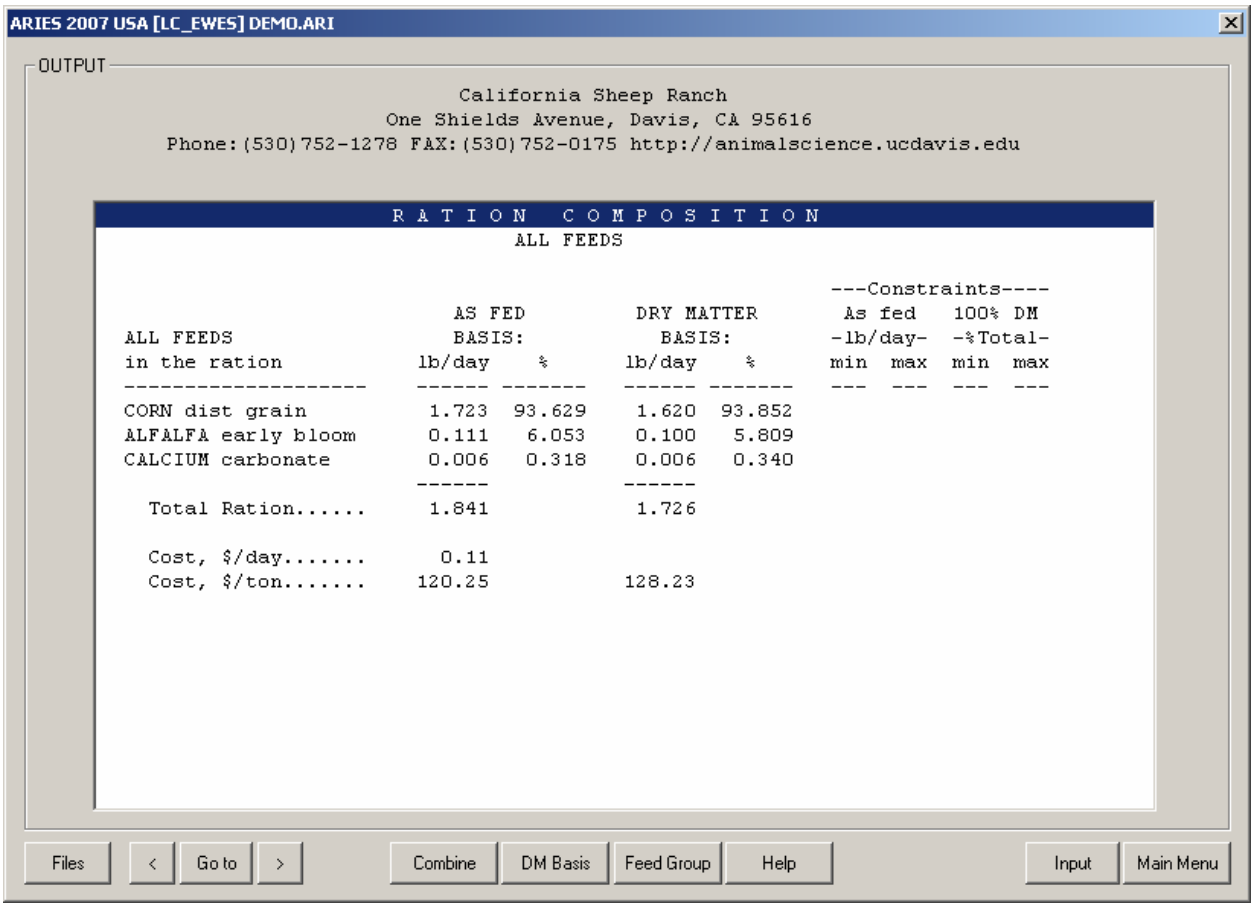
8. The Ratio Constraints dialog box:



You can specify a min or max to the ratio of any two nutrients, or any two feeds, or any two feed groups.

When you are done click the Formulate button. The program will enter the formulation mode and will formulate the ration and will show the output dialog box.

9. The Output Screen



By clicking the Next button you can view the following screens:
Cost and Performance
Ration Composition
Price Ranges / Feeds Not Used
Nutrient Analysis Detailed information about feeds

You can also view the results for all feeds or for a specific feed group on 100% DM basis or on AS Fed basis.

You can also print the out put or go back to the input screens and modify some entries and re-formulate the ration.

COFIGURATION AND CUSTOMIZATION

The Aries program has two configuration files:

1. COMPANY.CFG To configure the heading for all printouts.
2. ARISETUP.CFG To configure user-defined nutrients.

WARNING WARNING WARNING WARNING WARNING WARNING WARNING WARNING!!!

Please copy these files in another folder, such as C:\BACKUP\ as backup. This is very important. Because if you mess up any of these configuration files, you will be able to restore them by copying the configuration files from the backup folder onto the main folder for this application.

DO NOT EDIT ANY OF THESE CONFIGURATION FILES WITHOUT MAKING BACKUPS!!!!!!

1. COMPANY.CFG

This file is used to configure the heading for all printouts. This is a text file. It is located in the main folder for this application. Do not use Microsoft Word to open this file. Use Notepad program to edit it. This file has originally the following content:

```
+------------------------------------------------------------------------------+
|                           California Sheep Ranch                             |
|                       One Shields Avenue, Davis, CA 95616                    |
|    Phone:(530)752-1278 FAX:(530)752-0175 http://animalscience.ucdavis.edu    |
|                                                                              |
+------------------------------------------------------------------------------+
```

This file has exactly four lines. Each line has exactly 78 characters. The first line shows the name of your company. The second line shows your address. The third line shows your phone, fax, email, and web address. The fourth line must be blank to keep a blank line between the heading and the body of printouts. Use space bar to center the text. Do not use tab.

You must re-start the program for your modification to take effect.

2. ARISETUP.CFG

This file is used to configure user-defined nutrients. This is a text file. It is located in the main folder for this application. Do not use Microsoft Word to open this file. Use Notepad program to edit it. This file has originally the following content:

```
+------------------------------------------------------------------------------+
|*COMMENTS                                                                     |
|The NUTIENTS section has four columns: NO, CODE, NAME, and CLASS:             |
|                                                                              |
|NO   - Maximum width of this column is two digits. Do not change these        |
|       numbers: 43, 44, 45, and 46.                                           |
|CODE - Maximum width of this field is four characters. User upper case        |
|       letters. Enter an abbreviation for your nutrient, for example          |
|       IRON or PROT                                                           |
|NAME - Maximum width of this column is 12 characters. Enter a description     |
|       for your nutrient.                                                     |
|CLASS - Maximum width of this column is one digit. Enter a number between     |
|       1 and 5 in this field to specify the unit for your nutrient. The       |
|       class of a nutrient can be be one of the following:                    |
|         1 = {%}                                                              |
|         2 = {Mcal/lb  or  Mcal/kg}                                           |
|         3 = {IU/lb    or  IU/kg  }                                           |
|         4 = {ppm}                                                            |
|         5 = {Unit/lb  or  Unit/kg}                                           |
```

```
|         6 = {k IU/lb  or  k IU/kg}                                          |
|There should be  a comma between columns and all values must be aliened.    |
|                                                                             |
|The PAGE EHEADING section has a single line. The maximum width of page      |
|heading is 31 characters. Enter a description for your user-defined         |
|nutrients.                                                                   |
|                                                                             |
|*NUTRIENTS                                                                   |
|NO CODE NAME         CLASS                                                   |
|==,====,============,=                                                      |
|43,NUT1,User Nut 1  ,1                                                       |
|44,NUT2,User Nut 2  ,1                                                       |
|45,NUT3,User NUT 3  ,1                                                       |
|46,NUT4,User NUT 4  ,1                                                       |
|                                                                             |
|*PAGE HEADING                                                                |
|7. User-defined Nutrients                                                    |
+-----------------------------------------------------------------------------+
```

This file has three sections: COMMENTS, NUTRIENTS, and PAGE HEADING. The Comments section shows how to modify the other two sections. You must re-start the program for your modification to take effect.

PRINTOUTS

The program creates various text files for printouts. Although these are not used in configuration or customization of the program, but you can open them in your text editor and reformat and print them as you wish. These files will be constantly overwritten by the program, so save them under different names to keep them from being overwritten by the program.

You can use a text editor, such as notepad or Microsoft word to open these text files. Please, Use "Courier New" font to keep the spacing and alignment. Do not use "Times New Roman" or "Arial" or any other font.

Printout for Ration Formulation and Evaluation

Each time you print the formulation or evaluation of a ration, the program creates a text file which contains the same information as in the printout. This text file is called PRINTOUT.TXT and is located in the main folder of the application.

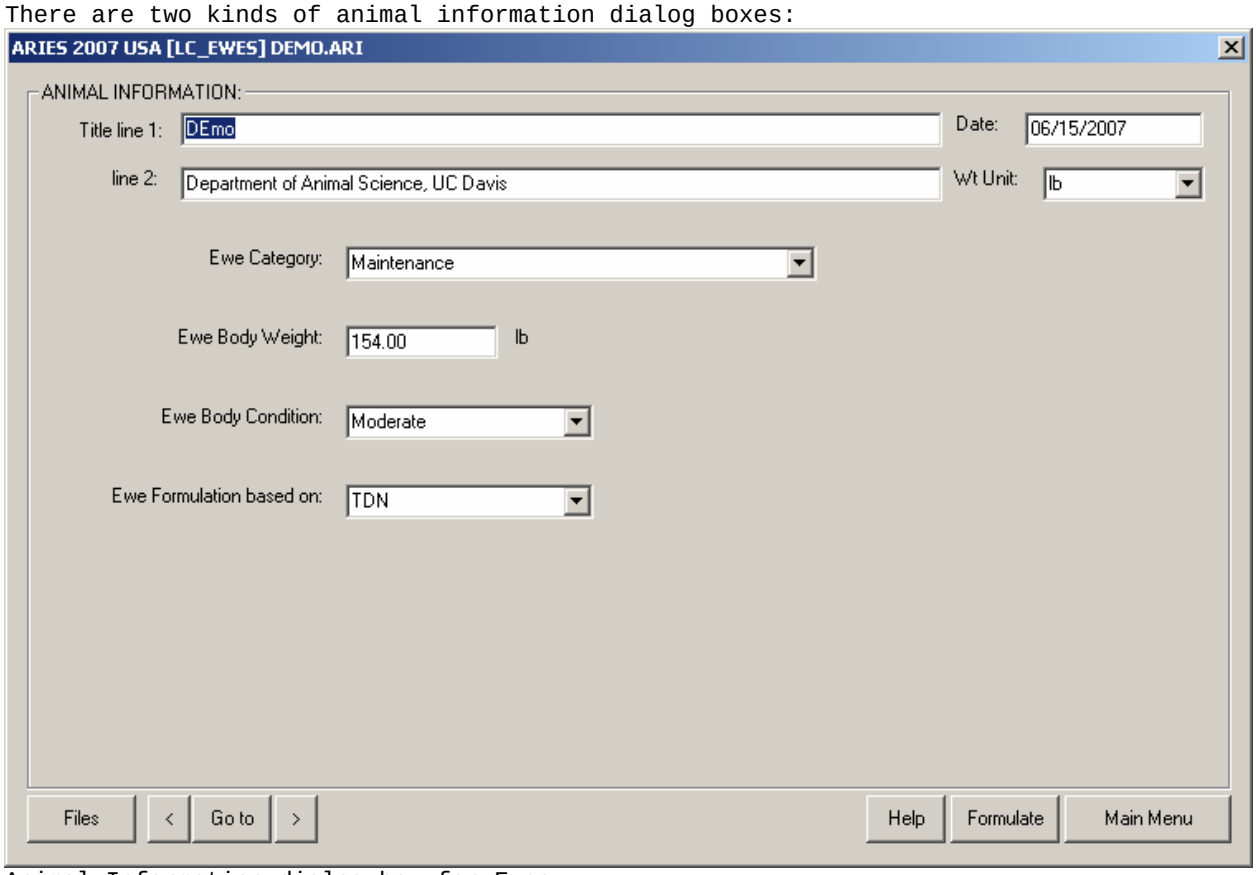
Printout for Loading and Unloading

Each time you run the delivery module and print the output, the program creates a series of text files, which contain the same information as the printouts. These files are located in the main folder of the application.

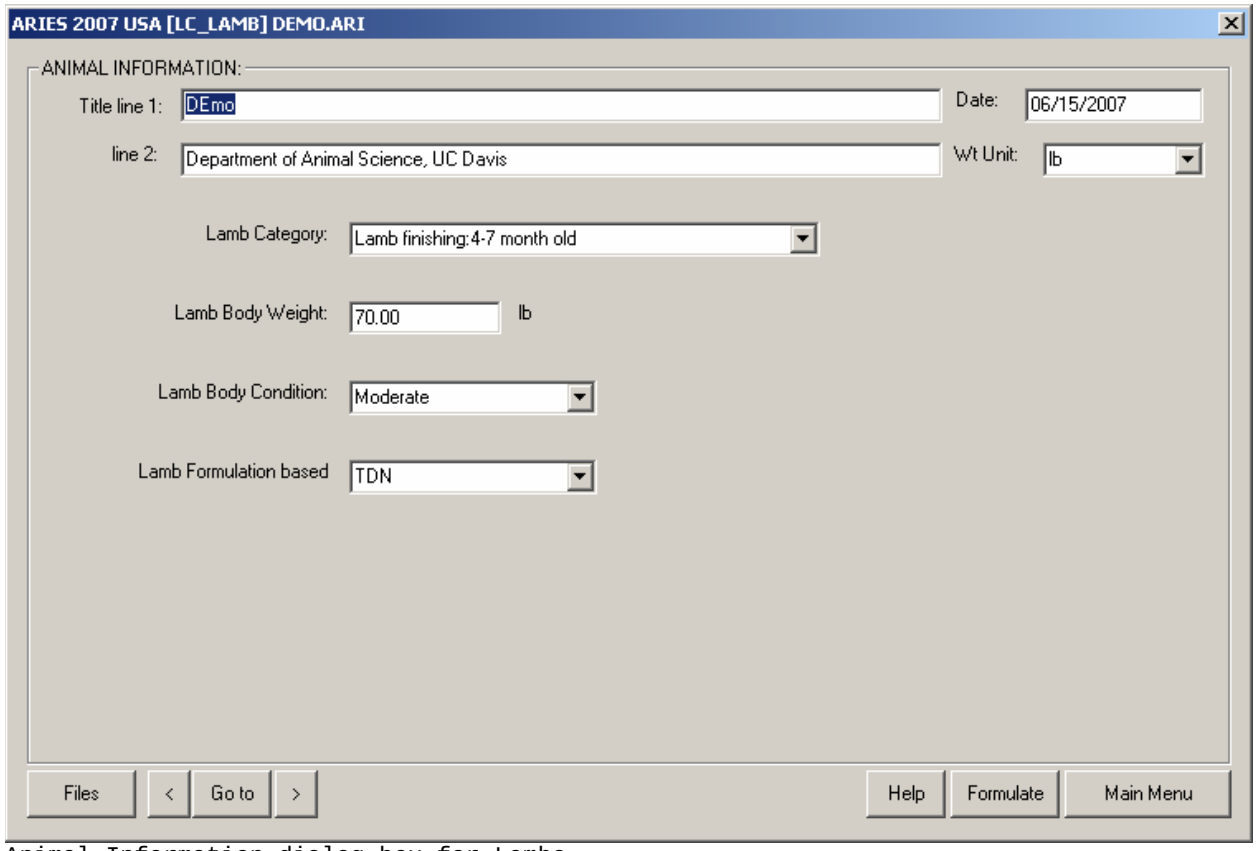
HEADT.LST - This contains the loading or unloading heading.
BODY.LST - This contains the loading or unloading printout

ANIMAL INFORMATION

There are two kinds of animal information dialog boxes:



Animal Information dialog box for Ewes



Animal Information dialog box for Lambs

NAVIGATION

[Files] Create, open, or save ration.
[<] Previous screen.
[Goto] Jump to another input section.
[>] Next screen.
[Help] Display help message.
[Formulate] Formulate ration.
[Evaluate] Evaluate ration.
[Main Menu] Exit and return to main menu

TITLE

Enter a name and/or address or other identification for your ration on these two lines. This title will be displayed at the top of all printed output for this ration.

