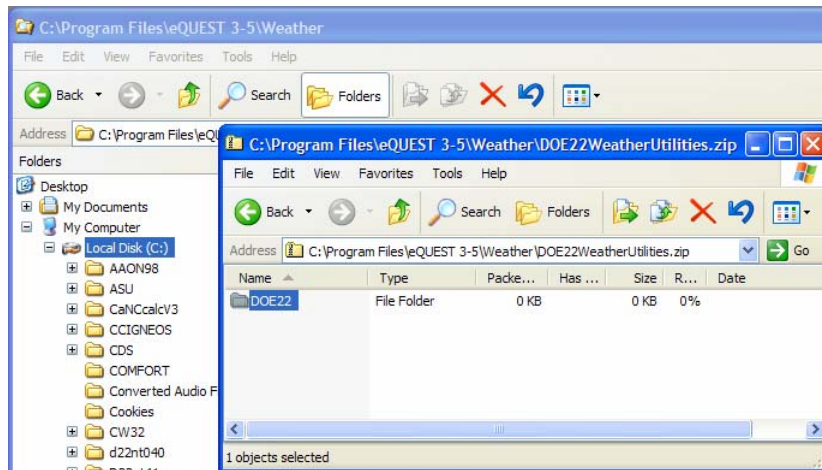


Procedure to customize eQUEST weather data, 31 March 2006

Since it is unlikely that one can obtain custom data for all of the weather variables included in an hourly eQUEST weather file (e.g., dry-bulb and wet-bulb temperatures are typically easier to obtain than solar), it is necessary to use a standard eQUEST weather file as a ‘template’ to serve as a data source for the data not included in your custom data set.

Step 1, Go to www.doe2.com and download “DOE22WeatherUtilities.zip”.

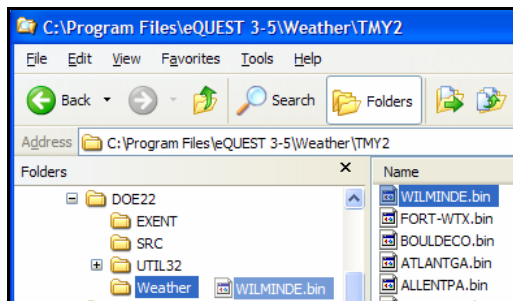
- 1a) At www.doe2.com, in the Weather Data section of the home page, click on the link for the ‘download areas’ (<http://doe2.com/Download/Weather/>). Click on “DOE22WeatherUtilities.zip” to download the DOE-2 weather processor utilities. Save the ZIP file to any preferred location on your hard drive or local network.
- 1b) Unzip “DOE22WeatherUtilities.zip” by double clicking on the zip file, then dragging the DOE22 folder to the root of your hard drive. (Places a folder named “DOE22” at the root of your hard drive.)



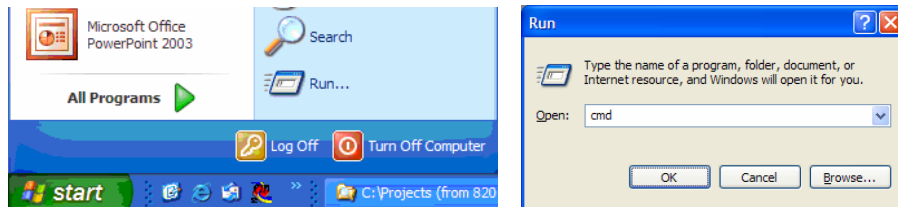
Step 2, ‘Unzip’ a standard eQUEST weather file to use as a template.

- 2a) Identify a preferred long-term average eQUEST weather file (e.g., a TMY2 file) to use as a template. Ideally, this is an eQUEST weather file for the same location as your custom weather data (or a near-by location). Download this from the www.doe2.com site if you don’t already have it on your hard drive or local network. This is easily done by running a sample eQUEST simulation for the selected location. eQUEST will automatically download your selected file and write it to “C:\Program Files\Quest 3-5\Weather\TMY2” (or similar, depending on where you installed eQUEST on your computer). The eQUEST weather file will have an eight character file name (the first six characters of the city name plus the two character postal abbreviation for the state, e.g., “WILMINDE.bin” for Wilmington, Delaware.

