For Users of the DOE-2, PowerDOE, and SPARK Programs

THE USER NEWS

✱ ✱ Keywords!! ✱ ✱ ✱

✱ PowerDOE Release

The release of the PowerDOE program has been pushed back to the Summer of 1995 instead of next Spring. We'll announce the program release in the User News, so stay tuned!

✱ Documentation Overhaul

YES!! We have decided to update, combine, and revamp the DOE-2 manuals. Targeted for release in late 1995, the new and improved documentation will consist of a "dictionary" of commands and keywords, a manual of topic-oriented tutorials (topics like Input Macros, Loads-Systems-Plant Methodology, System Types, Plant Equipment, etc.), and an Appendix of reports, libraries, flowcharts, etc. We will preview some of the tutorials in future newsletters so you can get an idea of the finished product.

✱ DOE-2.1E Documentation Update

Good News! You can now order 2.1E documentation from NTIS. See the back page for order numbers and prices. Keep in mind that NTIS offers overnight order processing.

✱ New DOE-2 Resource Center!

The Nanyang Technological University in Singapore is the fourth and newest DOE-2 Resource Center. See the writeup on p.3 in this issue, and Vol.15, No.1, p.3 for the original article on DOE-2 Resource Centers.

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THE HEAT EXCHANGER

" The Power Of Hourly Reports "

by

Rene' Meldem

Question: *"Why the H... does this Dual Duct system consume so much more cooling energy than a Variable Volume system? The electricity bill seems much too high; and the pumping energy is much too low. There must be a bug in the program!"*

Does that sound familiar? Then the following article is for you!

Answer: You may often be puzzled if you look critically at the results of a DOE-2 simulation. The numbers may not make sense; your intuition may be challenged. So what should you do to understand how DOE-2 is interpreting your input? How can you be sure that the system you're modeling acts the way you want it to? Where can you look if you're confused by the monthly and annual numbers in the summary reports? Look at the hourly reports!

Appendix A of the *Supplement (2.1E)* is an extensive list of the hundreds of hourly variables you can review, ranging from loads, to temperatures, flows, and energy use. Although checking the hourly reports requires time and patience, your efforts will be rewarded as you gain a better understanding of how your building and systems are performing. You will also be able to see what keyword default values are being used that you may have overlooked, keywords that could have a big effect on your results. Only by checking hourly values can you be assured of a reliable, high quality simulation.

There are many examples where checking hourly reports have helped users to correct their input. We will use the case of a problem that was recently reported to us to illustrate the use of hourly reports. A user wanted to compare the performance of a VAV (Variable Air Volume) system with a MZS (Multi-Zone Fan System) in an office building. He was surprised that the heating energy for the MZS system was much higher than that for the VAV system; he expected approximately the same heating energy for both systems. So he checked the hourly reports and found that at night, to hold the setback temperature, the MZS system had maximum outside air flow, while the VAV system was at minimum outside air. This problem was easily fixed by specifying zero outside air for the MZS system when the building was unoccupied.

In conclusion, please take the time to check hourly reports even if you think everything looks okay. This will improve your understanding of how your building performs and will assure a high quality simulation.

* New Resource Center In Singapore *

The School of Mechanical and Production Engineering at the Nanyang Technological University (NTU) in Singapore is the fourth and newest DOE-2 Resource Center. Members of their research group on Building Energy Efficiency are active in DOE-2 simulation work. Raymond Wong is the primary contact for this resource center, which will primarily serve Malaysia, Indonesia, Thailand, and the Philippines. NTU has a copy of the DOE-2.1E documentation (including *DOE-2 Basics (2.1E)*) and all back issues of the *User News*. They also have the newest LBL reports pertaining to DOE-2. Program users may contact Dr. Wong and arrange to get photocopies of the DOE-2 material for a nominal cost.

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Resource Centers for International DOE-2 Users

The new DOE-2 D to E Conversion Program

by Gene Tsai, P.E.
ERG/Acrosoft International
Golden, Colorado USA

To die hard "DOE-Dogs" (that is what we call them in-house), first impressions regarding the release of the 2.1E version probably went something like this:

No. 1 - Finally! We have been waiting, and waiting, and waiting since August ... (which year, I can't remember).

No. 2 -- "The 2.1E version is not totally upwardly compatible with 2.1D. This means that in most cases you will get one or more error messages when you run a 2.1D input file with 2.1E." (A quote from the E version Supplement.) As a matter of fact, the changes that need to be made for the Economics module on the D version input are not simply a line or two, the user needs to rewrite the *ENTIRE* Economics module. SURPRISE!

This second area, the incompatibility between the D and E versions, has certainly created tremendous inconvenience and frustration, especially for those who have accumulated years of treasured input files and now need to convert them in order to generate output consistent with the latest program. This incompatibility just about makes every DOE-2 user in the world mad. Except us. (Kidding.) Of course we really appreciate those new changes, especially in the Economics module allowing DOE-2 to easily accommodate and provide greater flexibility on more complicated utility schedules.

ERG/Acrosoft International's newly developed "D2E" conversion program will convert the D version input to E version input in SECONDS - typically just 2-3 seconds for a 2000 line file. And the user can easily run a simulation with converted files without needing to make a single change 90%-95% of the time.

On page 13 of the E version Supplement, there is a list of items that require conversion. The degree of difficulty in conversion varies greatly. For example, items #4 and #5 are basically syntax differences, so one-to-one substitution will easily do the job. However, item #1 involves relocation of BUILDING-RESOURCE command. The BUILDING-RESOURCE input block has to be deleted from the LOADS module along with some input in the PLANT module, and input into the SYSTEMS module under the PLANT-ASSIGNMENT command. Also all schedules called by different resources have to be copied to the SYSTEMS module. For the domestic hot water, input has to be changed from BTUH to gallon-per-minute with specified temperature difference between the supply and inlet temperatures.

D2E™

a new conversion program capable of translating your DOE-2 "D" Version files to the new "E" Version

Another area of difficulty is item #2, changes in the Economics module. When comparing the effort needed to develop the Economics module conversions, the other items seem to be a piece of cake. Developing an automated tool to convert the Economics module required an artificial intelligence technique: first, to disassemble the D input; next, to discern all data included and check its classification; last, to reconstruct input with all data included according to the E version style. Even though the Economics module is usually very short, it remains a very challenging task to implement this module. COST-PARAMETERS and DAY-CHARGE-SCH no longer exist, OVER-BLOCK-RANGE and cogeneration are entered in very different ways, and all make the conversion process very difficult. It probably takes most users many hours - if not days - just to understand what is involved before knowing what to do. The conversion is definitely not a trivial process.

To design a unique software tool like D2E is an

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...Making DOE2 Users' Lives Easier

interesting experience. We exercised and applied a great deal of software engineering knowledge and experience to create this product. We also designed this program in such way that it can easily incorporate new changes to convert different styles of BDL input in the future. We designed the data and program structure with great considerations on software modularity, maintainability, upgradability, compactness, efficiency, and life cycle costs. We also want to encourage the users to be involved in adding new capabilities to D2E to make it a kind of semi-custom designed software and make it more versatile as it evolves. Our concept is to offer the user a "pay once and receive three versions" deal, and D2E will be modified to suit the user's need- if the input case can be implemented within reasonable time and cost.