WT UNIT

You may choose to enter data using either the English or the metric system.

Enter lb to display all input and output in English units.
Enter kg to display all input and output in metric units.

The program will automatically convert any data already entered to the unit selected.

Ewe Category

Choose one of the nine categories for adult ewes. This data is used to calculate nutrient requirements. Flushing denotes 2 weeks prebreeding and first 3 weeks of breeding. Each category has a default value for daily weight change.

Ewe Category	Weight Change/Day (g)	(lb)
Maintenance	10	0.02
Flushing	100	0.22
Gest:first 15 wks	30	0.07
Gest:last 4 wks(130-150% lamb)	180	0.40
Gest:last 4 wks(180-225% lamb)	225	0.50
Lact:first 6-8 wks singles	-25	-0.06
Lact:first 6-8 wks twins	-60	-0.13
Lact:last 4-6 wks singles	45	0.10
Lact:last 4-6 wks twins	90	0.20

Ewe Body Weight

Enter body weight for adult ewe. The normal range is 50-90 kg or 110-198 lb. This data is used to calculate the nutrient requirements of the ewe. If you enter a value which is outside of this range, the calculation is not accurate.

Ewe Body Condition

Enter Thin, Moderate, or Fat. Nutrient requirements for fat ewes are calculated according to the next lower weight category and for thin ewes according to the next higher weight category.
For fat ewes we subtract 10 kg or 22 lbs form their weight and for thin ewes we add 10 kg or 22 lbs to their weights.

Ewe Formulation based on

Formulation can be based on one of the three kinds of energy:
 TDN Total Digestible Nut
 DE Digestible Energy
 ME Metabolized Energy

****

Lamb Category

Choose one of the ten categories for lambs. This data is used to calculate nutrient requirements. Each category has a default value for daily weight change.

Lamb Category	Weight Change/Day (g)	(lb)
Gest:first 15 wks	125-160	0.28-0.35
Gest:last 4 wks(100-120% lamb)	150-180	0.33-0.40
Gest:last 4 wks(130-175% lamb)	215-225	0.47-0.50
Lact:first 6-8 wks singles	-50	-0.11
Lact:first 6-8 wks twins	-100	-0.22
Replacement ewe lamb	100-227	0.22-0.50
Replacement ram lamb	250-330	0.55-0.73
Lamb finishing:4-7 month old	205-295	0.45-0.65
Early weaned lamb:Mod Growth	200-345	0.44-0.76
Early weaned lamb:Rapid Growth	250-425	0.55-0.94

Lamb Body Weight

Enter body weight for lamb. The normal range is 10-70 kg or 22-154 lb. This data is used to calculate the nutrient requirements of the ewe. If you enter a value which is outside of this range, the calculation is not accurate.

Lamb Body Condition

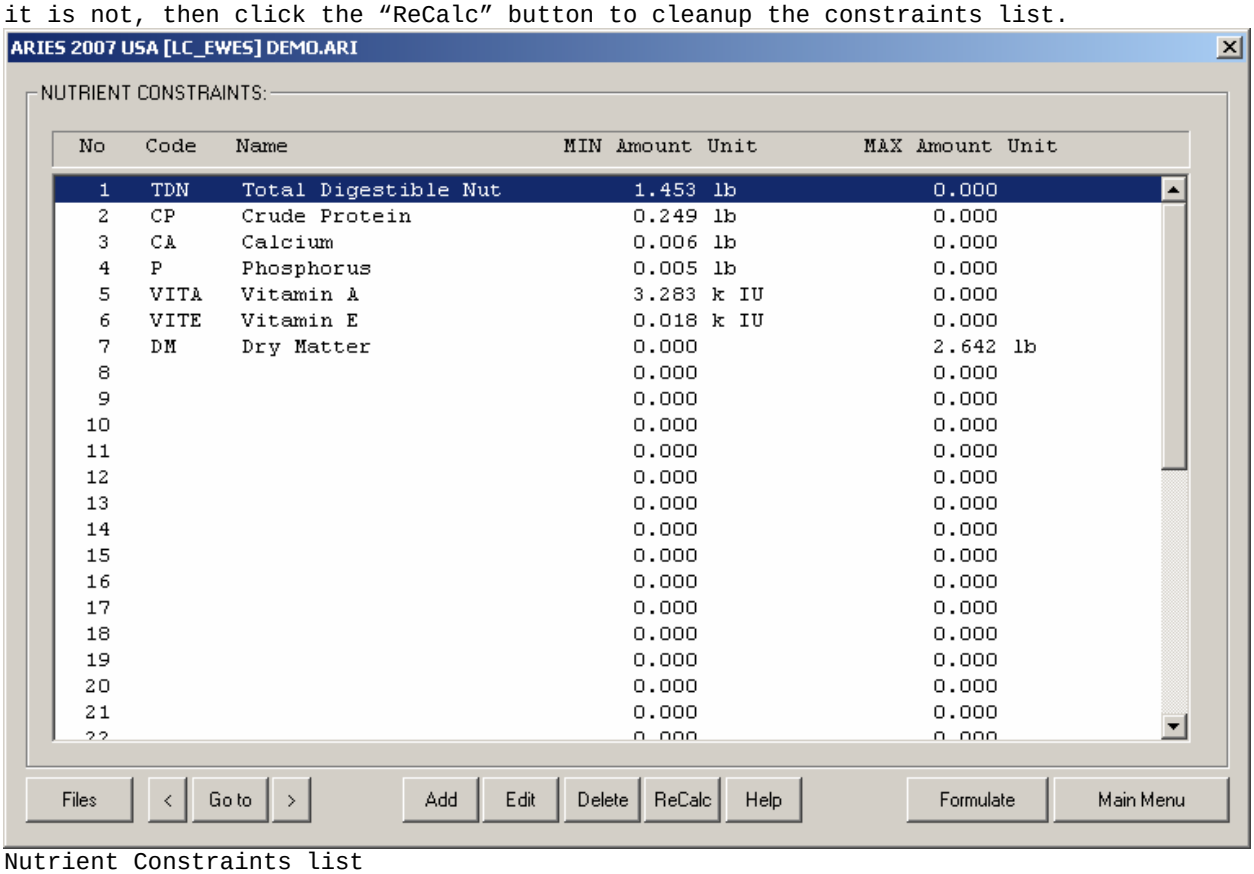
Enter Thin, Moderate, or Fat. Nutrient requirements for fat lambs are calculated according to the next lower weight category and for thin lambs according to the next higher weight category.
For fat lambs we subtract 10 kg or 22 lbs form their weight and for thin ewes we add 10 kg or 22 lbs to their weights.

Lamb Formulation based on

Formulation can be based on one of the three kinds of energy:
 TDN Total Digestible Nut
 DE Digestible Energy
 ME Metabolized Energy

NUTRIENT CONSTRAINTS LIST

The nutrient constraints are calculated based on the animal information. If you change any value in the animal information dialog box, the program recalculates the nutrient constraints. You can also click the "ReCalc" button recalculate the constraints. If you select the Least Cost Gain option, the nutrient constraint list must be empty, if it is not, then click the "ReCalc" button to cleanup the constraints list.



Nutrient Constraints list

NAVIGATION

[Files] Create, open, or save ration.
[<] Previous screen.
[Goto] Jump to another input section.
[>] Next screen.
[Add] Add new constraint.
[Edit] Edit existing constraint.
[Dbl Click] Double click on a row in the list box invokes Edit button.
[Delete] Delete existing constraint.
[Help] Display help message.
[ReCalc] Recalculate NRC requirements.
[Formulate] Formulate ration.
[Main Menu] Exit and return to main menu

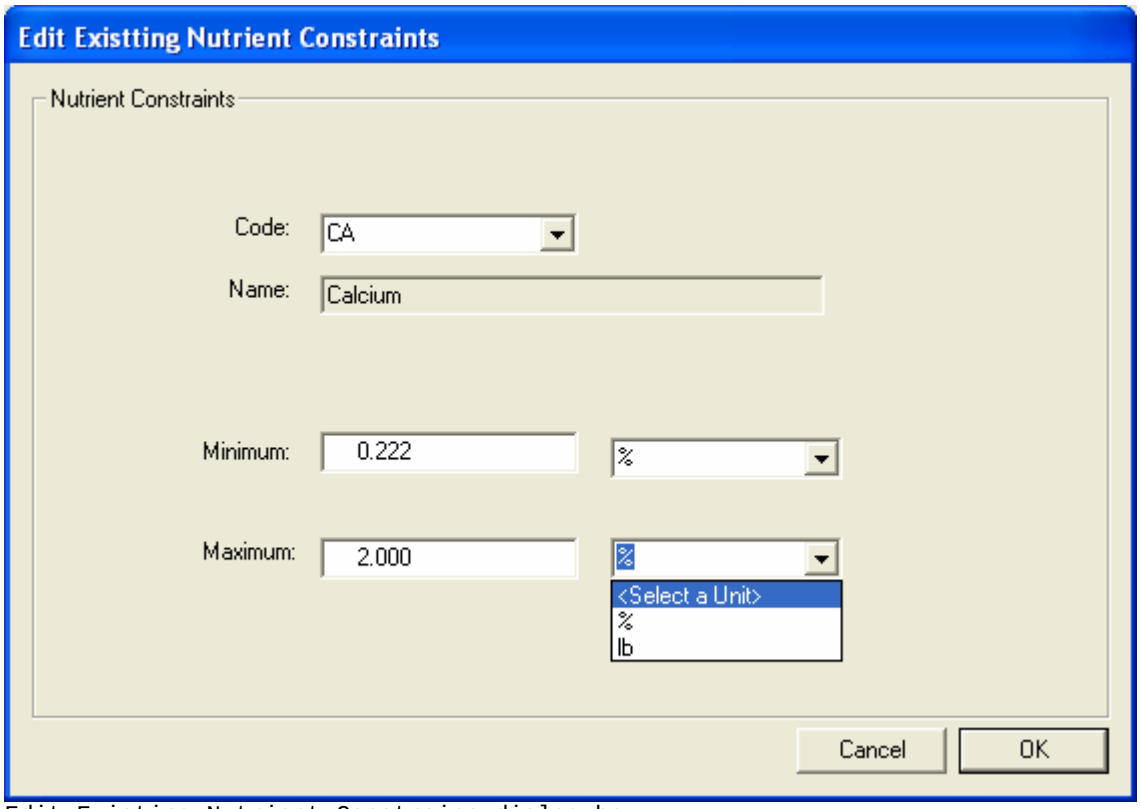
The nutrient constraints displayed on this page have been calculated based upon the animal information already entered on the previous page. If you wish to change any of these constraints, you may as follows:

To ADD a constraint: Move your cursor to a blank line and click the [Add] button. A dialog box appears. Enter your new nutrient constraint and then click the [OK] button.

To EDIT a constraint: Move your cursor to the line containing the constraint and click the [Edit] button. A dialog box appears. Modify the existing constraint and then click the [OK] button.
To DELETE a constraint: Move your cursor to the line containing the

constraint and click the [Delete] button.

To regenerate default NRC nutrient constraints, click the [ReCalc] button. This will replace all nutrient constraints which you may have changed previously. Alternatively, any change in the Animal Information screen, such as changing the animal weight, will have the same effect as clicking the [ReCalc] button.



Edit Existing Nutrient Constrains dialog box.

CODE

  This column contains the nutrient codes.

NAME

  This column contains the nutrient names.
  The following is a list of nutrients and their abbreviations:

ADF	Acid Detergent Fiber
ASH	Ash
CA	Calcium
CELL	Cellulose
CF	Crude Fiber
CL	Chlorine
CO	Cobalt
CP	Crude Protein
CU	Copper
DE	Digestible Energy
DIP	Degrad Intake Prot
DM	Dry Matter
EE	Ether Extract
FE	Iron
HC	Hemicellulose
I	Iodine
K	Potassium
LIGN	Lignin
LYSI	Lysine

ME	Metabolizable Energy
METH	Methionine
MG	Magnesium
MN	Manganese
NA	Sodium
NCHO	NonStruct Carbohyd
NDF	Neutral Det Fiber
NEG	Net Energy for Gain
NEM	Net Energy for Maint
NPN	Non Protein Nitrogen
NUT1	1st User Nut
NUT2	2nd User Nut
NUT3	3rd User Nut
NUT4	4th User Nut
P	Phosphorus
PHEN	Phenylalanine
S	Sulfur
SCHO	Struct Carbohydrate
SE	Selenium
TDN	Total Digestible Nut
THRE	Threonine
TRYP	Tryptophan
UIP	Undegrad Intake Prot
VITA	Vitamin A
VITD	Vitamin D
VITE	Vitamin E
ZN	Zinc