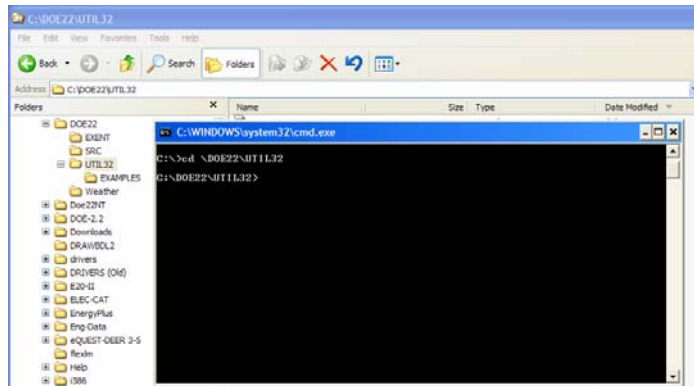
- 2b) Create a new folder in “C:\DOE22\” named “WEATHER”, i.e., “C:\DOE22\WEATHER”. Copy the eQUEST template weather file (e.g., WILMINDE.bin) to “C:\DOE22\WEATHER”.



- 2c) Launch a DOS command box (from the Start button, select “Run...”, then type “cmd” into the Open input line and click “OK”.)

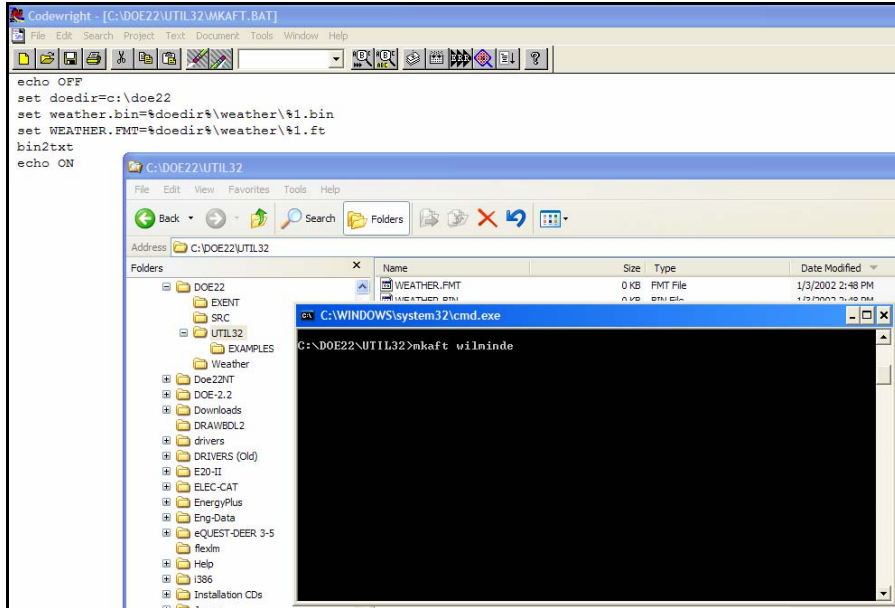


Within the DOS command box, change to the “C:\DOE22\UTIL32” directory by typing, “cd \DOE22\UTIL32” as indicated in the screen capture below and press enter.

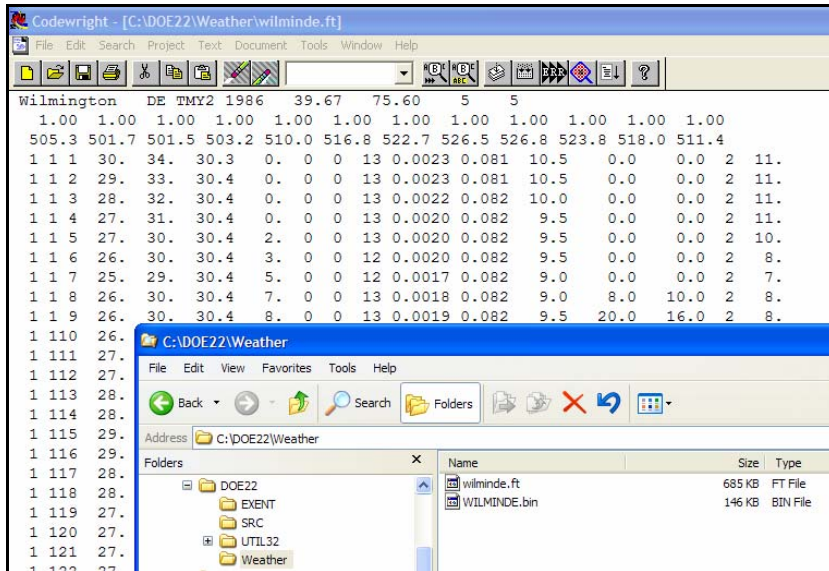


- 2d) ‘Unzip’ the binary DOE-2/eQUEST weather file by running the DOE2.2 weather utility batch named “MKAFT.bat” (‘make an FT file’, where FT is the file extension of an ‘unzipped’ or ‘formatted’ DOE-2/eQUEST weather file).