To get D2E to work is not a small job. At the outset, we had to overcome an input line size problem. We used the Borland C++ Compiler for this program. With the 16-bit DOS application option, we could not get the program to run after input lines exceeded 2000. Fortunately Borland had just released a new 32-bit linker called PowerPack for DOS in August, which really saved this project without switching to a different compiler. On the Economics module, we designed it and coded it the first time. Initially, we didn't like the result, and didn't feel it was good enough, so we re-designed the Economics module and re-coded the program. At this writing, we are testing more and more BDL input cases - so far so good.

BDL includes so many commands, keywords, and code words with so many features for so many different applications, writing a program to convert every single case is almost impossible. We had to make some decisions on what to include to make it viable to develop this software. Basically, the LBL input samples are our first cut. For BDL inputs similar to those input samples, D2E conversion is no problem. We also had to make decisions on how many

"The degree of difficulty in conversion varies greatly"

levels of ##INCLUDE Macro to allow. We chose three levels deep, which is probably more than enough 99% of time. The hardest BDL feature to handle is Macro feature, which can really skew the conversion process.

Frankly, to get the D2E program completed was more involved and time-consuming than we originally anticipated. We know many DOE-2 users will appreciate our efforts in making this software available. Probably many DOE-2 D version users are reluctant to switch to the E version just because of the hassle to convert all existing D version input files to the E version. With D2E, those worries can be put to rest. DOE-2 users are in a small community and DOE-2 programs can only be marketed to specialized professionals, unlike popular spreadsheet software that has the potential to sell thousands of copies. For a small company like us, it can be hard to justify our risk to develop a program like D2E, which will only benefit — the few — the proud —- the DOE-2 users. [The price of D2E is $295.00 plus shipping and handling.]

To show our dedication to serve DOE-2 users worldwide, our company recently released our first network edition of MICRO-DOE2™, called NETPATH™, and a new single user edition POWERPATH™. These new editions of the MICRO-DOE2 family can help you improve productivity in network environment setup and enhance your disk storage management capabilities, including project file management and more proficiency to run on a RAM drive. ❖

For more details about our products, contact:

ERG/Acrosoft International
1626 Cole Blvd., Suite 250, Golden, CO 80401
Tel: (303) 233-4453, Fax: (303) 233-4234

Energy Ideas Clearinghouse Bulletin Board Service

The Energy Ideas Clearinghouse Bulletin Board Service (EICBBS) is managed by the Washington State Energy Office (WSEO) for the Bonneville Power Administration. As a user, you can search for all kinds of energy-related information, send electronic mail, download files (like the National Energy Policy Act), and discuss problems and solutions with other energy professionals. The EICBBS not only provides information on commercial and industrial energy efficiency, but also includes information on environmental and renewable energy topics. There are over 50 discussion groups on-line, including forums for utility staff, engineers, architects, and for professional organizations and interest groups (like ASHRAE). There are over 800 files in their Software Library, over 400 postings in the Job/Resume Database, and about 200 current energy events in the Training Calendar. You can add information about your expertise, program, or organization to the 300 records in the Program and Organization Database.

Public agencies support the Clearinghouse BBS, so there are no subscription fees. Toll-free access is available in all Western states. Users from other states and countries may access the BBS using toll lines or the Internet. You can access the Clearinghouse BBS 24 hours a day. For assistance, contact the Energy Ideas Clearinghouse between 8 a.m. and 5 p.m. Pacific Time, Monday through Friday, at (206) 956-2237. More Clearinghouse BBS information may be obtained from WSEO brochure #94-077.

How to Log Onto the BBS:	
Area	BBS Access
Pacific Northwest.........	800-762-3319
Other Western States...	800-797-7584
Other Areas................	206-586-6854
Internet.......................	eicbbs.wseo.wa.gov

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* Recent LBL Reports *

Three recent LBL reports that used DOE-2 in the research are available from the Building Technologies Program. Please fax your request to Pat Ross at (510) 486-4089, and be sure to reference both the title and report number.

LBL-34458

The Design and Evaluation of Three Advanced Daylighting Systems: Light Shelves, Light Pipes, and Skylights

We present results from the design and evaluation of three advanced daylighting systems: a light shelf, a light pipe, and a skylight. These systems use optical films and an optimized geometry to passively intercept and redirect sunlight further into the building. The objectives of these designs are to increase daylighting illuminance levels at distances of 15-30 feet from the window, and to improve the uniformity of the daylight distribution and the luminance gradient across the room under variable sun and sky conditions throughout the year. The designs were developed through a series of computer-assisted ray-tracing studies, photometric measurements, and observations using physical scale models. Comprehensive sets of laboratory measurements in combination with analytical routines were then used to simulate daylight performance for any solar position. Results show increased daylight levels and an improved luminance gradient throughout the year, indicating that lighting energy consumption and cooling energy due to lighting can be substantially reduced with improvements to visual comfort. Future development of the designs may further improve the daylighting performance of these systems.

LBL-35732

A Comprehensive Approach to Integrated Envelope and Lighting Systems for New Commercial Buildings

This paper presents results on the development, implementation, and demonstration of two specific integrated envelope and lighting systems: (1) a system emphasizing dynamic envelope components and responsible electric lighting systems that offers the potential to achieve energy efficiency goals and a near-optimum comfort environment throughout the year by adapting to meteorological conditions and occupant preferences in real time, and (2) perimeter daylighting systems that increase the depth of daylight penetration from sidelight windows and improve visual comfort through the use of a small inlet aperture. The energy performance of the systems was estimated using the DOE-2 building energy simulation program.

LBL-35433

Effect of Switching Control Strategies on the Energy Performance of Electrochromic Windows

This paper presents the results of a study investigating the energy performance of electrochromic windows under a variety of state-switching control strategies. DOE-2.1E was used to analyze the annual cooling, lighting, and total electricity use and peak demand as a function of glazing type, size, and electrochromic control strategy.

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DOE-2.1E Bug Fixes

Since DOE-2.1E was first released in December 1993 we have made a number of bug fixes to the program. These fixes are described below. They take the program from Version 002 (the initial release version) to Version 054 (the current version as of October 15, 1994). Sun and VAX versions of DOE-2.1E with these fixes will soon be available from the Energy Science and Technology Software Center (ESTSC). ESTSC can be contacted for information on Version 054 at the address listed in the DOE-2 Directory, p.15. If you purchased DOE-2.1E Version 002 from ESTSC they will get in touch with you to see if you want to upgrade for a nominal charge.

We expect that private vendors of DOE-2.1E will include these fixes in their products in the next few months. Contact your vendor for more information.