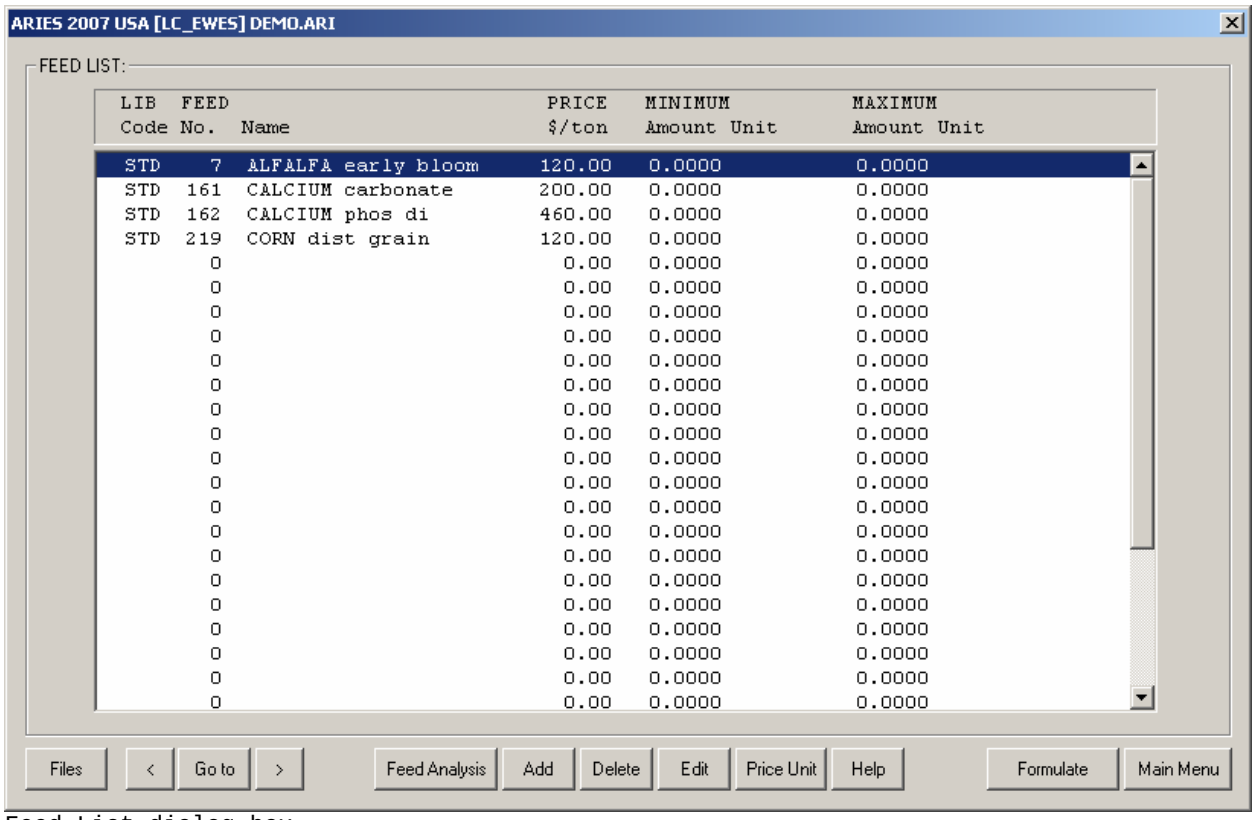
MINIMUM

This column contains the minimum amount of the selected nutrient that will be included in the ration. It also displays the type of minimum constraint.

MAXIMUM

This column contains the maximum amount of the selected nutrient that will be included in the ration. It also displays the type of maximum constraint.

FEED LIST



Feed List dialog box

NAVIGATION

[Files] Create, open, or save ration.
[<] Previous screen.
[Goto] Jump to another input section.
[>] Next screen.
[Feed Analysis] View or edit nutrient analysis of feed.
[Add] Add new feed.
[Edit] Edit existing feed.
[Dbl Click] Double click on a row in the list box invokes Edit button.
[Delet] Delete existing feed.
[Price Unit] Select the feed price unit.
[Help] Display help message.
[Formulate] Formulate ration.
[Main Menu] Exit and return to main menu

ADDING FEED

When you add a feed from the standard or alternate feed libraries to your ration data file, a separate copy of that feed will be added to your ration data file.

Change in the feed in your ration data file does not reflect back to the feed in the feed library. Change in the feed in the feed library does not reflect back to the feed in your ration data file. These two feeds remain independent from each other.

When you add a new feed, make sure to set its fourth feed group to 13, which specifies the real feeds. This is useful in the output section for viewing only the real feeds and excluding all the infeasible feeds.

LIBRARY CODE

Enter the set of feeds that you wish to consider for ration formulation into the table on this page. If you are evaluating an existing ration, enter all of the feeds that are in the ration as well as the amounts as fed per day.

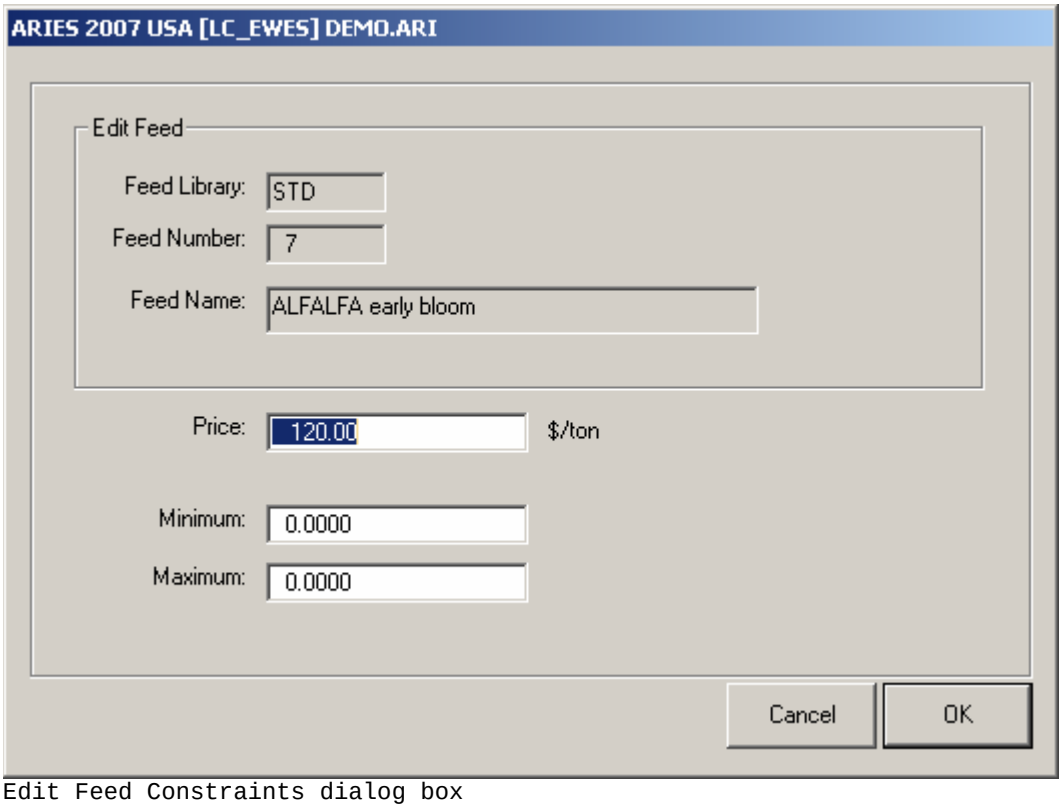
To ADD a feed to the list: use the arrow keys to move to a blank line in the table. Then press the <Add> button.

Feed library codes are as follows:

- STD - the information for this feed is stored in the standard library of feeds supplied by the program.
- ALT - the feed information is contained in an alternate feed library which has been created or modified by you, the program user.
- NEW - the feed information is not contained in any existing feed library. You must enter into the program the entire nutrient analysis for a new feed, since the information is not stored anywhere else.

To DELETE a feed from the list: use the arrow keys to move to the line in the table containing the feed that you wish to delete. Remove the feed by pressing the <Delete> button.

To EDIT a feed: move to the line that you want to edit and then press the <Edit> button.



Edit Feed Constraints dialog box

FEED NUMBER

Each feed in the standard and alternate feed libraries has a unique number assigned to it. If you are entering information for a new feed, you may assign it any number you wish. If you are selecting a feed from one of the existing feed libraries and you do not know its corresponding number, press the arrow in the choice list to get a list of all feed numbers and names in the selected library. You can then use the arrow keys to move to the feed that you want.

FEED NAME

Enter a descriptive name for the feed.

FEED PRICE

Enter the cost of this feed in the units specified:

```
       dollars per ton:      English ton    ( = 2000 lb),  OR
                   cwt:      hundred weight ( =  100 lb),  OR
                   met ton:  metric ton     ( = 1000 kg),  OR
                   kg:       kilogram
```

If you wish to enter the feed price in a unit different from the one specified, press the <Price Unit> button. After you select the desired price unit, the program will automatically convert any data already entered to the unit selected.

MINIMUM AMOUNT

You can force a feed to be included in the ration by entering a minimum constraint amount. The program will then include at least this amount and maybe more when formulating the ration. After you enter the desired amount, the program will ask you to identify the type of constraint (i.e. percent, lbs) by displaying a menu of choices. Use the arrow keys to move to the desired constraint type, and then press <Enter>.

To delete an existing minimum constraint, enter 0 for the amount.

MINIMUM UNIT

Identify the type of minimum constraint by using the arrow keys to move to the desired type. Then press the <Enter> key.

MAXIMUM AMOUNT

You can limit the amount of a feed in the ration by entering a maximum constraint on that feed. After you enter the desired amount, the program will ask you to identify the type of constraint (i.e. percent, lbs) by displaying a menu of choices. Use the arrow keys to move to the desired constraint type, and then press <Enter>.

Many of the feeds in the standard feed library have built-in maximum constraints which will automatically be displayed in this column.

To delete an existing maximum constraint, enter 0 for the amount.

MAXIMUM UNIT

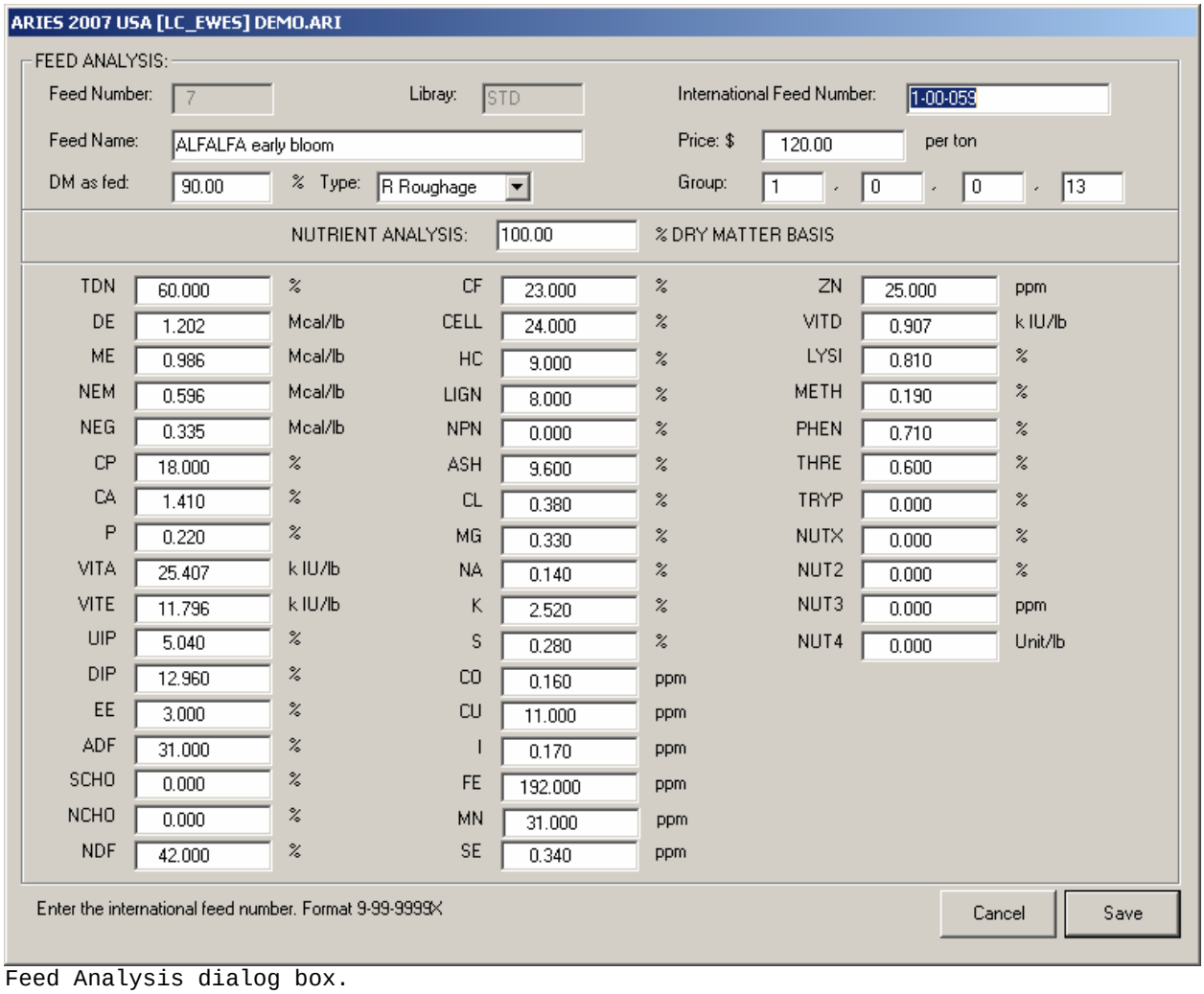
Identify the type of maximum constraint by using the arrow keys to move to the desired type. Then press the <Enter> key.

FEED ANALYSIS

If you wish to view or edit the nutrient analysis for a particular feed, press the <Feed Analysis> button. The program will then display the entire nutrient analysis for the feed.

If you are entering information for a NEW feed, you must fill in the entire nutrient analysis, since the information for a new feed is not already stored in one of the feed libraries.

All changes are local to this particular ration data file and does not change the nutrient analysis of that particular feed in the standard or alternate feed libraries.



Feed Analysis dialog box.

INTERNATIONAL FEED NUMBER

This field is optional. Common feed stuffs are assigned a 6-digit international feed number (IFN) for identification and computer manipulation. The first digit in the IFN represents the international feed classes:

1. Dry forages and roughages
2. Pasture, range plants, and forage fed fresh
3. Silage
4. Energy feeds
5. Protein supplements
6. Mineral supplements
7. Vitamin supplements
8. Additives

DRY MATTER (PERCENT AS FED)

The dry matter percentage of a feed is 100 minus the moisture percentage of the feed. If a feed is totally dry, it has 100% dry matter. If, for example, the feed has a 20% moisture content, its dry matter percentage would be 80.

FEED TYPE

Each feed must be classified as either a roughage or a concentrate. Roughages are feeds containing a high amount of fiber, such as alfalfa hay and corn silage. All other feeds are concentrates.

MVI FACTOR

Each roughage feed has a corresponding maximum voluntary intake (MVI) factor (range: 1.0 to 1.4: excellent quality = 1.0, fair quality = 1.4). If an MVI factor for a forage is omitted, the default value = 1.4.

FEED GROUPS

Each feed may be a member of one or more groups of similar feeds. By placing the feed into a group, you can put constraints on the group of feeds for ration formulation. You can also choose to view the nutrient analysis for a particular feed group in the ration display portion of the program.