The screen capture below includes a view of the batch file commands in the background. Note that the batch file adds the necessary file extensions so when typing the “MKAFT” command on the DOS command line, ONLY the eQUEST weather file name should be added as the argument on the command line (i.e., OMIT the ‘dot’ and the file extension), e.g., “mkafst wilmide”. Note also that DOS commands are not case sensitive.



This results in new text file in the “C:\DOE22\Weather” folder, named “wilmide.ft”. The file extension stands for ‘formatted’ (as opposed to ‘binary’). The screen capture below illustrates the format of the file.



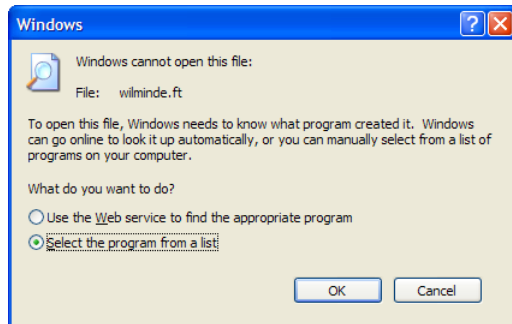
The format of the FT file is as follows:

- row 1: columns 1-20: weather file name (used to label output in the SIM file)
- columns 22-25: weather year (no meaning for long-term average weather), DO NOT ALTER
- columns 29-41: site latitude and longitude, best not to alter (used to modify file solar data).
- column 46: time zone (integer) where 5=Eastern, 6=Central, 7=Mountain, and 8=Pacific. DO NOT ALTER (If you feel the need to alter these, make sure the site longitude is within the new time zone.)
- column 51: solar processor flag. DO NOT ALTER
- row 2: all columns clearness number (12 months) DO NOT ALTER
- row 3: all columns ground temperature (12 months, in degrees Rankine)
- rows 4-8763 (all cols) hourly weather data (8760 hours). See format below.

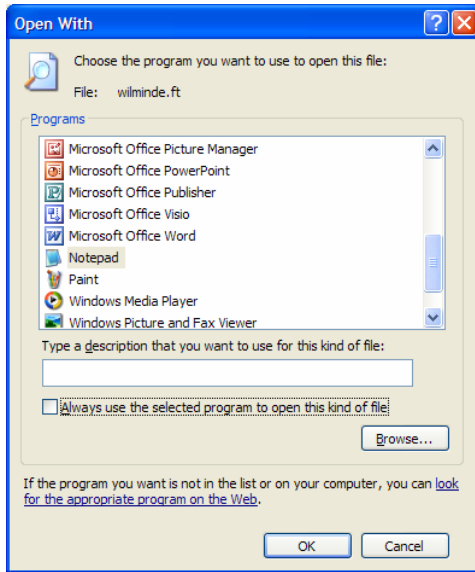
Variable Name	Description	units
KMON	MONTH	1-12
KDAY	DAY OF MONTH	1-31
KH	HOUR OF DAY	1-24
WBT	WET BULB TEMP	DEG F
DBT	DRY BULB TEMP	DEG F
PATM	PRESSURE	INCHES OF HG
CLDAMT	CLOUD AMOUNT	0-10
ISNOW	SNOW FLAG	1=SNOWFALL
IRAIN	RAIN FLAG	1=RAINFALL
IWNDDR	WIND DIRECTION	0-15; 0=N, 1=NNE, etc.
HUMRAT	HUMIDITY RATIO	LB H2O/LB AIR
DENSTY	DENSITY OF AIR	LB/CU FT
ENTHAL	SPECIFIC ENTHALPY	BTU/LB
SOLRAD	TOTAL HOR. SOLAR	BTU/HR-SQFT
DIRSOL	DIR. NORMAL SOLAR	BTU/HR-SQFT
ICLDTY	CLOUD TYPE	0-2
WNSPD	WIND SPEED	KNOTS

Step 3, Paste the contents of the FT file into “Custom eQUEST Weather Data.xls”.