Following is a list of the bug fixes. Shown at the left is the version number, which is incremented for each new set of fixes. This is followed on the same line by the subprograms to the which the fixes were made (bdl = Building Description Language Processor, lds = LOADS program, sys = SYSTEMS program, etc.). Then comes a short description of the set of fixes corresponding to that version number. The author and date of each fix are also shown. Note that a particular version will include all fixes made up to and including that version number. So Version 005, for example, includes the fixes listed under "-005" as well as those listed under "-003" and "-004". You can easily determine what version number of DOE-2.1E you are currently using by checking any of the DOE-2 output reports, where version NNN is indicated as "DOE-2.1E-NNN".

Also note that, in the following, the version number jumps from -009 to -050. This indicates a major addition the program: a new residential system type and extension of natural ventilation to system types other than RESYS. (These additions are currently undocumented; they will be described in an update of the *Supplement (2.1E)* planned for early 1995.)

Bug fixes to DOE-2.1E up to Version 054

(The initial release in 12/93 was Version 002)

Version Number	Programs in which fixes were included; description of fix; and author/date of fix
-003:	bdl dkey drlc sys Change GHP default WASTE–HEAT–USE to SPACE–HEAT rather than SPACE–HEAT+DHW. Change default for WASTE–HEAT–USE to SPACE–HEAT+DHW for non GAS–HEAT–PUMP systems so that desuperheater DHW works. [JJH 2/94] Add new PLANT–ASSIGNMENT variables for net loop heating and cooling for HP systems (items 41 and 42 in V-T = P-A). [JJH 2/23/94] Fix bug for packaged systems PMZS, PSZ, PVAVS, and PVVT. This bug caused the system compressor to run when it had a zero load (load less than one btu). This was worst when the hot-gas-bypass ratio went to 0 because then the unit ran at min-unload-ratio power (.25) when zero load. This bug was not a problem when min-hgb-ratio > 0, since the unit then cycled at these very low loads. The problem was usually seen when a large amount of outside air (about 100%) was used and min-hgb-ratio is 0. Work-around is to set min-hgb-ratio at least to 0.1. [JJH 2/94] Fix bug in single duct systems and fan coils (or other systems that use SDSF for the air handler). This bug was evident when the sensible cooling was very low (or the flowrate was low) but the latent gain was high relative to the total system airflow. This caused the return air humidity to go above MAX–HUMIDITY (or saturation in the case that MAX–HUM is allowed to default to 100). This then caused the supply temperature to be depressed (way too much in the case when MAX–HUM < 100) and reheat to be done. This caused a spike of simultaneous heating and cooling when only a small amount of cooling should be required. The work-around is to eliminate latent gains from the spaces in the system. [JJH 2/94]

-003: (continued)

Fix bug that caused divide by zero when input functions are used to reset outside air or caused wrong calculation used when evaporative or desiccant cooling reset outside air above economizer value. PO (see SYSTEMS subr. ECONO) was used in several places when POA should have been used. This problem was in systems using SDSF (all single duct systems as well as FPFC, TPFC) and DDSF (DDS, MZS, PMZS) and HVSYS. [JJH 2/94]

Fix bug in error messages:
1) When a zone was not placed into a PLANT-ASSIGNMENT then warning message included a reference to a PLANT-ASSIGNMENT name that has nothing to do with the problem. This was removed.
2) When a SYSTEM was not included in any PLANT-ASSIGNMENT the error message listed the wrong SYSTEM name; the name in the message was the last SYSTEM in the last PLANT-ASSIGNMENT rather than the missing SYSTEM.
3) When a SYSTEM is in a PLANT-ASSIGNMENT more than once, the message is issued many times (same number of times as there are systems); this was fixed except for the case that the SYS-TEM is in the PLANT-ASSIGNMENT more than twice. Then the message appears for each of the 2*N occurrences.
4) Add message to distinguish between a SYSTEM in a PLANT-ASSIGNMENT more than once and a SYSTEM in more than one PLANT-ASSIGNMENT. [JJH 2/94]

Fix bug in routine that finds wetbulb temperature. This caused the program to abort when out-of-range temperatures were being calculated. Also updated the code to be easier to read. [JJH 2/94]

Fix bug in PSZ, SZRH system doing dehumidification. When MAX-HUMIDITY is specified and a reheat coil is in the zone, the supply temperature is depressed and the reheat coil comes on to control humidity without overcooling the zone. This bug kept the reheat coil load from being calculated even though the zone temp calculation assumed the coil was there. Also, the dehumidification reheat needed to be transferred to the central coil so that heat reclaim could be used to satisfy it; otherwise it would get left in QHZ which was not seen be the reclaim coils). [JJH 2/94]

Fix some problems with heat recovered for desuperheater DHW heater. Add the desuperheater option to the central (non-zonal) DX cooling systems. Properly account for recovered waste heat in HP report. Note: The default for WASTE-HEAT-USE was changed to add DHW as a default for non GAS-HEAT-PUMP DX cooling. The desuperheater does not function on heating mode in heat pumps except for the variable speed heat pump. [JJH 2/94]

Add desuperheater DHW capability to the RESYS system. The default for WASTE-HEAT-USE was changed to add DHW as a default for non GAS-HEAT-PUMP DX cooling. The desuperheater does not function on heating mode in heat pumps except for the variable speed heat pump. [JJH 2/94]

Fix some problems with the RESYS evaporative cooler. The electric consumption of the direct evaporative cooler in system RESYS was calculated incorrectly. It was double counted (appearing as both fan KW and cooling KW) and did not account for the on/off cycling of the unit.

-004:   lds
Fix bug in switchable glazing simulation for SWITCH-CONTROL = DAYLIGHT-LEVEL when there are two daylighting reference points. For glare calculation at first reference point, window luminance at second reference point was being used. This is not a problem when there is only one reference point. [FW 2-11-94]

-005:   sys
Fix bug in which fan coils were extracting too much moisture. The problem was that TCMIN (the minimum supply air temperature) was used in SDSF in the calculation of coil surface temperature, but TCMIN was never set in FCOIL. Hence, TCMIN was zero. There is no work-around. [WFB 2/22/94]

Add a pair of hourly variables for circulating loops (HP systems) that give the total heat added to the loop or rejected from the loop. This is particularly needed for ground-coupled systems; these quantities are not calculated elsewhere. (PLANT–ASSIGNMENT hourly variables 41 and 42). [JJH 2/23/94]

-006:   lds
Fix bug that gave incorrect solar calculations if LATITUDE and LONGITUDE were not specified when only design days were used (i.e., no weather file run). The fix causes an error message to be issued in this situation. [RM 3/30/94, JJH 4/26/94]

-007:   lds
Fix bug in which previous-hour shading fraction instead of current-hour shading fraction is used in determining whether shades (blinds/drapes) are deployed on a window under the following combination of conditions:
MAX–SOLAR–SCH is specified for the window;
GLASS–TYPE–CODE >= 1000 (i.e., from Window Library);
the window is in the first space defined in the input;
the sun is up.
This problem could cause the window shade to be closed when it should have been open, or vice versa. [FW 04/18/94]

-008:   bdl lds sim sys
Fix bug in macros.
Commands like '##reserve STACK 1234' gave a bogus error message complaining that 1234 is bad number. Without this mod one must enter the number 16 digits long with leading zeros (e.g. 0000000000001234). [EE 04/19/94]

Change all references to -99999/-88888/-77777/-66666 to use ITYPLS and the UNDEF array. This prevents math exceptions from occurring for certain compilers and operating systems and thus prevents incorrect comparisons. This also helps to make for more portable code.