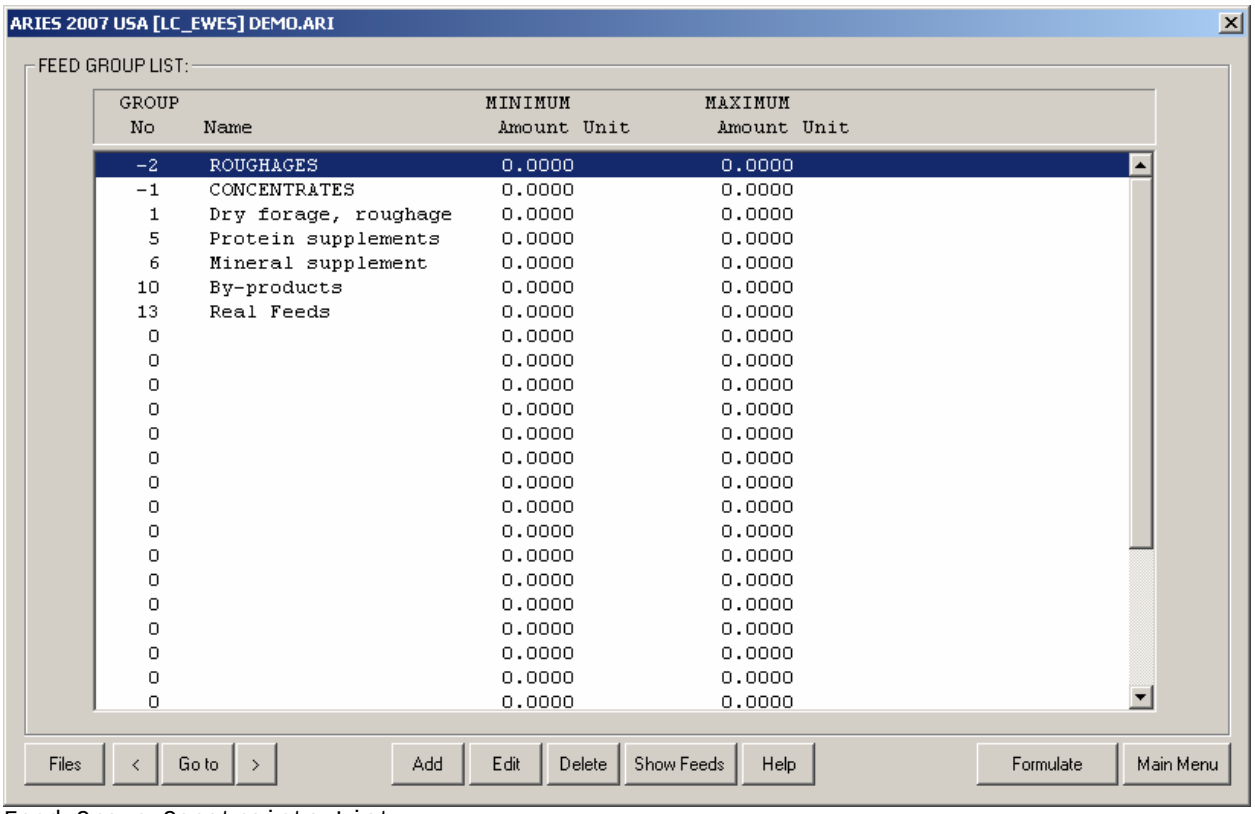
All feeds with an identical group number are considered to be members of the same group.

DRY MATTER BASIS

This field allows you to choose the dry matter basis to use for editing the nutrient analysis of the feed. Most feed nutrient analyses are reported on a 100% dry matter basis. However, if you have nutrient data on other than a 100% dry matter basis, enter the dry matter percentage used for the analysis and corresponding nutrient data, and the program will convert everything to 100% dry matter internally.

If you wish to enter data on an "as fed" basis, enter 0, and the program will insert the correct basis, as fed.

FEED GROUP CONSTRAINTS LIST



Feed Group Constraints List

NAVIGATION

[Files] Create, open, or save ration.
[<] Previous screen.
[Goto] Jump to another input section.
[>] Next screen.
[Add] Add new constraint.
[Edit] Edit existing constraint. Not available in Evaluation module.
[Dbl Click] Double click on a row in the list box invokes Edit button.
[Delete] Delete existing constraint.
[Help] Display help message.
[Show Feeds] Show feeds in a feed group.
[Formulate] Formulate ration.
[Evaluate] Evaluate ration.
[Main Menu] Exit and return to main menu

GROUP NUMBER

This table lists all of the feed groups that have been specified in the feed list.

To ADD a group to the list: You can not add a feed group directly. The programs adds groups automatically when a feed which belongs to that group is added in the previous screen.

To DELETE a group from the list: You can not delete a feed group directly. The programs deletes groups automatically when all feeds which belongs to that group are deleted in the previous screen.

Two exceptions are the pre-defined Roughage and Concentrate groups, which are built in to the program and can never be deleted.

GROUP NAME

Enter a descriptive name for the feed group.

MINIMUM AMOUNT

You can force a feed group to be included in the ration by entering a minimum constraint amount. The program will then include at least this amount and maybe more when formulating the ration. After you enter the desired amount, the program will ask you to identify the type of constraint (i.e. percent, lbs) by displaying a menu of choices. Use the arrow keys to move to the desired constraint type, and then press <Enter>.

To delete an existing minimum constraint, enter 0 for the amount.

MINIMUM UNIT

Identify the type of minimum constraint by using the arrow keys to move to the desired type. Then press the <Enter> key.

MAXIMUM AMOUNT

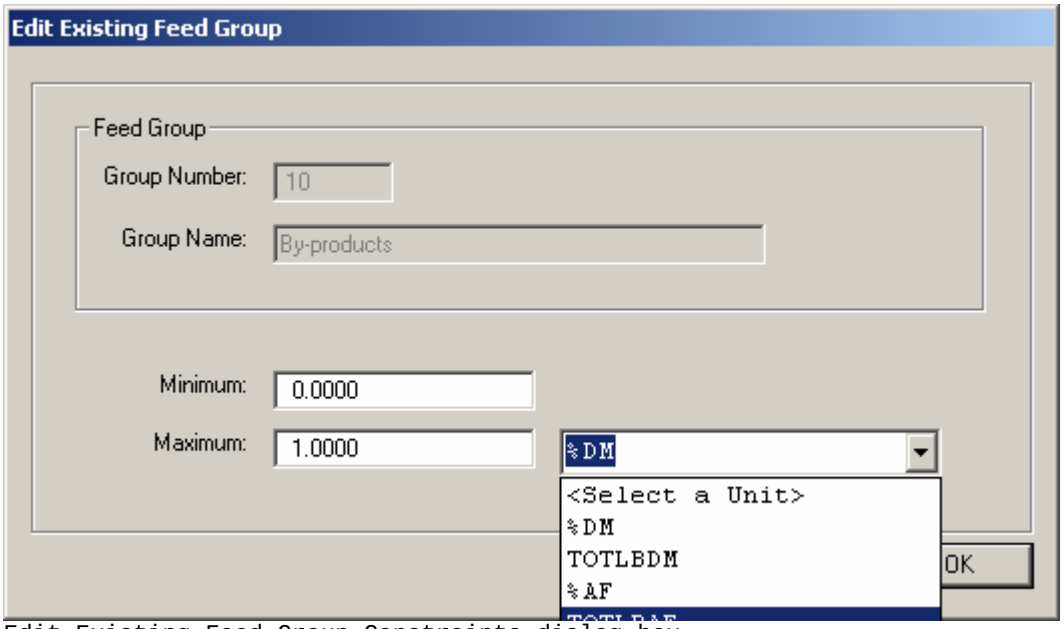
You can limit the amount of a feed group in the ration by entering a maximum constraint on that group. After you enter the desired amount, the program will ask you to identify the type of constraint (i.e. lbs, percent) by displaying a menu of choices. Use the arrow keys to move to the desired constraint type, and then press <Enter>.

Many of the feed groups in the standard library have built-in maximum constraints which will automatically be displayed in this column.

To delete an existing maximum constraint, enter 0 for the amount.

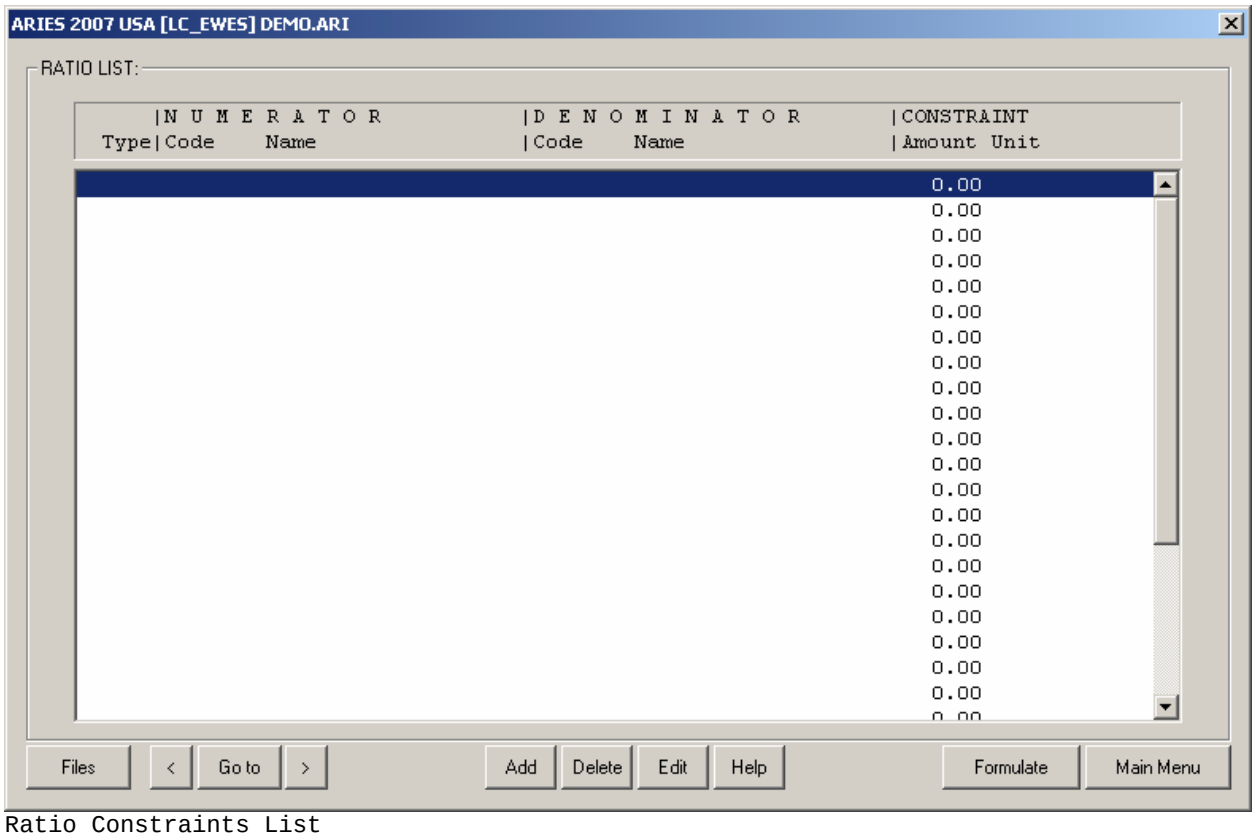
MAXIMUM UNIT

Identify the type of maximum constraint by using the arrow keys to move to the desired type. Then press the <Enter> key.



Edit Existing Feed Group Constraints dialog box

RATIO CONSTRAINTS LIST



Ratio Constraints List

NAVIGATION

[Files] Create, open, or save ration.
[<] Previous screen.
[Goto] Jump to another input section.
[>] Next screen.
[Add] Add new constraint.
[Edit] Edit existing constraint. Not available in Evaluation module.
[Dbl Click] Double click on a row in the list box invokes Edit button.
[Delete] Delete existing constraint.
[Help] Display help message.
[Formulate] Formulate ration.
[Evaluate] Evaluate ration.
[Main Menu] Exit and return to main menu

RATIO TYPE

In this table you can define ratio constraints to be used for ration formulation, or you can simply specify a set of ratios to automatically be calculated by the program when displaying the contents of the ration.

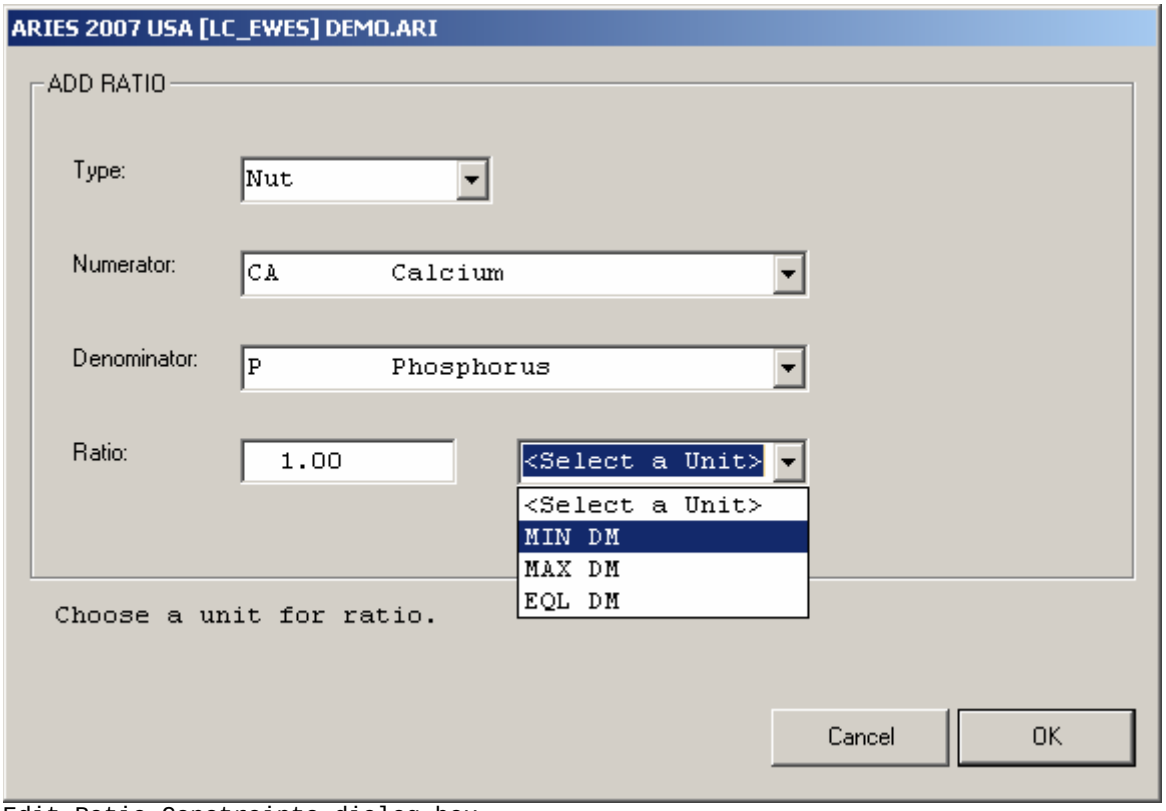
To ADD a ratio to the list: use the arrow keys to move to a blank line in the table and click the <Add> button.