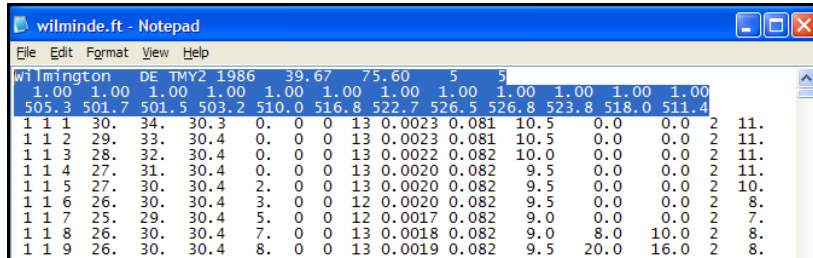
- 3a) Place a copy of “Psych.xla” in the Excel startup directory (e.g., for Windows XP, C:\Documents and Settings\your user name\Application Data\Microsoft\Excel\XLSTART), then open “Custom eQUEST Weather Data.xls”
- 3b) Open the FT file using a text editor. In Windows Explorer, right click on the FT file and select “Open”. Select “Select the program from a list” and click “OK”.



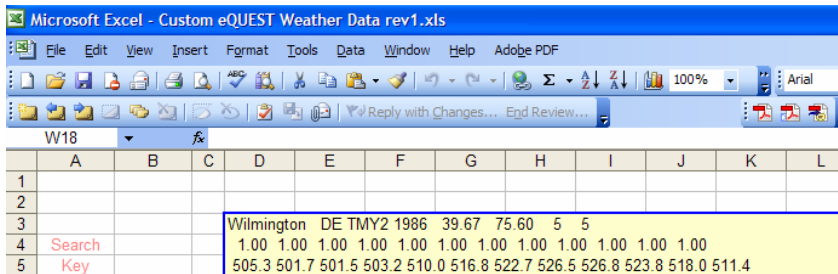
- 3c) Select “Notepad” from the list and click “OK”. (Unless you wish to have Notepad registered for use with all FT files, uncheck the box next to “Always use the selected program to open this kind of file.”)



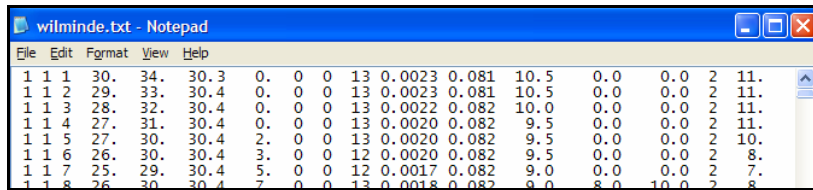
- 3d) Within Notepad, highlight the first three rows of the FT file and copy them (via



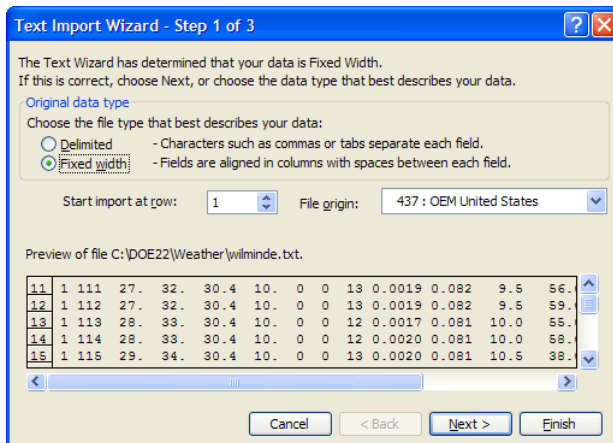
Paste Special Values, i.e., ‘Edit’, then ‘Paste Special’, then ‘Values’) in the “Template Data” tab of “Custom eQUEST Weather Data.xls”, column D, rows 3 through 5. This will actually paste these data only into column A. This is as intended.