The most important of these changes is at WALL1.162 as follows:
Fix incorrect check on wall type being defined. This caused an air-wall to not have its visible reflectance set to zero; also caused it to be included in the daylighting factor calculation and resulted in incorrect daylighting factors. [JJH 4/22/94]

Fix the packing and unpacking of daylighting factors to round rather than truncate. This allows better comparison of results between various compilers and operating systems. This also allowed the values used in the calculations to have the same values as those printed in the report LV–L; sometimes the third decimal place was not the same. [JJH 4/26/94]

Fix incorrect call to MSGSIM during initialization. [JJH 4/26/94]

Fix incorrect common block length. [JJH 4/26/94]

Change some debugging output: require DEBUG and STD–FILES for DESIGN file, STD–FILE and hourly file dumps. Fix some incorrect calls to MSGSIM. [JJH 4/26/94]

-008: (continued)

Change air handler coil load calculation to ignore very small loads (those less than 1 Btu/hr). This will allow better agreement between versions of the program created with different compilers and on different hardware. This also eliminates most of the "convergence" problems where the estimation calculations in DKTEMP and the routines calling the air handler routines get very small differences in mixed and supply temperatures (this is the case when very low loads can be handled by mixed air rather than the coil being activated). [JJH 4/94]

-009:   sys

Fix bug in which SYSTEMS was incorrectly picking up certain values passed from LOADS. The effect was to print incorrect hourly report values for heat transfer between a sunspace and adjacent spaces. Only the reported values, not the actual heat transfer calculations in SYSTEMS, were affected. [RM 04/26/94]

-050:   dkey sys

Add natural ventilation capability to PSZ (and all single duct systems if keywords are enabled in system default table). Not yet documented. Create a new residential system type, RESYS2, a better RESYS (not yet documented). The above two items are a major upgrade to DOE-2.1E done for the CIEE project "Alternatives to Compressor Cooling". Thus, the version number has been ratcheted up to 050.

The evaporative cooler option, EVAP–COOL+M–SUP = SEPARATE, did not work. This was fixed. [WFB 5/16/94]

-051:   lds

Fix a bug in the daylighting calculation in which incorrect daylighting factors were being picked up in subr. DINTIL for the southern hemisphere (latitude < 0). The result was incorrect interior daylight illuminances when the sun was to the west of north. The fix resets the solar azimuth THSUND from a range of -180 TO 180 (as set in DAYCLC) to a range of 0 to 360, so that it now corresponds to the range over which the daylight factors are calculated in subr. DCOF. This was NOT a problem in the northern hemisphere. [FCW 6-3-94]

-052:   dkey lds plt

Fix the load passed to the cooling tower calculation for the gas fired absorption chiller and the engine driven chiller in PLANT. The gas fired absorption chiller model assumed that all the fuel heat is passed to the tower, but the burner is only 83% efficient, so 17% of the fuel input is lost to the atmosphere. The engine chiller model assumed that the heat to the tower was the cooling load plus the fuel input minus the recoverable heat. This is incorrect. The exhaust heat never goes to the tower; the jacket heat goes to the tower if it is not recovered. We introduce four new keywords: ABSORG–BURN–EFF, the efficiency of the burner in the gas fired absorption chiller; ENG–CH–JAC–EFF, the efficiency of the engine chiller in producing recoverable jacket heat; ENG–CH–EXH–EFF, the efficiency of the engine chiller in producing recoverable heat from the exhaust; and ENG–CH–COMP–COP, the COP of the chiller driven by the gas engine. ENG–CH–JAC–EFF   and   ENG–CH–EXH–EFF   replace   ENG–CH–REC–EFF;   namely, ENG–CH–JAC–EFF + ENG–CH–EXH–EFF = ENG–CH–REC–EFF. [WFB 6/94]

Make the daylighting error and warning messages readable in 80 character wide lines in lower case. [JJH 6/11/94]

-053:   bdl

Fix bug in macros in which ##reserve command didn't take more than one item, giving error message complaining the next keyword is bad number. [EE 06/10/94]

Macros: when undefined macro name is referenced give a fake macro substitution to minimize the error propagation. Fake macro is installed by simulating the command: ##set1 !!!Undefined!!! 00000. [EE 06/10/94]

Macros: give more detailed error messages in #eval. Check division by zero, and bad library function arguments. [EE 06/10/94]

Fix following bug in input functions: A function that is in include file clobbers the include file sequence. It reverts back to file INPUT2.TMP after processing the first (of the many functions) in the include file. Also it doesn't tell that it is reverting back to the file INPUT2.TMP. [EE 06/10/94]

-054:   sys

Fix bug in the PSZ, PVAVS, PVVT, and RESYS2 systems. When INDOOR–FAN–MODE is INTERMITTENT the capacity calculation that sets TCMIN in DKTEMP used the total flow in the previous hour (CFM) rather than the instantaneous flow (CFM/CFMCYC). This caused the TCMIN to be too low and resulted in an underestimation of the kW into the compressor. [JJH 9/21/94]

✳ ✳ Keywords!! ✳ ✳ ✳

(continued from P.1)

✳ Home Energy Magazine

Home Energy magazine has published a comprehensive Special Issue on Lighting. This information-packed publication covers energy-efficient residential lighting from various perspectives, including technical and design information and details about utility programs. It also includes a stand-alone guide to home lighting for consumers. To order this special issue, send a check or money-order for $10 (includes shipping and handling) to "Special Lighting Issue", Home Energy Magazine, 2124 Kittredge Street, #95, Berkeley, CA 94704.

✳ New Reference Book

The 1994 Commercial Energy Source Directory is a comprehensive catalog of energy efficient commercial building products which provide real energy savings. Products are organized into six major categories: HVAC Controls, HVAC Equipment, Insulation, Lighting, Motors and Drives, and Water Heating. Address and phone information is given for featured manufacturers (USA and Canada). Available from Iris Communications, 258 East 10th Avenue, Suite E, Eugene Oregon 97401-3284. Fax (503) 484-1645 for details.

Two "Must Read" Articles from ASHRAE:

Among the excellent material that appears in the *ASHRAE Journal*, we would like to draw your attention to two articles from recent issues.

The first one, which appeared in August 1994, discussed the impact of heat output from data processing equipment on building air conditioning systems. Look for *"Measuring Computer Equipment Loads in Office Buildings"* by Christopher K. Wilkins, P.E. and Nicholas McGaffin, p.21ff.

The second article, from September 1994, is titled *"Real-World Seasonal Efficiency of Gas-Fired Steam Boilers"* by Tim M. Tierney and Charles J. Fishman, p.31ff.; it describes a field study that used actual metered data from existing buildings to establish the true seasonal efficiencies of gas steam boilers.