Ratio types are as follows:
Nut - nutrient ratios
Fd - feed ratios
Grp - feed group ratios

To DELETE a ratio from the list: use the arrow keys to move to the line

in the table containing the ratio that you wish to delete. Then click the <Delete> button.

To EDIT a ratio: move to the line that you want to edit and then click the <Edit> button.



Edit Ratio Constraints dialog box

NUMERATOR CODE

Each ratio has two parts: a numerator and a denominator. If, for example, you are defining a calcium to phosphorus ratio, the numerator is calcium and the denominator is phosphorus.

Enter the code for the numerator in this column.

DENOMINATOR CODE

Each ratio has two parts: a numerator and a denominator. If, for example, you are defining a calcium to phosphorus ratio, the numerator is calcium and the denominator is phosphorus.

CONSTRAINT AMOUNT

You should enter a ratio constraint amount as x.xx to 1, where the x's represent the ratio of the numerator to the denominator. For example, if you want to have twice as much calcium as phosphorus in the ration, you would define a calcium to phosphorus ratio of 2 to 1, where 2 is the number that you would specify for the constraint amount.

If you do not want to enter a constraint for formulation but you do want to have the actual ratio calculated by the program when displaying the contents of the ration, enter 0 for the constraint amount.

CONSTRAINT UNIT

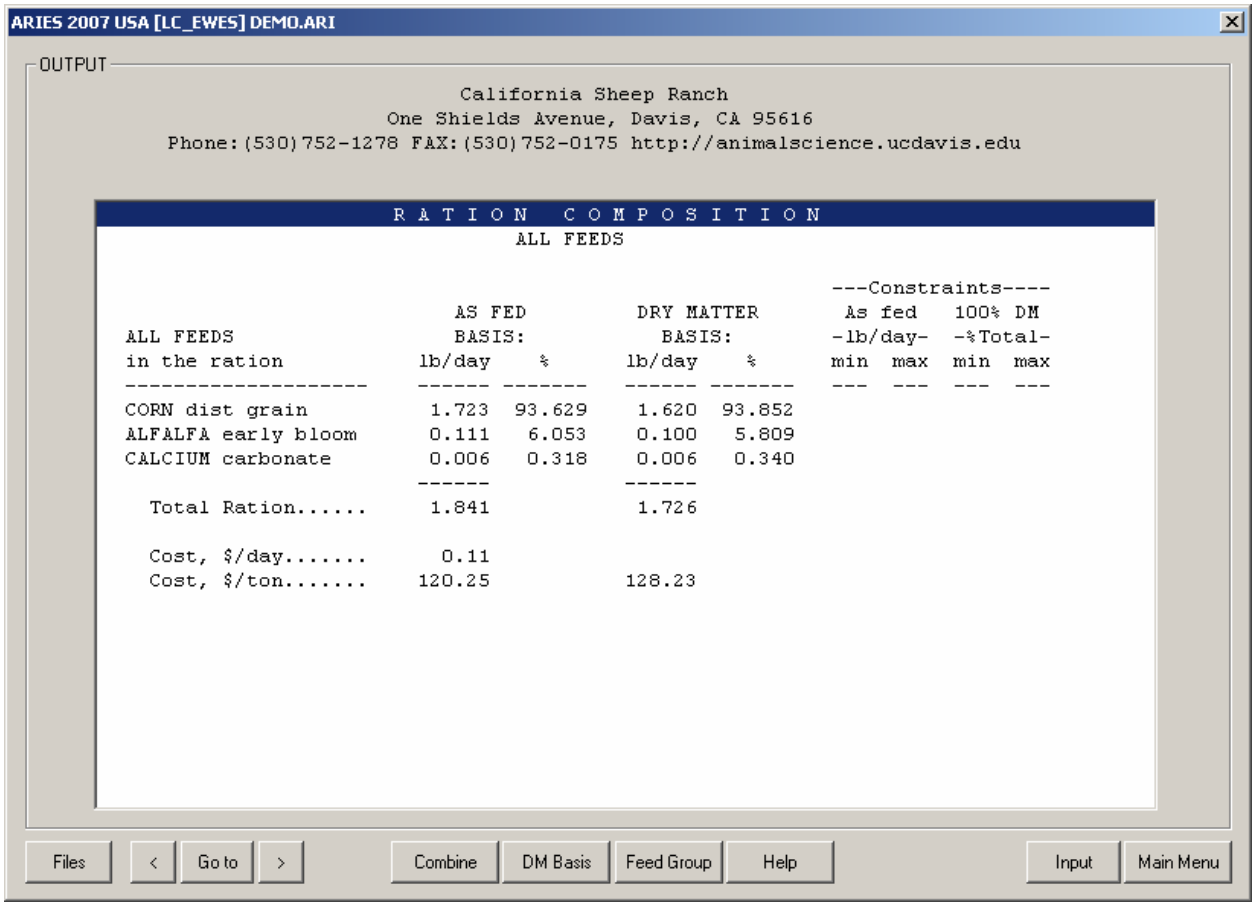
Identify the type of ratio constraint by using the arrow keys to move to the desired type. Then press the <Enter> key.

OUTPUT

NAVIGATION

[Files] Create, open, or save profit projection files.
The print option is under Files button.
[<] Previous screen.
[Goto] Jump to another output section.
[Dbl Click] Double click on a row in the list box invokes Goto button.
[>] Next screen.
[Combine] Combine feeds in mix. Available only in LC_G and LCB modules.
[Feed Group] Select feed group to display.
[DM Basis] Select dry matter basis.
[Help] Display help message.
[Input] Jump to input screen.
[Main Menu] Exit and return to main menu.

RATION (OR FEED GROUP) COMPOSITION



This section displays the amounts of all feeds used in the ration, or the amounts for a feed group selected by using the <Feed Group> button. The following information is included for each feed used in the ration (or group):

1. The amount of the feed in the ration, lb/day or kg/day, as fed basis.

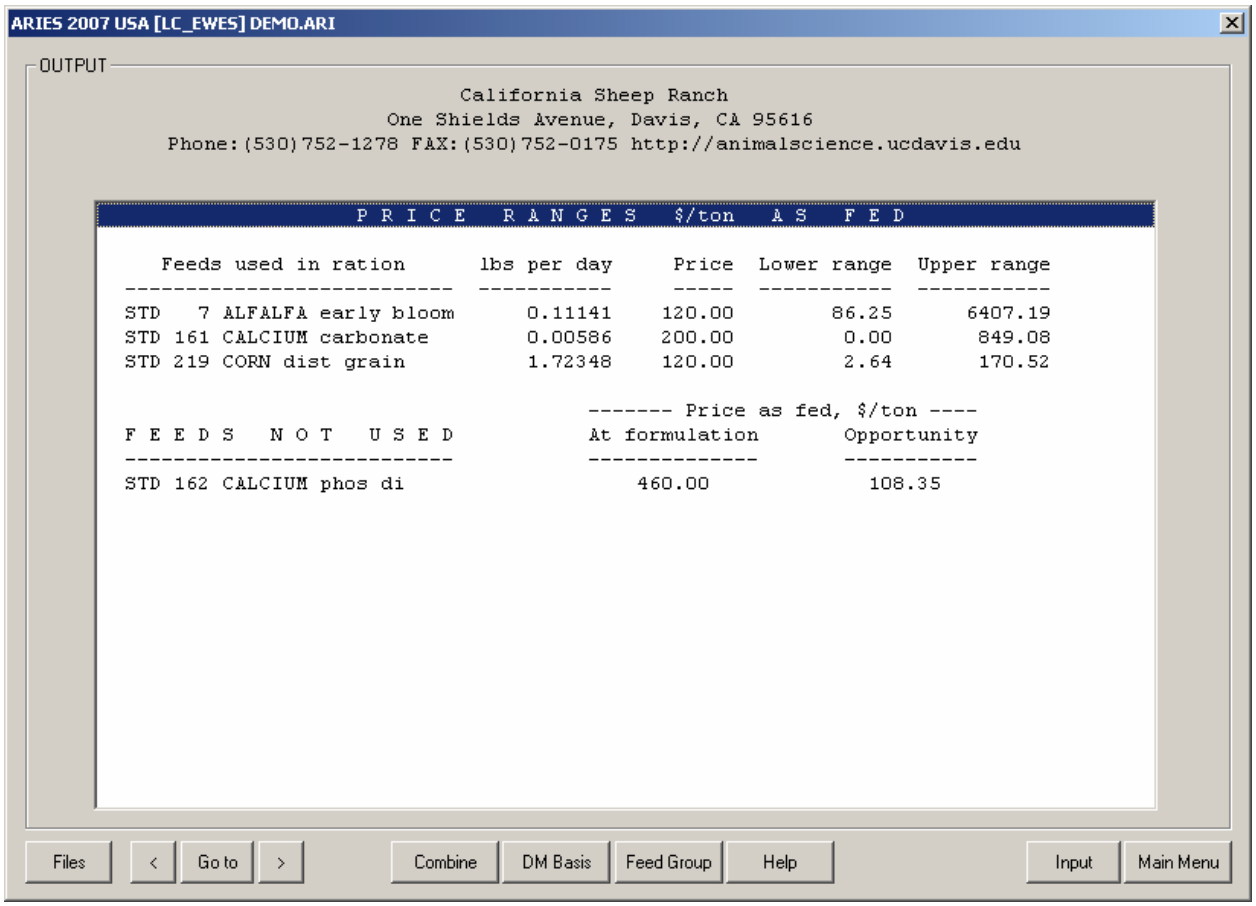
2. The percentage of the feed in the ration (or group), as fed basis.

3. The amount of the feed in the ration, lb/day or kg/day, on a 100% dry matter basis.

4. The percentage of the feed in the ration (or group), on a 100% dry matter basis.

5. Feed and feed group ratios. If you previously defined any feed or group ratios on the Ratios List, the program will calculate the ratio amounts in the ration (or feed group) and display them in this section. Feed ratios will be displayed only if both feeds are used in the ration (or group). Group ratios are displayed only when viewing the composition of ALL FEEDS in the ration.

PRICE RANGE AND FEEDS NOT USED



This section displays the following information for feeds used in the ration:

1. The amount of each feed in the ration, lb/day or kg/day on an as fed basis.

2. The current price of the feed on an as fed basis.

3. The lower range of the feed price. This is the lowest price that the feed can have without affecting its amount used in the ration. If you change the feed to a price below the lower range and then reformulate the ration, the ration composition will change to include more of that feed. Other feeds previously used in the ration may no longer be used. If the lower range is negative, it is not practical to use more of the feed in the ration. If the lower range is -999999.99, the feed amount in the ration cannot be increased due to a maximum constraint on that feed.

4. The upper range of the feed price. This is the highest price that the feed can have without affecting its amount used in the ration. If you change the feed to a price above the upper range and then reformulate the ration, the ration composition will change to include less of that feed, or the feed may be eliminated from the ration. If the upper range is 999999.99, the feed amount in the ration cannot be decreased due to a minimum constraint on that feed.

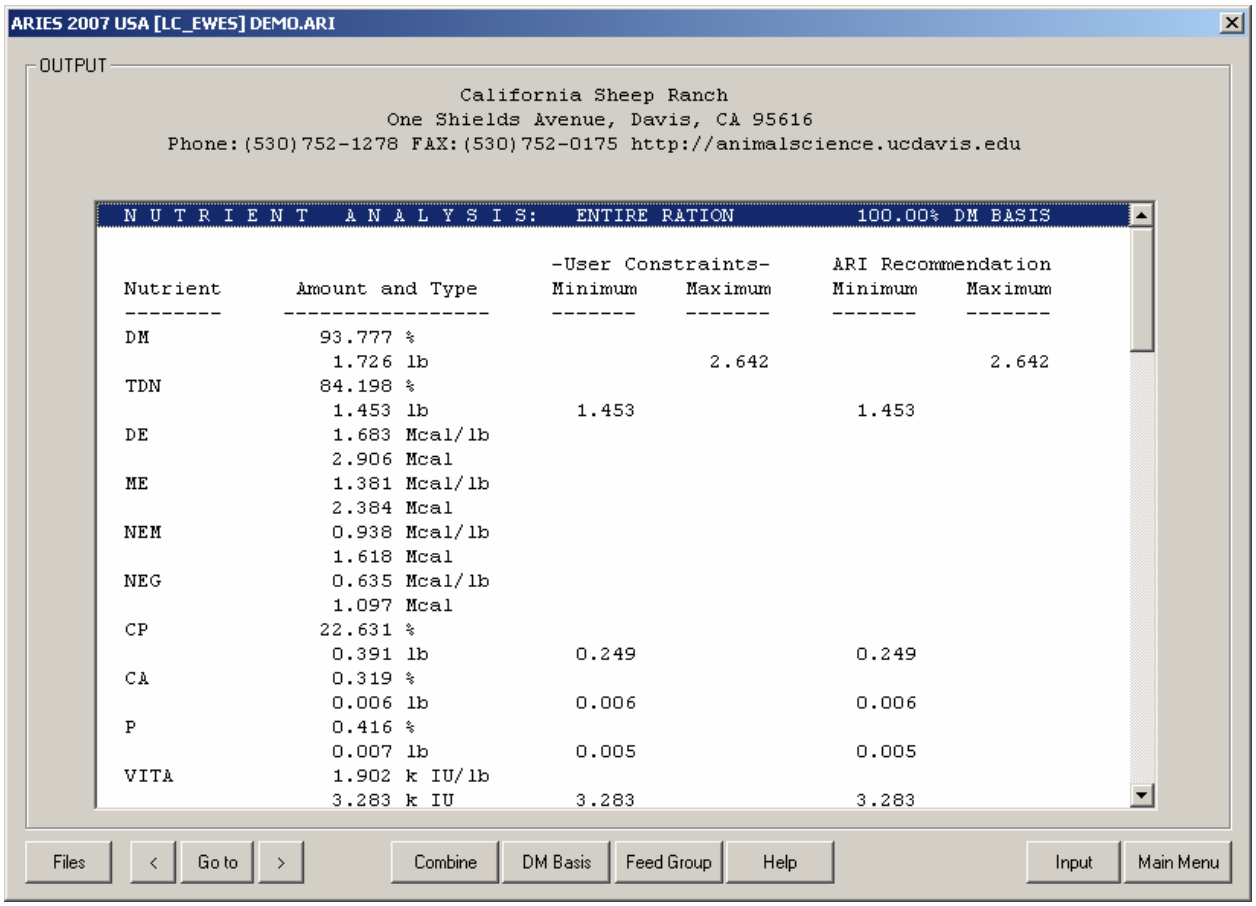
For feeds NOT USED in the ration, this section displays the following:

1. The current price of the feed on an as fed basis.

2. The opportunity price of the feed. This is the price that the feed

must drop to in order for it to be used in the ration. If you add a feed with a price of $10000 per cwt to the feed list and then formulate the ration, the feed will not be included unless it contains some necessary nutrient that is not available from any other feed. If the feed is not used, it would become a good buy if its cost were less than or equal to the opportunity price.