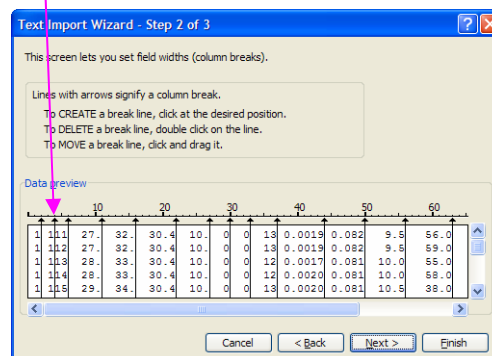
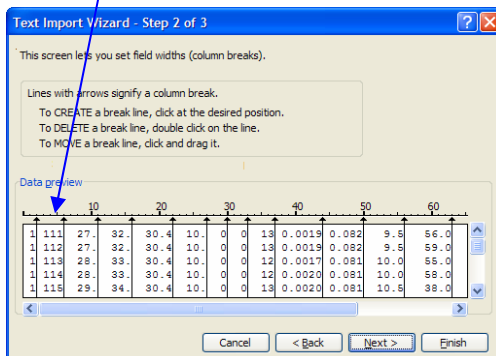
- 3e) Within Notepad, perform a “Save As” to save the FT file as a new file. Change the file extension to TXT (e.g., “wilmind.txt”). After saving as a new file, delete the first three rows of “wilmind.txt” (i.e., delete the non-hourly data), leaving only the 8760 hourly data. Save the TXT file and exit Notepad.



- 3f) Within Excel, open “wilmind.txt” (be sure to indicate you are searching for a file with a TXT file extension). At the Text Import Wizard screen 1 of 3 (see screen capture below), select “Fixed width” (the default), then click “Next>”.



At the Text Import Wizard screen 2 of 3, confirm that a vertical line break appears after each field. Note that this text import wizard will fail to place a **break line after the day**. Add a line by left clicking **here**. Click “Finish” (i.e., no need to go to screen 3 of 3).



3g) Within Excel, copy all 8760 rows from “wilmind.txt” and

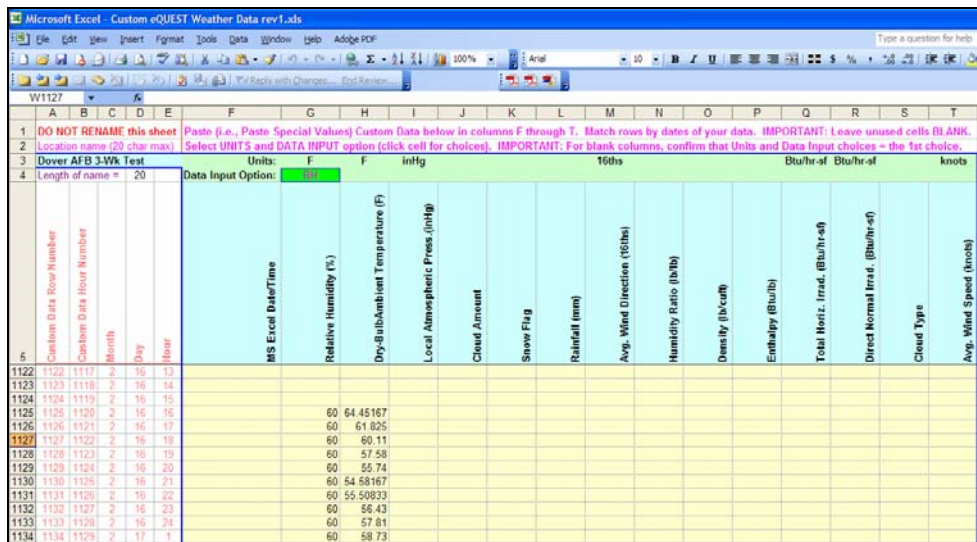
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	1	1	1	30	34	30.3	0	0	0	13	0.0023	0.081	10.5	0	0	2	11	
2	1	1	2	29	33	30.4	0	0	0	13	0.0023	0.081	10.5	0	0	2	11	
3	1	1	3	28	32	30.4	0	0	0	13	0.0022	0.082	10	0	0	2	11	
4	1	1	4	27	31	30.4	0	0	0	13	0.002	0.082	9.5	0	0	2	11	
5	1	1	5	27	30	30.4	2	0	0	13	0.002	0.082	9.5	0	0	2	10	
6	1	1	6	26	30	30.4	3	0	0	12	0.002	0.082	9.5	0	0	2	8	
7	1	1	7	25	29	30.4	5	0	0	12	0.0017	0.082	9	0	0	2	7	
8	1	1	8	26	30	30.4	7	0	0	13	0.0018	0.082	9	8	10	2	8	
9	1	1	9	26	30	30.4	8	0	0	13	0.0019	0.082	9.5	20	16	2	8	
10	1	1	10	26	31	30.4	10	0	0	13	0.0017	0.082	9.5	29	3	2	9	
11	1	1	11	27	32	30.4	10	0	0	13	0.0019	0.082	9.5	56	2	2	9	
12	1	1	12	27	32	30.4	10	0	0	13	0.0019	0.082	9.5	59	2	2	10	