COMPREHENSIVE COLLECTION OF DOE-2 WEATHER FILES

EnergySoft has released an up-to-date collection of weather files for energy analysis. The days of hard drives crowded with weather data or stacks of floppy discs spilling all over your desk are over! Finally, all of the latest weather files available from the National Climatic Data Center and the California Energy Commission have been gathered and are stored on a single CD. The CD contains over 500 MB of data in the form of 344 different weather files from sites across the country. The data can be used with COMPLY 24, MICRO-DOE2 (formerly ACROSOFT), and other versions of DOE-2 Energy Analysis Software, as well as micro-AXCESS. The data files are a combination of five different file formats; TMY, TRY, WY2, CTZ and CWC depending on the source of the original file.

The files are organized in three fundamental sections on the CD, packed files, source files and header files. Each weather file on the CD is pre-packed in three different formats. There are two separate formats for use with both the ACROSOFT 286 and 386 versions of DOE-2 and one for other major versions of DOE-2 Energy Analysis Software. The pre-packed files are completely ready to use. Simply copy the file to your DOE-2 directory and perform the analysis. The "source" files are the original numeric data in ASCII format, and can be re-packed using the packer files also included in the collection in the event the source files require modification.

Two hundred thirty-four TMY, Typical Meteorological Year, files constitute the bulk of the data. TMY files are compiled from a 20 year database of information by the National Climatic Data Center. TMY weather files include several site characteristics, including solar radiation data, cloud cover, visibility, barometric pressure, wind speed and direction, dry-bulb and dew point temperatures. The TMY format contains the most complete weather data available and is most often the preferred format.

Also included on the CD are 60 TRY, or Test Reference Year, files. The TRY file format is similar to the TMY format except that the files lack solar radiation data. Nearly all of the sites for which TRY data is available also have TMY data that can be used for comparative analysis.

There are 48 files distributed by the California Energy Commission (CEC), three from each of the sixteen climate zones within California. Each climate zone has a file with the extension WY2, CEC and CTZ. The WY2 files are the most recent and are used with the 1992 & 1995 California Energy Efficiency Standards. CEC and CTZ files were used under the 1988 and 1978 versions of the energy standards respectively.

For Canadian users, the collection contains five weather files representing the five climate regions established by the Canadian Energy Codes.

The CD also includes a directory that features meteorological statistics summarizing the site conditions. Some of these statistics include the latitude and longitude of the site, the average solar radiation, the number of heating and cooling degree days based on several reference temperatures, the average monthly temperature, wind speed, sky cover and humidity information.

This CD contains all non-proprietary hourly weather data files in circulation at this time. The cost for the entire collection is only $499.00, (plus tax for CA residents). Multiple copies are available at a discount. EnergySoft also distributes individual sites on floppy diskette for $20.00 each, or nine for $100.00, and CD players are available for only $59.00, (plus tax for CA residents).

ENERGY SOFT

100 Galli Drive Suite #1
Novato, CA 94949
(800) 4 NRG SFT   (800) 467-4738

* Calendar of Meetings and Conferences *

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Dec 4-8 — *Thermal Performance of the Exterior Envelopes of Buildings, IV*

To be held in Clearwater Beach, Florida.
Contact: Pat Love, Oak Ridge National Laboratory, Thermal Envelopes Conference, P.O. Box 2008 (Bldg 3147), Oak Ridge, TN 37831-6070.

* *

Dec 7-9 — *The 17th World Energy Engineering Congress*

To be held in Atlanta, Georgia.
Contact: Association of Energy Engineers, 4025 Pleasantdale Road #420, Atlanta, GA 30340. Phone (404) 447-5083 x210, Fax (404) 446-3969.

* *

Jan 15-18, 1995 — *SCS Western MultiConference*
to be held in Las Vegas, Nevada.
Organized by: The Society for Computer Simulation and the University of Nevada, Las Vegas.
Contact: The Society for Computer Simulation, P.O. Box 17900, San Diego, CA 92177-7900. Phone (619) 277-3888, Fax (619) 277-3930, email: scs@sdsc.edu

* *

Feb 8-9 — *Energy Efficiency and the Global Environment*

To be held in Newport Beach, California.
Contact: Synergic Resources Corporation, 111 Presidential Boulevard #127, Bala Cynwyd, PA 19004.

* *

Mar 26-29, 1995 — *New Construction Programs for DSM, Best-of-the-Best Design Competition*
to be held in Cambridge, Massachusetts
Contact: ADM Associates, Elisa Herrera, 3239 Ramos Circle, Sacramento, CA 95827. Phone (916) 363-8383, Fax (916) 363-1788.

Apr 5-6 — *17th National Industrial Energy Technology Conference*

To be held in Houston, Texas.
Contact: "Industrial Energy Technology Conference", Mechanical Engineering Department-ESL, Texas A&M University, College Station, TX 77843-3123.

* *

May 10-12, 1995 — *IAQ, Ventilation, and Energy Conservation in Buildings Second International Conference*

to be held in Montreal, Canada.
Contact: Fariborz Haghighat, Centre for Building Studies, Concordia University, 1455 de Maisonneuve Blvd. West, Montreal, Quebec H3G 1MB, Canada. Fax (514) 848-7965.

* *

Jun 6-10, 1995 — *ECEEE 1995 Summer Study*
to be held in France.
Theme: Sustainability and the Reinvention of Government: A Challenge for Energy Efficiency.
Contact: European Council for an Energy-Efficient Economy, c/o NUTEK/DOEE, 117 86 Stockholm, Sweden. Fax +(46)-8-681-9585.

* *

Jun 26-27, 1995 — *Preconference Workshops*
Jun 28-30, 1995 — *7th Annual DSM Conference*
to be held in Dallas, Texas.
Host Utility: TU Electric
Sponsors: Synergic Resources Corporation, Electric Power Research Institute, U.S. Department of Energy, and Edison Electric Institute.
Registration Information: Pam Turner, EPRI, P.O. Box 10412, Palo Alto, CA 94303. Phone (415) 855-8900, Fax (514) 855-2041.
Technical Information: Bill Leblanc, Phone (415) 855-8900.