NUTRIENT ANALYSIS OF THE RATION (OR FEED GROUP)



This section displays information for all feeds in the ration, or for a feed group selected by using the <Feed Group> button. The following information is included:

1. Amount and type. Two lines are displayed for each nutrient: line 1 is the CONCENTRATION (percent, ppm, Mcal/lb, etc.) of the nutrient. Line 2 is the AMOUNT (lb, kg, Mcal, etc.) of the nutrient contained in the ration or in a selected feed group.

2. NRC recommendation. This is the nutrient amount recommended by the National Research Council. These amounts are calculated internally by the program, based upon the data that you supplied on the Animal Information page. Not all NRC amounts are used as constraints for ration formulation. By comparing the NRC recommendation with the actual amount of the nutrient in the ration (or selected feed group), you can determine if the ration (or feed group) is deficient in that particular nutrient.

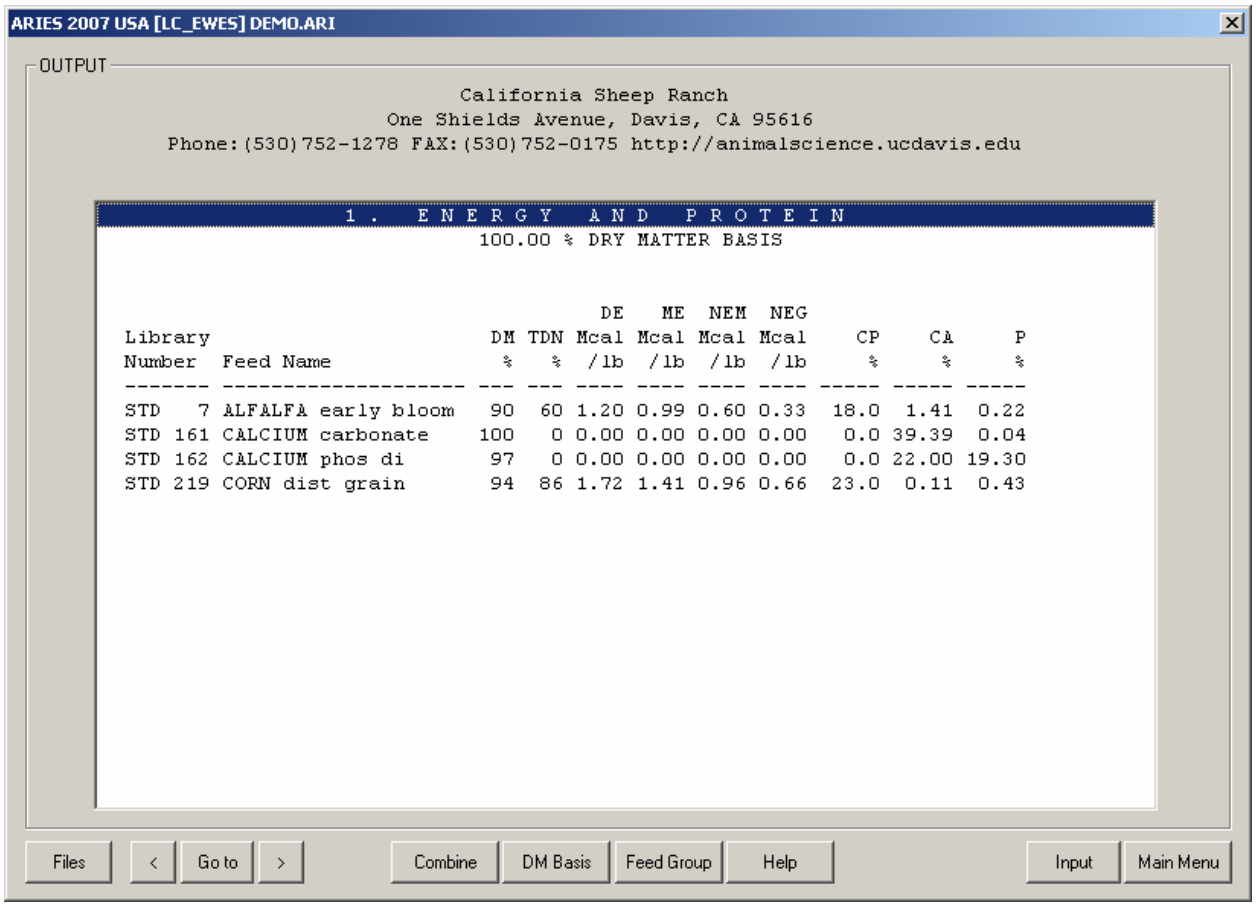
3. Nutrient ratios. If you previously defined any nutrient ratios on the Ratios List, the program will calculate the ratio amounts in the ration (or feed group) and display them in this section.

If you have just formulated a ration, you will also see the following:

4. Minimum and maximum constraints. These are the constraints which were used by the program when the ration was formulated. The displayed nutrient constraints do not apply to any selected feed groups within the ration: they are constraints on ALL feeds.

By clicking the <DM Basis> button, you can change the dry matter basis for calculation of the nutrient analysis. The dry matter basis affects the concentration of the nutrients, but not the actual amounts or ratios of nutrients in the ration (or feed group). The nutrient constraints and the NRC minimum requirements are also affected by the dry matter basis if they represent nutrient concentrations and not actual amounts or ratios.

NUTRIENT ANALYSIS OF FEEDS IN THE RATION DATA FILE



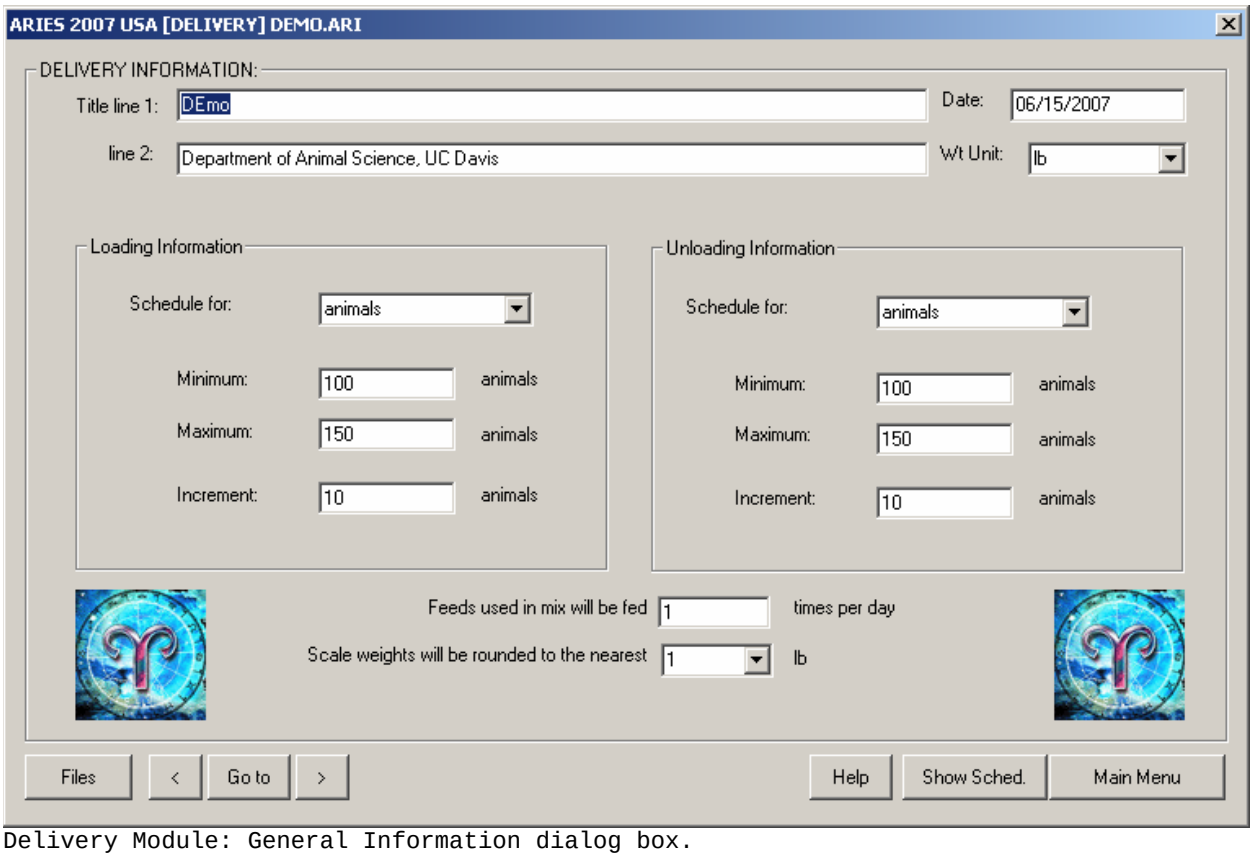
This section displays the nutrient analysis for all feeds that you have selected to be in your feed list.

By pressing the <DM Basis> button, you can change the dry matter basis for calculation of the nutrient analysis. Enter 0 to calculate the analysis for all feeds on an as fed basis.

If an asterisk (*) appears in any column, the nutrient amount for the feed in question is too large to be printed inside that column. You can view the actual amount by looking at the nutrient analysis within the feed list page in the input section of this program.

DELIVERY MODULE

DELIVERY MODULE: GENERAL INFORMATION



Delivery Module: General Information dialog box.

```
--------------------------------------------------------------------------
NAVIGATION
--------------------------------------------------------------------------
[Files]        Create, open, or save ration.
[<]            Previous screen.
[Goto]         Jump to another input section.
[>]            Next screen.
[Help]         Display help message.
[Show Sched]   Display schedules.
[Main Menu]    Exit and return to main menu
--------------------------------------------------------------------------

TITLE
-----
  Enter a name and/or address or other identification for your ration
  on these two lines.  The title will be displayed at the top of all
  printed output for this ration.

Wt Unit
-------
  You may choose to enter data using either the English or the metric
  system.

  Enter  lb  to display all input and output in English units.
  Enter  kg  to display all input and output in metric units.

  The program will automatically convert any data already entered
  to the unit selected.

LOADING SCHEDULE TYPE
```

```
---------------------
  You may choose to calculate the loading schedules based upon
  the total number of animals to be fed  OR  the total amount of feed
  (lb or kg per feeding per day) to be added to the mix.  Total feed
  amounts do NOT include feeds in the ration that are fed separately
  from the mix.

  If all feeds in the ration are to be fed separately (there is no mix
  to be created), the total amount (lb or kg) that you enter on this line
  will correspond to the total amount of feeds fed separately (lb or kg
  per feeding per day).

FEED LOADING MINIMUM AMOUNT
---------------------------
  Feed loading schedules are calculated for a range of the total number
  of animals to be fed.  Enter the minimum number of animals to be fed on
  this line (range: 0 to 45000 animals).

  If you have specified lb or kg instead of animals as the schedule type,
  enter the minimum amount of mix to be created (lb or kg per feeding per
  day;  range: 0 to 45000 lb, or 0 to 20400 kg).

FEED LOADING MAXIMUM AMOUNT
---------------------------
  Feed loading schedules are calculated for a range of the total number
  of animals to be fed.  Enter the maximum number of animals to be fed on
  this line (range: 0 to 45000 animals).

  If you have specified lb or kg instead of animals as the schedule type,
  enter the maximum amount of mix to be created (lb or kg per feeding per
  day;  range: 0 to 45000 lb, or 0 to 20400 kg).

FEED LOADING INCREMENT
----------------------
  Feed loading schedules are calculated for a range of the total number
  of animals to be fed.  Enter the number of animals that you want to use
  as an increment for calculating each of the schedules (range: 0 to
  45000 animals).

  If you have specified lb or kg instead of animals as the schedule type,
  enter the increment for the total amount of mix to be created (lb or kg
  per feeding per day;  range: 0 to 45000 lb, or 0 to 20400 kg).

  The program will calculate a maximum of twelve schedules.

UNLOADING SCHEDULE TYPE
-----------------------
  You may choose to calculate the unloading schedules based upon
  the total number of animals to be fed  OR  the total amount (lb or kg
  per feeding per day) to be unloaded from the mix.  Total amounts do
  NOT include feeds in the ration that are fed separately from the mix.

  If all feeds in the ration are to be fed separately (there is no mix
  feed), the total amount (lb or kg) that you enter on this line
  will correspond to the total amount of feeds fed separately (lb or kg
  per feeding per day).

FEED UNLOADING MINIMUM AMOUNT
-----------------------------
  Feed unloading schedules are calculated for a range of the total number
  of animals to be fed.  Enter the minimum number of animals to be fed on
  this line (range: 0 to 45000 animals).

  If you have specified lb or kg instead of animals as the schedule type,
  enter the minimum amount of mix to be unloaded (lb or kg per feeding per
  day;  range: 0 to 45000 lb, or 0 to 20400 kg).

FEED UNLOADING MAXIMUM AMOUNT
```

Feed unloading schedules are calculated for a range of the total number of animals to be fed. Enter the maximum number of animals to be fed on this line (range: 0 to 45000 animals).

If you have specified lb or kg instead of animals as the schedule type, enter the maximum amount of mix to be unloaded (lb or kg per feeding per day; range: 0 to 45000 lb, or 0 to 20400 kg).

FEED UNLOADING INCREMENT

Feed unloading schedules are calculated for a range of the total number of animals to be fed. Enter the number of animals that you want to use as an increment for calculating each of the schedules (range: 0 to 45000 animals).

If you have specified lb or kg instead of animals as the schedule type, enter the increment for the total amount of mix to be unloaded (lb or kg per feeding per day; range: 0 to 45000 lb, or 0 to 20400 kg).

The program will calculate a maximum of twelve schedules.