paste them (via Paste Special Values, i.e., ‘Edit’, then ‘Paste Special’, then ‘Values’) into columns D through T, rows 6 through 8765 (yellow area) in the “Template Data” tab of “Custom eQUEST Weather Data.xls”.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1																				
2																				
3																				
4	Search			Wilmington	DE	TM12	1986	39.67	75.60	5	5									
5	Key			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6				505.3	501.7	501.5	503.2	510	0	516	8	522.7	526.5	526	8	529.8	518	0	511.4	
7	1	1	1	1	1	1	30	34	30.3	0	0	0	13	0.0023	0.081	10.5	0	0	2	11
8	2	1	1	2	29	33	30.4	0	0	0	13	0.0023	0.081	10.5	0	0	2	11		
9	3	1	1	3	28	32	30.4	0	0	0	13	0.0022	0.082	10	0	0	2	11		
10	4	1	1	4	27	31	30.4	0	0	0	13	0.002	0.082	9.5	0	0	2	11		
11	5	1	1	5	27	30	30.4	2	0	0	13	0.002	0.082	9.5	0	0	2	10		
12	6	1	1	6	26	30	30.4	3	0	0	12	0.002	0.082	9.5	0	0	2	8		
13	7	1	1	7	25	29	30.4	5	0	0	12	0.0017	0.082	9	0	0	2	7		
14	8	1	1	8	26	30	30.4	7	0	0	13	0.0018	0.082	9	8	10	2	8		
15	9	1	1	9	26	30	30.4	8	0	0	13	0.0019	0.082	9.5	20	16	2	8		
16	10	1	1	10	26	31	30.4	10	0	0	13	0.0017	0.082	9.5	29	3	2	9		
17	11	1	1	11	27	32	30.4	10	0	0	13	0.0019	0.082	9.5	56	2	2	9		
18	12	1	1	12	27	32	30.4	10	0	0	13	0.0019	0.082	9.5	59	2	2	10		
19	13	1	1	13	28	33	30.4	10	0	0	12	0.0017	0.081	10	55	2	2	10		
20	14	1	1	14	29	33	30.4	10	0	0	12	0.002	0.081	10	58	3	2	9		
21	15	1	1	15	29	34	30.4	10	0	0	13	0.002	0.081	10.5	38	1	2	9		
22	16	1	1	16	29	34	30.4	10	0	0	13	0.0019	0.081	10	21	1	2	8		

Step 4, Paste custom weather data into “Custom eQUEST Weather Data.xls”.

- 4a) Paste (via Paste Special Values) your custom weather data into the “Custom Hrly Data” worksheet, beginning on row 6 in columns F through T (the yellow area). Paste in data to only those rows for which you have data. Match rows by dates (columns C, D, and E) of your data. **IMPORTANT:** Leave unused cells BLANK. The example below provides approximately three weeks of hourly dry-bulb data beginning on February 16 at hour 16. In the absence of wet-bulb or dew point data, relative humidity was assumed to be a constant.