* *

* * * * DOE-2 DIRECTORY * * * *

Program Related Software and Services

Mainframe and Workstation Versions of DOE-2

DOE-2.1D and 2.1E (Source code, executable code and documentation) For 2.1E DEC-VAX, Order #000158-DOVAX-02 For 2.1E SUN-4, Order #000158-SUN-0000 For 2.1D DEC-VAX, Order #000158-D6220-01 For a complete listing of the software available from ESTSC order their "Software Listing" catalog ESTSC-2.	Energy Science and Technology Software Center P.O. Box 1020 Oak Ridge, TN 37831-1020 Phone: (615) 576-2606 FAX: (615) 576-2865 email: ESTSC@ADONIS.OSTI.GOV
FTI-DOEv2.1E (Source code and documentation) Combined source code package for both VAX and SUN versions of DOE-2.1E. Available on most distribution formats and for most operating systems (1/4" QIC tape, TK50 tape, 3.5" floppy, etc). Note: this is the distribution package only, no executables. Complete documentation for DOE-2.1E, digitally reproduced, spiral bound, and separated into multi-volume sets. [See *User News* Vol.12, No.4, p.16]	Finite Technologies, Inc 821 N Street, #102 Anchorage, AK 99501 Contact: Scott Henderson Phone: (907) 272-2714 FAX: (907) 274-5379 email: 76530,1114@compuserve.com

Microcomputer Versions of DOE-2

ADM-DOE2 ADM-DOE2 (DOE-2.1E) is the most recent version of DOE-2.1E. This release is compiled for use on a 386 or 486 personal computer. It runs in a DOS or Windows environment and is a highly reliable and tested version of DOE-2. The package contains everything needed to run the program: program files, utilities, sample input files, and weather files. More than 300 weather files are available (TMY, TRY, WYEC, CTZ formats) for the U.S. and Canada. [See *User News* Vol.7, No.2, p.6]	ADM Associates, Inc. 3239 Ramos Circle Sacramento, CA 95827 Contact: Marla Sullivan, Sales Alex Lekov, Support Phone: (916) 363-8383 FAX: (916) 363-1788
CECDOEDC (Version 1.0A) A microcomputer version of DOE-2.1D integrated with a pre- and post-processing system designed strictly for compliance use within the State of California. It generates some of the standard compliance forms as output. Order P40091009 for the CECDOEDC Program with Manuals. Order P40091010 for the DOE-2.1 California Compliance Manual. [See *User News* Vol.12, No.4, p.13]	Publication Office California Energy Commission P.O. Box 944295 Sacramento, CA 94244-2950

Caveat: We list third-party DOE-2-related products and services for the convenience of DOE-2 users, with the understanding that the Simulation Research Group does not have the resources to check the DOE-2 program adaptations and utilities for accuracy or reliability.

DOE-24/Comply-24
DOE-24 is a special DOE-2 release which is both a California-approved compliance program for the state's 1992 non-residential energy standards, and a stand-alone version of DOE-2.1E that includes a powerful yet easy-to-use input preprocessor. A demonstration program is available upon request.
[See *User News* Vol.12, No.2, p.2]

Gabel Dodd Associates
1818 Harmon Street
Berkeley, CA 94703-2416

Contact: Rosemary Howley
Phone: (510) 428-0803
FAX: (510) 428-0324

DOE-Plus™
DOE-Plus, a complete implementation of DOE-2.1D, is used to interactively input a building description, run DOE-2, and plot graphs of simulation results. Features include interactive error checking, context-sensitive help for all DOE-2 keywords, a 3-D view of the building that can be rotated, and several useful utilities.
[See *User News* Vol.11, No.4, p.4 and Vol.13, No.2, p.54]

ITEM Systems
1402 - 3rd Avenue, #901
Seattle, WA 98101

Contact: Steve Byrne
Phone: (206) 382-1440
FAX: (206) 382-1450

EZDOE
EZDOE is an easy-to-use PC version of DOE-2.1D. It provides full screen, "fill in the blank" data entry, dynamic error checking, context-sensitive help, mouse support, graphic reports, a 750-page user manual, extensive weather data, and comprehensive customer support. EZDOE integrates the full calculation modules of DOE-2 into a powerful, full implementation of DOE-2 on DOS-based 386 and 486 computers.
[See *User News* Vol.14, No.2, p.10 and No.4, p.8-14]

Elite Software, Inc.
P.O. Drawer 1194
Bryan, TX 77806

Contact: Bill Smith
Phone: (409) 846-2340
FAX: (409) 846-4367
email: 76070,621@compuserve.com

FTI-DOEv2.1E
Highly optimized version of DOE-2.1E software, available for most computing systems. Current support: MSDOS and Windows 3.x, Windows NT, OS/2, RS/6000 (AIX), NeXT, SUN, UNIX (most systems). Call for platforms not listed. Documentation and weather files are available. Also FTI-DOEv2.1E source code, highly optimized and portable version; will compile for most systems.
[See *User News* Vol.12, No.4, p.16]

Finite Technologies, Inc
821 N Street, #102
Anchorage, AK 99501

Contact: Scott Henderson
Phone: (907) 272-2714
FAX: (907) 274-5379
email: 76530,1114@compuserve.com

MICRO-DOE2™
MICRO-DOE2 (2.1E), which runs in a DOS or Windows environment, is a widely used, reliable, and tested PC version of DOE-2. The 2.1E version includes automatic weather processing, batch file creation, and a User's Guide with instructions on how to set up a RAM drive. System requirements: 386/486 PCs with 4 MB of RAM and math co-processor.

Also available are NETPath and POWERPath. NETPath is a network edition of MICRO-DOE2 that allows you to store and run DOE-2 application files on one machine using input files from another machine. The result is improved space usage and project file management. POWERPath, for single machines, allows you to keep MICRO-DOE2 application files in one directory and submit input from any other directory. [See *User News* Vol.7, No.4, p.2; Vol.11, No.1, p.2; Vol.15, No.1, p.8; and Vol.15, No.3, p.4]

ERG/Acrosoft International, Inc.
1626 Cole Boulevard #250
Golden, CO 80401-3306

Contact: Gene Tsai, P.E.
Phone: (303) 233-4453
FAX: (303) 233-4234
email: ergi@igc.apc.org

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PRC-DOE2 A fast, robust and up-to-date PC version of DOE-2.1E. Runs in extended memory, is compatible with any VCPI compliant memory manager and includes its own disk caching. 377 weather data files available (TMY, TRY, WYEC, CTZ) for the U.S. and Canada [See *User News* Vol.13, No.4, p.11 and Vol.15, No.1, p.5]	Partnership for Resource Conservation 140 South 34th Street Boulder, CO 80303 Contact: Paul Reeves Phone or FAX: (303) 499-8611 email: paulreeves@aol.com
VisualDOE for Windows™ VisualDOE, which uses DOE-2.1E as the calculation engine, enables architects and engineers to quickly evaluate the energy savings of HVAC and other building design options. Program is supported by context-sensitive on-line help. Program includes climate data for the 16 California weather zones. [See *User News* Vol.15, No.2, p.10]	Eley & Associates 142 Minna Street San Francisco, CA 94105 Contact: Charles Eley or John Kennedy Phone: (415) 957-1977 FAX: (415) 957-1381