MIX FEEDS: NUMBER OF FEEDINGS PER DAY

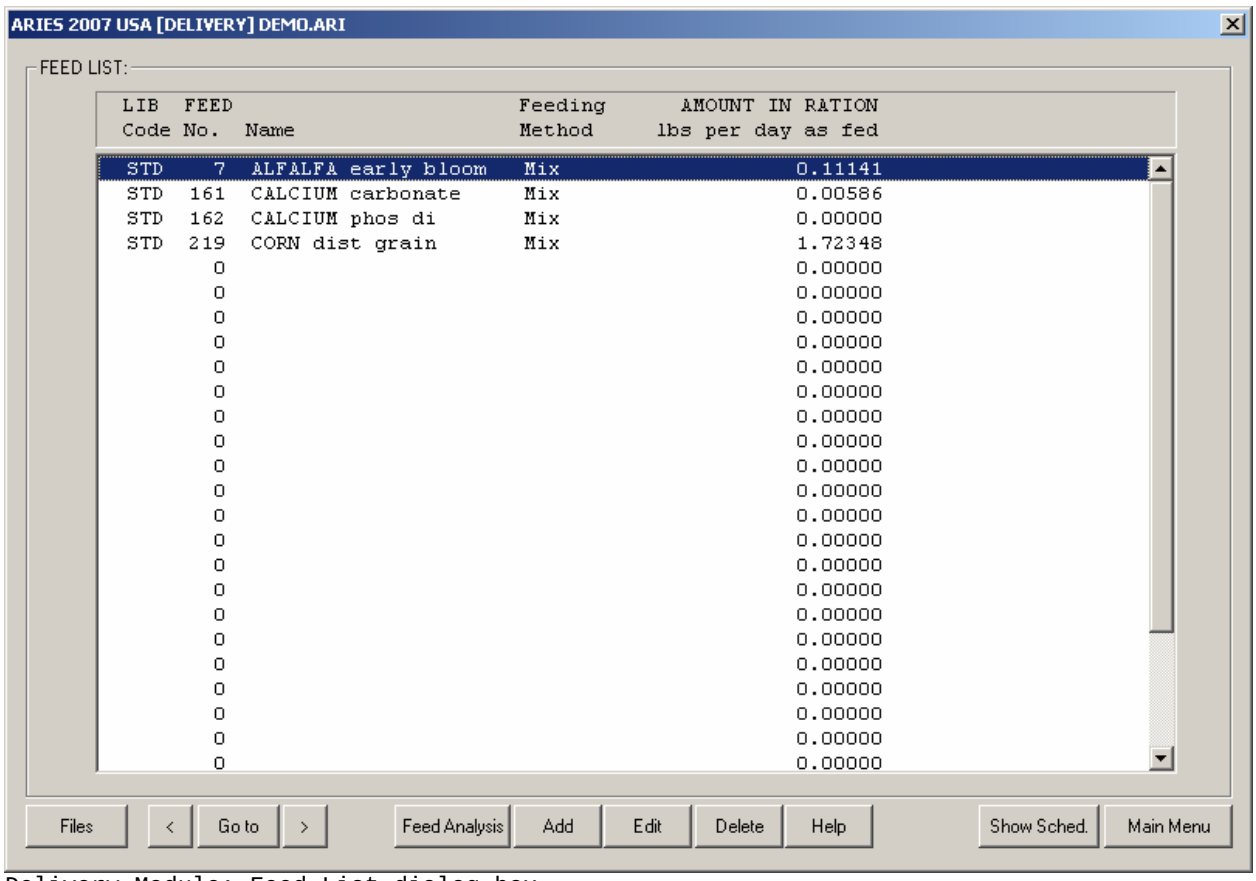
Enter the number of times per day that the animals are to be given ration feeds included in a mix (range: 1 to 9 feedings per day).

ROUNDING FACTOR FOR SCALE WEIGHTS

Enter the rounding factor used to display the scale weights in the loading and unloading schedules. You have the following choices for rounding factors:

1	nearest	one lb (kg)	(158.347 displays as 158)
10	nearest	ten lb (kg)	(158.347 displays as 160)
0.1	nearest	tenth lb (kg)	(158.347 displays as 158.3)
0.01	nearest	hundredth lb (kg)	(158.347 displays as 158.35)

DELIVERY MODULE: FEED LIST



Delivery Module: Feed List dialog box.

NAVIGATION

[Files] Create, open, or save ration.
[<] Previous screen.
[Goto] Jump to another input section.
[>] Next screen.
[Feed Analysis] View or edit nutrient analysis of feed.
[Add] Add new feed.
[Edit] Edit existing feed.
[Dbl Click] Double click on a row in the list box invokes Edit button.
[Delete] Delete existing feed.
[Help] Display help message.
[Show Schdl] Display loading and unloading schedules.
[Main Menu] Exit and return to main menu

LIBRARY CODE

Enter the set of feeds that you wish to consider for ration formulation into the table on this page. If you are evaluating an existing ration, enter all of the feeds that are in the ration as well as the amounts as fed per day.

To ADD a feed to the list: use the arrow keys to move to a blank line in the table. Then press the <Add> button.

Feed library codes are as follows:
STD - the information for this feed is stored in the standard library of feeds supplied by the program.

```
    ALT - the feed information is contained in an alternate feed library
          which has been created or modified by you, the program user.
    NEW - the feed information is not contained in any existing feed
          library.  You must enter into the program the entire nutrient
          analysis for a new feed, since the information is not stored
          anywhere else.

  To DELETE a feed from the list:  use the arrow keys to move to the line
  in the table containing the feed that you wish to delete.  Remove the
  feed by pressing the <Delete> button.

  To EDIT a feed:  move to the line that you want to edit and then press
  the <Edit> button.

FEED NUMBER
-----------
  Each feed in the standard and alternate feed libraries has a unique
  number assigned to it.  If you are entering information for a new feed,
  you may assign it any number you wish.  If you are selecting a feed
  from one of the existing feed libraries and you do not know its
  corresponding number, press the arrow in the choice list to get a list
  of all feed numbers and names in the selected library.  You can then use
  the arrow keys to move to the feed that you want.

FEED NAME
---------
  Enter a descriptive name for the feed.

FEEDING METHOD
--------------
  Enter one of following feeding methods:

        Mix  - this feed will be included in a mix
        Sep  - this feed will fed separately from the mix
        Both - a portion of this feed will be included in the mix;
               the rest will be fed separately

AMOUNT IN RATION
----------------
  You can edit the actual amount of the feed in the ration and thus change
  the content and nutrient analysis of the ration.

  You should enter all feed amounts on an as fed basis, lbs or kgs
  per day.

FEED ANALYSIS
-------------
  If you wish to view or edit the nutrient analysis for a particular feed,
  press the <Feed Analysis> button. The program will then display the
  entire nutrient analysis for the feed.

  If you are entering information for a NEW feed, you must fill in the
  entire nutrient analysis, since the information for a new feed is not
  already stored in one of the feed libraries.

  All changes are local to this particular ration data file and does not
  change the nutrient analysis of that particular feed in the standard or
  alternate feed libraries.

INTERNATIONAL FEED NUMBER
-------------------------
  This field is optional.  Common feed stuffs are assigned a 6-digit
  international feed number (IFN) for identification and computer
  manipulation.  The first digit in the IFN represents the international
  feed classes:

       1.   Dry forages and roughages
       2.   Pasture, range plants, and forage fed fresh
```

3. Silage
4. Energy feeds
5. Protein supplements
6. Mineral supplements
7. Vitamin supplements
8. Additives

DRY MATTER (PERCENT AS FED)

The dry matter percentage of a feed is 100 minus the moisture percentage of the feed. If a feed is totally dry, it has 100% dry matter. If, for example, the feed has a 20% moisture content, its dry matter percentage would be 80.

FEED TYPE

Each feed must be classified as either a roughage or a concentrate. Roughages are feeds containing a high amount of fiber, such as alfalfa hay and corn silage. All other feeds are concentrates.

MVI FACTOR

Each roughage feed has a corresponding maximum voluntary intake (MVI) factor (range: 1.0 to 1.4: excellent quality = 1.0, fair quality = 1.4). If an MVI factor for a forage is omitted, the default value = 1.4.

FEED GROUPS

Each feed may be a member of one or more groups of similar feeds. By placing the feed into a group, you can put constraints on the group of feeds for ration formulation. You can also choose to view the nutrient analysis for a particular feed group in the ration display portion of the program.

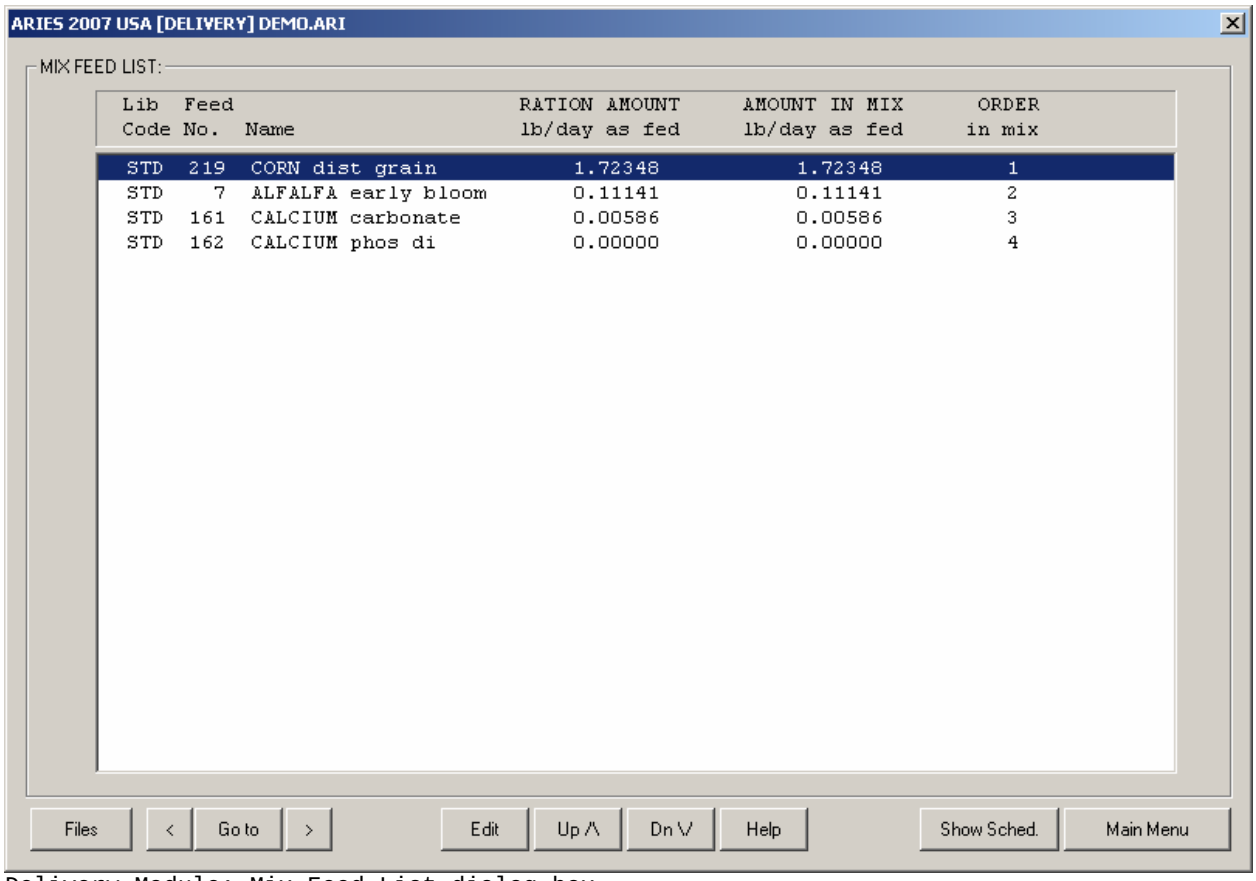
All feeds with an identical group number are considered to be members of the same group.

DRY MATTER BASIS

This field allows you to choose the dry matter basis to use for editing the nutrient analysis of the feed. Most feed nutrient analyses are reported on a 100% dry matter basis. However, if you have nutrient data on other than a 100% dry matter basis, enter the dry matter percentage used for the analysis and corresponding nutrient data, and the program will convert everything to 100% dry matter internally.

If you wish to enter data on an "as fed" basis, enter 0, and the program will insert the correct basis, as fed.

DELIVERY MODULE: MIX FEED LIST



Delivery Module: Mix Feed List dialog box.

NAVIGATION

[Files] Create, open, or save ration.
[<] Previous screen.
[Goto] Jump to another input section.
[>] Next screen.
[Edit] Edit mix amount.
[Dbl Click] Double click on a row in the list box invokes Edit button.
[Up] Move up existing feed.
[Dn] Move down existing feed.
[Help] Display help message.
[Show Schdl] Display loading and unloading schedules.
[Main Menu] Exit and return to main menu

LIBRARY CODE

Feed library codes are as follows:

STD - the information for this feed is stored in the standard library of feeds supplied by the program.

ALT - the feed information is contained in an alternate feed library which has been created or modified by you, the program user.

NEW - the feed information is not contained in any existing feed library. You must enter into the program the entire nutrient analysis for a new feed, since the information is not stored anywhere else.

FEED NUMBER

Each feed in the standard and alternate feed libraries has a unique number assigned to it.

FEED NAME

Each feed has a descriptive name..

AMOUNT IN RATION

This field shows the actual amount of the feed in the ration.

AMOUNT IN MIX

Enter the amount of this feed that is to be included in the mix.

You should enter all feed amounts on an as fed basis, lbs or kgs per day.

ORDER IN MIX

The order in mix specifies the order that this feed is to be loaded onto the mixer.

Press the <Up> button to move up the feed in the list. Press the <Dn> button to move down the feed in the list.

DELIVERY MODULE: SEPARATE FEED LIST

NAVIGATION

[Files] Create, open, or save ration.
[<] Previous screen.
[Goto] Jump to another input section.
[>] Next screen.
[Edit] Edit separate amount.
[Dbl Click] Double click on a row in the list box invokes Edit button.
[Help] Display help message.
[Show Schdl] Display loading and unloading schedules.
[Main Menu] Exit and return to main menu

LIBRARY CODE

Feed library codes are as follows:

STD - the information for this feed is stored in the standard library of feeds supplied by the program.

ALT - the feed information is contained in an alternate feed library which has been created or modified by you, the program user.

NEW - the feed information is not contained in any existing feed library. You must enter into the program the entire nutrient analysis for a new feed, since the information is not stored anywhere else.

FEED NUMBER

Each feed in the standard and alternate feed libraries has a unique number assigned to it.

FEED NAME

Each feed has a descriptive name..

AMOUNT IN RATION

This field shows the actual amount of the feed in the ration.