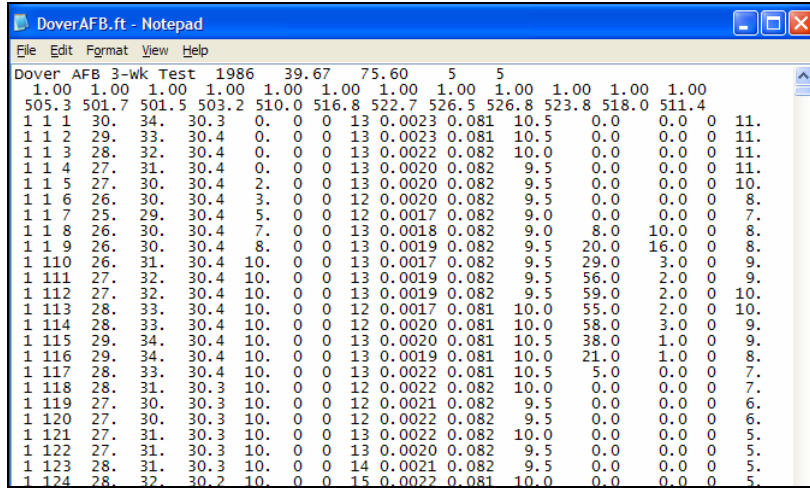


- 4b) Check and modify as necessary, the unit choices in row 3, columns G through T (the green area). DOE-2 weather files assume I-P units. Change the unit selections by first clicking on the selected units cell (in row 3) and pulling down the selection list. The selection of any SI units will cause the cell to display in bright green, indicating the custom data will have its units converted to I-P on the “Step 2” worksheet.
- 4c) Check and modify as necessary, the data input choices in row 4, column G. DOE-2 weather files assume wet-bulb temperatures, however, this spreadsheet permits moisture data to be input either as wet-bulb, dew point, or RH. Change the data input options by first clicking on cell G3 and pulling down the selection list. The selection of any non-standard DOE-2 input for moisture (i.e., wet-bulb) will cause the cell to display in bright green, indicating the custom data will have its units converted to wet-bulb on the “Step 2” worksheet.
- 4d) Enter into the light blue area of row 5 of the “Custom Hrly Data” worksheet (columns F through T), a description for each custom data column.
- 4e) Enter into the light blue area of row 3 of the “Custom Hrly Data” worksheet (columns A through E), a name (exactly 20 characters) for the weather file to be echoed at the upper right corner of each DOE-2 SIM file report.

Worksheets named “Step 1”, “Step 2”, and “Step 3” prepare the data for export.

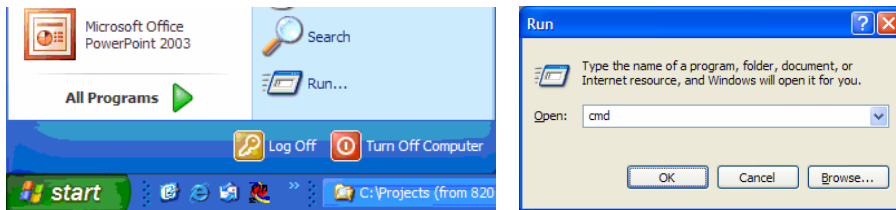
Step 5, Export custom weather data from “Custom eQUEST Weather Data.xls” into a text file.

- 5a) On the “Export” worksheet, copy column A, rows 3 through 8765 (the gray area) into an empty text file (i.e., using NotePad). Save as a text file with an “FT” file extension into the WEATHER folder (i.e., “C:\DOE22\WEATHER”).

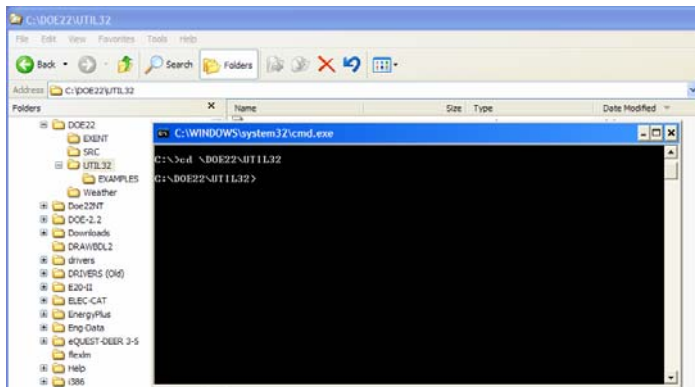


Step 6, ‘Pack’ this new text FT file into a binary (i.e., BIN) file ready for use with DOE-2.2/eQUEST.

- 6a) If the DOS box from Step 2 has been closed, launch a new DOS command box (from the Start button, select “Run...”, then type “cmd” into the Open input line and click “OK”).

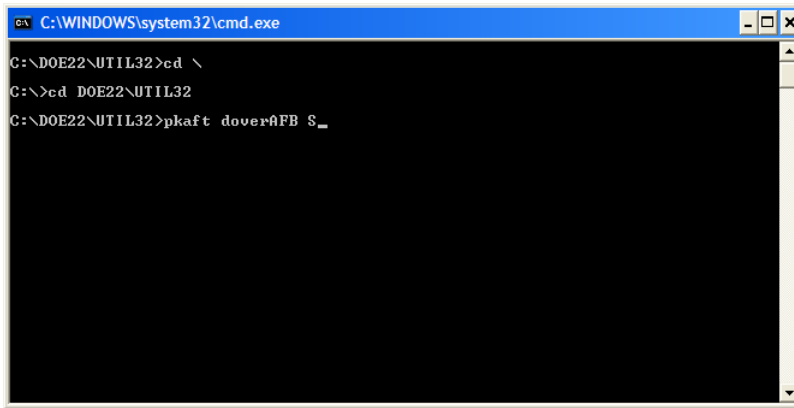


Within the DOS command box, change to the “C:\DOE22\UTIL32” directory by typing, “cd \DOE22\UTIL32” as indicated in the screen capture below and press enter.