Pre- and Post-Processors for DOE-2

D O E 1 2 3 Uses Lotus 1-2-3 to graphically display DOE-2.1D output as barcharts, pie charts, and line graphs. [See *User News* Vol.10, No.3, p.5]	Ernie Jessup 4977 Canoga Avenue Woodland Hills, CA 91364 Phone: (818) 884-3997
DrawBDL Graphic debugging and drawing tool for DOE-2 building geometry. DrawBDL reads your BDL input and makes a rotatable 3-D drawing of your building with walls, windows and building shades shown in different colors for easy identification. Runs on PC's under Microsoft Windows. [See *User News* Vol.14, No.1, p.5-7 and Vol.14, No.4, p.16-17]	Joe Huang & Associates 6720 Potrero Avenue El Cerrito CA 94530 Contact: Joe Huang Phone/FAX: (510) 236-9238
Graphs for DOE-2 2-D, 3-D, hourly, daily, and psychrometric plots [See *User News* Vol.13, No.1, p.5]	Energy Systems Laboratory Texas A&M University College Station, TX 77843-3123 Contact: Jeff Haberl Phone : (409) 845-6065 FAX: (409) 862-2762
PRC-TOOLS A set of PC programs that aids in extracting, analyzing and formatting hourly DOE-2 output. Determines energy use, demand, and cost for any number of end-uses and periods. Automatically creates 36-day load shapes. Custom programs also available. [See *User News* Vol.14, No.2, p.9]	Partnership for Resource Conservation 140 South 34th Street Boulder, CO 80303 Contact: Paul Reeves Phone or FAX: (303) 499-8611 email: paulreeves@aol.com

Pre- and Post-Processors for DOE-2 (continued)

Pre-DOE A math pre-processor for BDL.	Nick Luick 19030 State Street Corona, CA 91719 Phone: (714) 278-3131
Prep™ Prep is a batch preprocessor that enables conditional text substitution, expression evaluation, and spawning of other programs. Prep is ideal for large parametric studies that require dozens or even thousands of DOE-2 runs.	ITEM Systems 1402 - 3rd Avenue, #901 Seattle, WA 98101 Contact: Steve Byrne Phone: (206) 382-1440 FAX: (206) 382-1450

RESOURCES

User News Sent without charge to DOE-2 users, the newsletter prints documentation updates and changes, bug fixes, inside tips on using the program more effectively, and articles of special interest to program users. Regular features include a directory of program-related software and services and an order form for documentation. In the summer issue an alphabetical listing is printed of all commands and keywords in DOE-2, and where they are found in the documentation. The winter issue features an index of articles printed in all the back issues.	Simulation Research Group Bldg. 90, Room 3147 Lawrence Berkeley Laboratory Berkeley, CA 94720 Contact: Kathy Ellington Phone: (510) 486-5711 FAX: (510) 486-4089 e-mail: kathy%gundog@lbl.gov
Help Desk – Bruce Birdsall Call or fax our DOE-2 expert, Bruce Birdsall, if you have a question about advanced modeling techniques. If you need to fax an example of your problem to Bruce, please be sure to telephone him prior to sending the fax. This service is supported by the Simulation Research Group.	Bruce Birdsall Ph/Fx: (510) 829-8459 Monday through Friday 10 a.m. to 3 p.m. Pacific Time
Training DOE-2 courses for beginning and advanced users. DOE-2 training for large and small groups.	Energy Simulation Specialists 64 East Broadway, Suite 230 Tempe, AZ 85282 Contact: Marlin Addison Phone: (602) 967-5278 Gary H. Michaels, P.E. 1512 Crain Street Evanston, IL 60602 Phone: (708) 869-5859
Instructional DOE-2 Video and Manual Takes you step-by-step in DOE-2.1D input preparation and output interpretation.	JCEM/U. Colorado Campus Box 428 Boulder, CO 80309-0428 Contact: Prof. Jan Kreider Phone: (303) 492-3915

R E S O U R C E S (continued)

Weather Data

All 344 weather files from the National Climatic Data Center and the California Energy Commission on a single CD. TMY, TRY, WY2, CTZ, and CWC formats, depending on the source of the original file. For Canadian users, the CD contains five weather files representing the five climate regions established by the Canadian energy codes.

Jenny Lathum or Martyn Dodd
EnergySoft
100 Galli Drive, Suite 1
Novato, CA 94949
Phone: (800) 4 NRG SFT
or (800) 467-4738
Fax: (415) 883-5970

European Weather Files

Andre Dewint
Alpha Pi, s.a.
rue de Livourne 103/12
B-1050 BRUXELLES
Belgium
Phone: 32-2-649-8359
FAX: 32-2-649-9437

TMY (Typical Meteorological Year)
TRY (Test Reference Year)

National Climatic Data Center
Federal Building
Asheville, North Carolina 28801
(704) 259-0871 climate data
(704) 259-0682 main number

CTZ (California Thermal Climate Zones)

California Energy Commission
Bruce Maeda, MS-25
1516-9th Street
Sacramento, CA 95814-5512
1-800-772-3300 Energy Hotline

WYEC (Weather Year for Energy Calculation)

ASHRAE
1791 Tullie Circle N.E.
Atlanta, GA 30329
(404)636-8400 / Fax: (404)321-5478

The hair of a polar bear is an efficient solar collector. Polar bear hair has a 95% efficiency rate in absorbing heat from the sun. Solar collectors developed by human technology have a low 65 to 70% efficiency rate.

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* * DOE-2 ENERGY CONSULTANTS * *

Consulting Engineers
Charles Fountain
Burns & McDonnell Engineers
8055 E. Tufts Avenue, Suite 330
Denver, CO 80237 (303) 721-9292

Consultant
Greg Cunningham
Cunningham + Associates
512 Second Street
San Francisco, CA (415) 495-2220

Consultant
Philip Wemhoff
1512 South McDuff Avenue
Jacksonville, FL 32205 (904) 632-7393

Consultant
Jeff Hirsch
12185 Presilla Road
Camarillo, CA 93012 (805) 532-1045

Consultants
Charles Eley, John Kennedy
Eley Associates
142 Minna Street
San Francisco, CA 94105 (415) 957-1977

Computer-Aided Mechanical Engineering
Mike Roberts
Roberts Engineering Co.
11946 Pennsylvania
Kansas City, MO 64145 (816) 942-8121

Consultant
Steven D. Gates, P.E.
Building HVAC Design/Performance Modeling
11608 Sandy Bar Court
Gold River, CA 95670 (916) 638-7540

Consultant
Donald E. Croy
CAER Engineers, Inc.
814 Eleventh Street
Golden, CO 80401 (303) 279-8136

Mechanical Engineers
Chuck Sherman
Energy Simulation Specialists
64 East Broadway, Suite 230
Tempe, AZ 85282 (602) 967-5278

Energy Engineering: Commercial & Institutional
Michael W. Harrison, P.E.
139 Bluebird Lane
Whitehall, MT 59759 (406) 287-5370

Consulting Engineers
Alan Cowan
Criterion Engineers
5331 SW Macadam Ave., Suite 205
Portland, OR 97201 (503) 224-8606

Hourly Calibrated DOE-2 Analysis
Jeff S. Haberl
Energy Systems Laboratory
Texas A&M University
College Station, TX 77843-3123 (409) 845-6065

Consultant
Martyn C. Dodd
Gabel Dodd Associates
100 Galli Drive, Suite 1
Novato, CA 94949 (415) 883-5900

Consulting Engineers
Prem N. Mehrotra
General Energy Corporation
230 Madison Street
Oak Park, IL (708) 386-6000

Energy Management Specialists
Hank Jackson, P.E.
P.O. Box 675
Weaverville, NC 28787-0675 (704) 658-0298