AMOUNT FED SEPARATELY

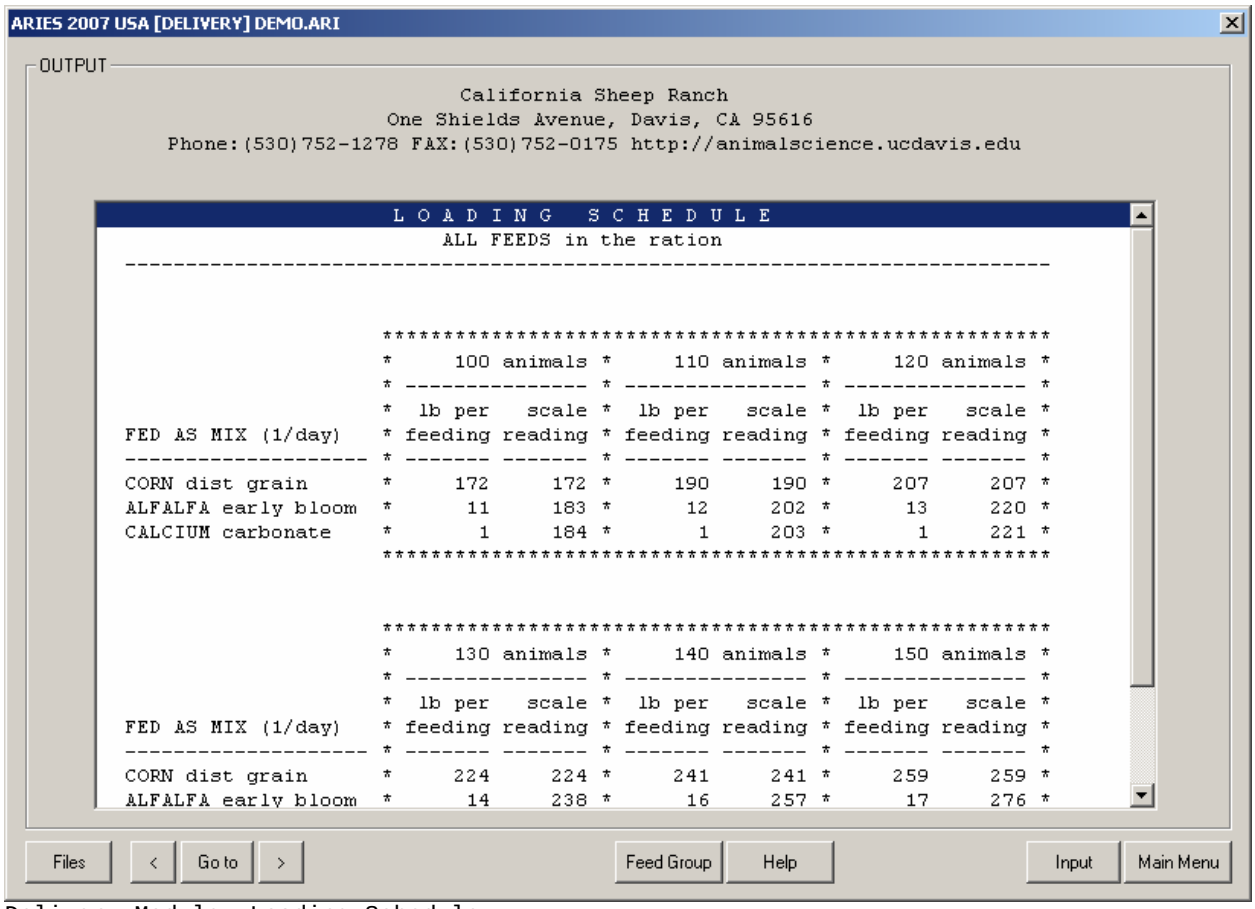
Enter the amount of this feed that is to be fed separately from the mix.

You should enter all feed amounts on an as fed basis, lbs or kgs per day.

DELIVERY MODULE: OUTPUT

```
------------------------------------------------------------------------
NAVIGATION
------------------------------------------------------------------------
[Files]        Create, open, or save profit projection files.
               The print option is under Files button.
[<]            Previous screen.
[Goto]         Jump to another output section.
[Dbl Click]    Double click on a row in the list box invokes Goto button.
[>]            Next screen.
[Feed Group]   Select feed group to display.
[Help]         Display help message.
[Input]        Jump to input screen.
[Main Menu]    Exit and return to main menu.
------------------------------------------------------------------------
```

LOADING SCHEDULE



Delivery Module: Loading Schedule.

This section displays the loading schedules for all feeds used in the ration, or for a feed group selected by using the <Feed Group> button.

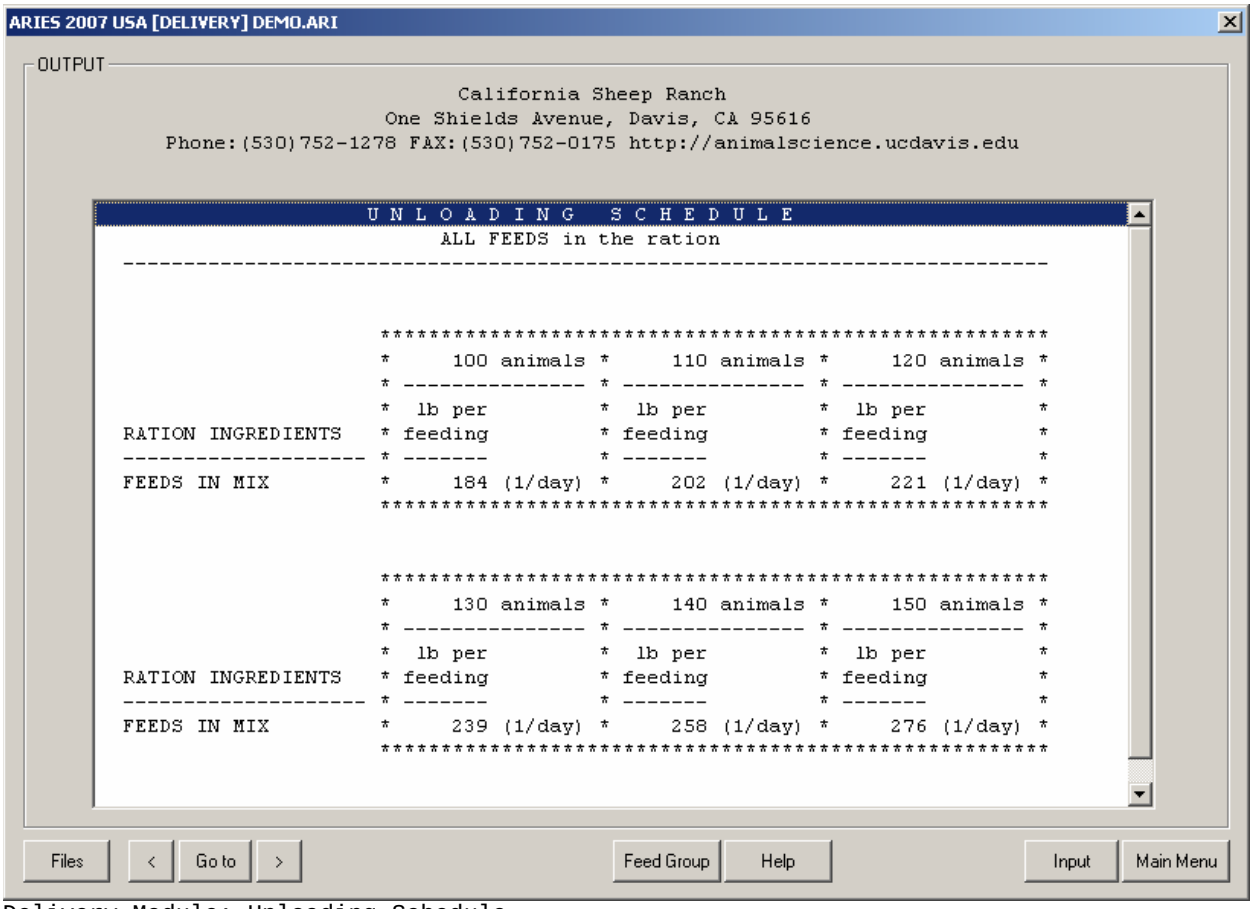
Loading schedules are displayed for both mix feeds and feeds fed separately from the mix. A maximum of twelve schedules will be printed.

For each feed fed separately, the schedule shows the amount to be fed at each feeding.

For each feed in the mix, the schedule shows the actual amount of the feed to be added to the mixer, along with the mixer scale reading that

will be obtained after the feed has been added. Mix feeds are added in the order that you previously specified on the Mix Feed List form.

UNLOADING SCHEDULE



Delivery Module: Unloading Schedule.

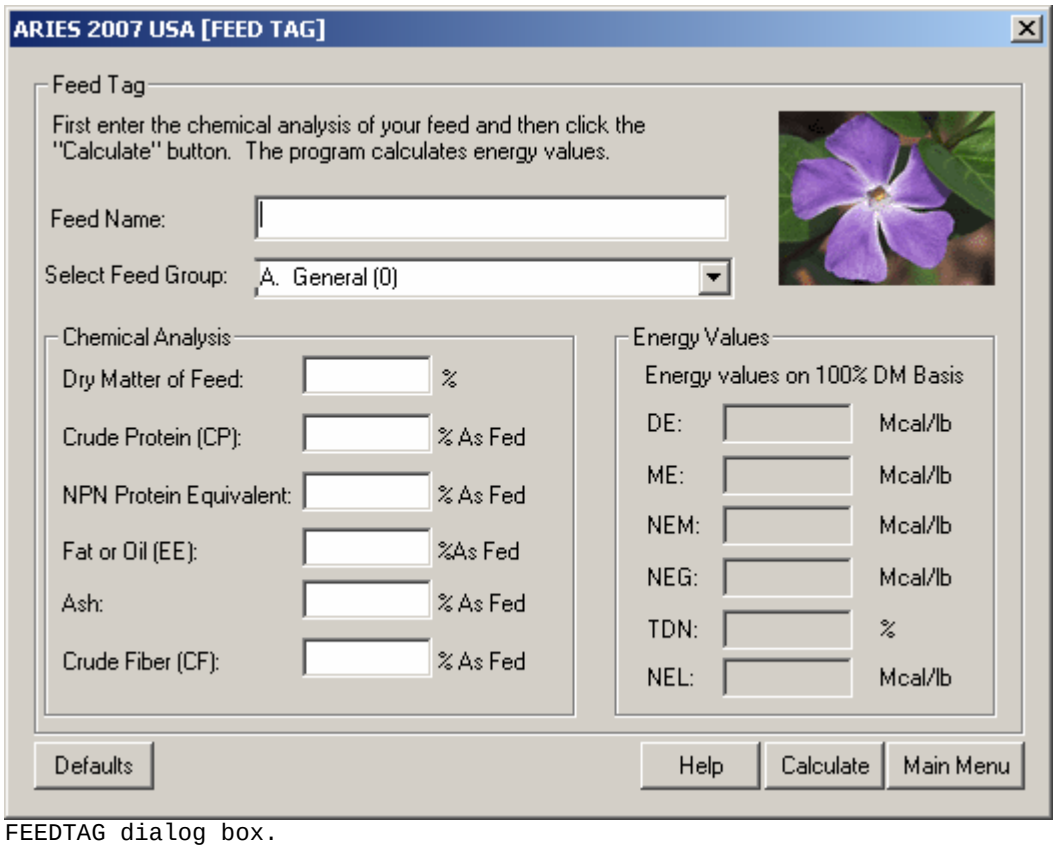
This section displays the unloading schedules for all feeds used in the ration, or for a feed group selected by using the <Feed Group> button.

Unloading schedules are displayed for the mix feed, along with all feeds fed separately from the mix. A maximum of twelve schedules will be printed.

For each feed fed separately and for the mix, the schedule shows the amount to be unloaded for each feeding.

The number of feedings per day is displayed in parentheses after the amount to be unloaded.

FEEDTAG



FEEDTAG dialog box.

NAVIGATION

[Defaults] Set the input fields to default values.
[Help] Display help message.
[Calculate] Calculate energy values.
[Main Menu] Exit and return to main menu.

FEEDTAG utilizes a feed group category and user specified proximate analyses values for crude protein, ether extract, ash and crude fiber. Based on this chemical analyses and a regression equation for that group, FEEDTAG calculates a value for digestible energy content of the feed. FEEDTAG then derives values for metabolizable energy, total digestible nutrients, net energy for maintenance, net energy for gain and net energy for lactation from this digestible energy value (NRC, 1984). The program displays all the energy values for the feed in question on the screen.

Feeds are grouped into five categories based on their International Feed Number, with the exception of forages (group 1), which were further divided into legumes and non-legumes.

GROUP	CATEGORY
Group A	General
Group B	Dry forage and roughage: Legumes
Group C	Dry forage and roughage: Non legumes
Group D	Pasture and range plants
Group E	Silage
Group F	Energy feeds
Group G	Protein supplements

FEEDTAG INPUT

In the input screen you will enter all of the information (feed group, crude protein, etc) that is required to estimate the energy contents of the feed. The input screen consists of the following fields:

FEED NAME
Enter the name of the feed that you wish to calculate energy values for.

FEED GROUP
Each feed group has its own equation for estimating energy values. So, be careful in selecting your group. If you are not sure choose Group A (General).

DRY MATTER
If you want to enter the chemical analysis on the 100 % D.M. basis, enter 100 in this field. Usually the chemical analysis values on the feed tags are on as fed basis, in this case you would enter the dry matter contents of the feed (for example 90%) in this field. In either case the program will give you the energy contents of the feed on a 100% dry matter basis.

CRUDE PROTEIN
Enter the crude protein contents of the feed (%).

NPN PROTEIN EQUIVALENT
Enter the Non-Protein Nitrogen contents of the feed.

FAT OR OIL (E.E.)
Enter the ether extract contents of the feed (%).

ASH
Enter the ash contents of the feed (%).

CRUDE FIBER
Enter crude fiber contents of the feed (%).

FEEDTAG OUTPUT

Press the “Calculate” button and the program calculates the energy values of the feed. The FEEDTAG output is shown at the bottom right corner of the input screen. It consists of energy values: DE Mcal/lb., ME Mcal/lb, NEm Mcal/lb, NEg Mcal/lb, TDN %, and MEl Mcal/lb. All energy values are on 100 % dry matter basis.

At this time you can print the output by holding down the **Alt** key and pressing the **PrtSc** (print screen) key.

The methods used for predicting energy values of feedstuffs are based in regression equations developed from data obtained from digestibility studies. These prediction equations were developed based on chemical analysis and regression equations. The program calculates energy values, using the following algorithm:

Step 1. Converts all values to 100% DM basis.

Step 2. Calculates Digestible Energy, Mcal/kg, for different groups:

```
    Grp A: DE= 3.916828-0.00812  *CP+0.04554  *EE-0.0176 *ash-0.0422  *CF
    Grp B: DE= 2.811904+0.0209413*CP+0.006492 *EE+0.01302*ash-0.0274  *CF
    Grp C: DE= 3.264743+0.06363  *CP-0.0761   *EE-0.0508 *ash-0.0283  *CF
    Grp D: DE= 3.723255+0.002459 *CP+0.0815818*EE-0.0211 *ash-0.036135*CF
    Grp E: DE= 3.681242-0.0130   *CP+0.04553  *EE-0.0328 *ash-0.0284  *CF
    Grp F: DE= 3.729697+0.008047 *CP+0.04582  *EE-0.0393 *ash-0.0392  *CF
    Grp G: DE= 4.706482-0.0158   *CP+0.034633 *EE-0.0241 *ash-0.0598  *CF
```

Step 3. Corrects for Non Protein Nitrogen Protein Equivalent:
DE = DE * (1-(CP * NPN/28200))

Step 4. All other energy values are calculated by using DE.

Metabolizable Energy, Mcal/kg:
ME = 0.82 * DE

Net Energy for Maintenance, Mcal/kg:
NEM = 1.37 * ME - 0.138 * ME * ME + 0.0105 * ME * ME * ME - 1.12

Net Energy for Gain, Mcal/kg:
NEG = 1.42 * ME - 0.147 * ME * ME + 0.0122 * ME * ME * ME - 1.65

Total Digestible Nutrients, %:
TDN = 100 * (DE/4.4)

Net Energy for Lactation, Mcal/kg:
NEL = 0.0245 * TDN - 0.12

Step 5. The Energy values finally are converted to the user-specified system (English or Metric).