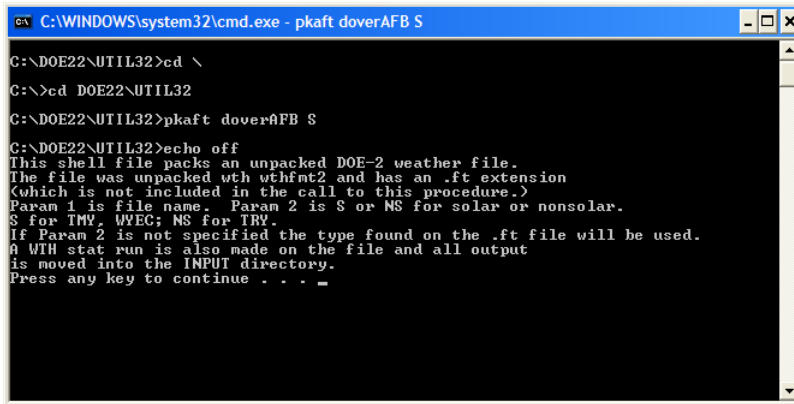


- 2d) ‘Pack’ the binary DOE-2/eQUEST weather file by running the DOE2.2 weather utility batch named “PKAFT.bat” (‘pack an FT file’, where FT is the file extension of an ‘unzipped’ DOE-2/eQUEST weather file).

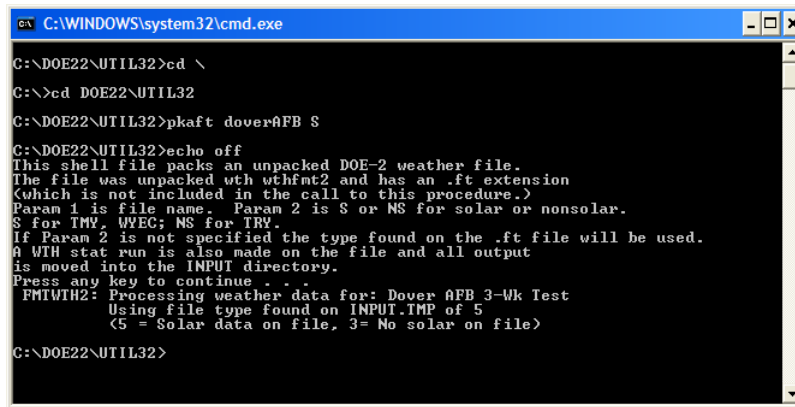
As with the MKAFT batch file, the PKAFT batch file adds the necessary file extensions so when typing the “PKAFT” command on the DOS command line, ONLY the new FT weather file name should be added as the first argument on the command line (i.e., OMIT the ‘dot’ and the file extension). For the PKAFT batch file, a second argument is required, S=Solar data is on the file, NS=no solar data is on the file (solar will be approximated from cloud cover and cloud type data in the file), e.g., “pkافت doverAFB S”.



Pressing enter will display a further DOS prompt from the PKAFT batch file. Press any key to continue.



Running the PKAFT procedure results in new binary file in the “C:\DOE22\Weather” folder, named “doverAFB.bin”. The file extension stands for ‘binary’, ready for use with eQUEST.



```
C:\WINDOWS\system32\cmd.exe
C:\DOE22\UTIL32>cd \
C:\>cd DOE22\UTIL32
C:\DOE22\UTIL32>pkaft doverAFB S

C:\DOE22\UTIL32>echo off
This shell file packs an unpacked DOE-2 weather file.
The file was unpacked with whfmt2 and has an .ft extension
(which is not included in the call to this procedure.)
Param 1 is file name. Param 2 is S or NS for solar or nonsolar.
S for TMY, WVEC; NS for TRY.
If Param 2 is not specified the type found on the .ft file will be used.
A WTH stat run is also made on the file and all output
is moved into the INPUT directory.
Press any key to continue . . .
FMIWTH2: Processing weather data for: Dover AFB 3-Wk Test
        Using file type found on INPUT.TMP of 5
        (5 = Solar data on file, 3= No solar on file)

C:\DOE22\UTIL32>
```

A second file, “doverAFB.sta”, is also produced which contains a statistical summary of the new weather file.