Consultant/Building Systems Analysis
Robert H. Henninger, P.E.
ElectroCom GARD Ltd.
7449 N. Natchez Avenue
Niles, IL 60714 (708) 647-3252

* * DOE–2 ENERGY CONSULTANTS (continued) * *

Consulting Engineers/Computer Simulation Sciences Robert E. Gibeault A-TEC 5515 River Avenue, Suite 301 Newport Beach, CA 92663 (714) 548-6836	**Energy Consultants** Gene Tsai ERG/Acrosoft International, Inc. 1626 Cole Boulevard, Suite 250 Golden, CO 80401 (3030 233-4453
Consulting Engineers Susan Reilly Enermodal Engineering 1554 Emerson Street Denver, CO 80218 (303) 861-2070	**Technical Real World Analysis** David J. Schwed Romero Management Associates 1805 West Avenue K, #202 Lancaster, CA 93534 (805) 940-0540
Energy Codes – DSM Doug Mahone The Heshong Mahone Group 4610 Paula Way Fair Oaks, CA 95628 (916) 962-7001	**Consulting Engineers** Gregory Banken, P.E. Q-Metrics, Inc. P.O. Box 3016 Woodinville, WA 98072 (205) 915-8590
space available	**Consulting Energy Engineers** Gary H. Michaels, P.E. 1512 Crain Street Evanston, IL 60602 (708) 869-5859
Consultant/Building Systems Engineering Ellen Franconi 1504 Grant Street Berkeley, CA 94703 (510) 559-8340	**Consulting Engineer** Robert Mowris, P.E. 1084 Sterling Avenue Berkeley, CA 94708 (510) 549-0557

* DOE–2 ENERGY CONSULTANTS – INTERNATIONAL *

Mainframe DOE-2 for European Users Joerg Tscherry EMPA, Section 175 8600 Dubendorf Switzerland	**Energy Consultant** Philipp Schluchter Institut fur Bauphysik Klein Urs Graf-Strasse 1 CH4052 Basel Switzerland
Consultant Werner Gygli Informatik Energietechnik Weiherweg 19 CH-8604 Volketswil Switzerland	**Consultant, Distributor for FTI-DOEv2.1E** Andre Dewint rue de Livourne 103/12 B-1050 BRUXELLES Belgium

* * DOE-2 RESOURCE CENTERS * *

The people listed here have agreed to be primary contacts for DOE-2 program users in their respective countries. Each resource center has the latest program documentation, all back issues of the User News, and recent LBL reports pertaining to DOE-2. In the future, these resource centers will receive copies of all new reports and documentation. Program users can then make arrangements to get photocopies of the new material for a nominal cost. We hope to establish resource centers in other countries; please contact us if you are interested in establishing a center in your area.

South America Prof. Roberto Lamberts Universidade Federal de Santa Catarina Campus Universitario--Trindade Cx. Postal 476 88049 Florianopolis SC BRASIL Telephone: (55)482-31-9272 Fax: (55)482-34-1524 email: ECV1RLR@IBM.UFSC.BR	**Australasia** Dr. Deo K. Prasad/P. C. Thomas SOLARCH University of New South Wales P.O. Box 1 Kensington, N.S.W. 2033 AUSTRALIA Telephone: (61)-2-697-5783 (P.C. Thomas) Fax: (61) 2-662-4265 or -1378 email: PC.Thomas@unsw.EDU.AU
Portugal, Spain, Italy, and Greece Antonio Rego Teixeira ITIME Azinhaga dos Lameiros a Estrada do Paco do Lumiar 1699 Lisboa Codex PORTUGAL Telephone: (351) 1-716-4096 Fax: (351) 1-716-4305	**Singapore, Malaysia, Indonesia, Thailand, and the Philippines** WONG Yew Wah, Raymond Nanyang Technological University School of Mechanical and Production Engineering Nanyang Avenue Singapore 2263 REPUBLIC OF SINGAPORE Telephone: (65)799-5543 Fax: (65)791-1859 email: mywwong@ntuvax.ntu.ac.sg

DOE-2 USER SURVEY — PART 1

— Input Functions —

During the 15+ that years DOE-2 has existed, we have tried to keep track of how the program is used and to respond to the needs of our users. For the most part this effort was done informally, mostly from answering your questions when problems arose.

Through conversations with users who call our office, it is clear that many of you are showing a lot of creativity in solving problems by using Input Functions. Input Functions are an elegant way to solve a wide range of problems; almost every user could benefit from the solutions offered by existing functions.

We are willing to create an Input Function data base and make it available to all DOE-2 users. We urge you to participate in the survey and have your function become part of the data base. Of course, you will not be responsible for the use of the functions or their results. Also, if you don't want to send us the function, you can simply describe what it does; we are still interested in how you are using the program whether or not you choose to contribute to the data base.

Please email your Input Function to us, or send it on a PC- or Unix-formatted diskette, or mail/fax a hard copy to us. Include a sample input and output incorporating your function. Please also:

1. State the problem that you solved by using your function.

2. Give the version of DOE-2 that you used.

2. Describe briefly the function and the algorithm on which it is based.

3. Give the limitation of the function; when is it valid?

Finally, be sure to include your name, company, address (including zip code), phone, fax, email, and the primary activity of your company (engineers, energy consultants, architects, etc.). Also, please indicate your level of DOE-2 expertise (expert user, experienced user, intermediate user, or beginner) and the number years you have used DOE-2.

Send the information to:
Rene Meldem
MS: 90-3147
Simulation Research Group
Lawrence Berkeley Laboratory
Berkeley, CA 94720

Email: meldem%gundog@lbl.gov
Fax: (510) 486-4089

DOE-2 Program Documentation

Document	Order Number	Price
DOE-2 Basics Manual (2.1E)	DE-940-13165	44.50
BDL Summary (2.1E)	DE-940-11217	27.00
Sample Run Book (2.1E)	DE-940-11216	91.00
Reference Manual (2.1A)	LBL-8706, Rev.2	126.00
Supplement (2.1E)	DE-940-11218	91.00
Engineers Manual (2.1A) [algorithm descriptions]	DE-830-04575	52.00

Order from:

National Technical Information Service   Phone (703) 487-4650
5285 Port Royal Road   FAX (703) 321-8547
Springfield, VA 22161

LAWRENCE BERKELEY LABORATORY
SIMULATION RESEARCH GROUP 90-3147
UNIVERSITY OF CALIFORNIA
BERKELEY, CA 94720
U S A

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Berkeley, CA
Permit No. 1123

ADDRESS CORRECTION REQUESTED

Sirius, the "Dog Star", can be seen shining in the heavens. But what is a sun dog? It is an optical effect of ice-crystal clouds, often causing bright spots of light to appear on either side of the sun.
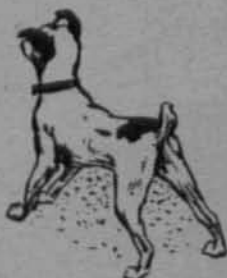
77843-3123
Tarek Bou-Saada
Energy Systems Laboratory
Dept of Mechanical Engineering
Texas A&M University
College Station, TX 77843-3123