

## SOFTWARE RELEASE NOTICE

|  |       |                          |
|--|-------|--------------------------|
| 01. SRN Number: <b>RDCO-SRN-008</b>  |       |                          |
| 02. Project Title:<br><b>Universal Distinct Element Code, CNWRA Version 1.1</b>  |       | Project No.              |
| 03. SRN Title: <b>UDEC V1.8</b>  |       |                          |
| 04. Originator/Requester:<br><b>Thomas J. Ratchford</b>  |       | Date:<br><b>12/14/93</b> |
| 05. Summary of Actions<br><br><div style="margin-left: 20px;"> <input checked="" type="checkbox"/>     Release of new code admitted to CM System<br/><br/> <input type="checkbox"/>     Release of modified code:<br/> <div style="margin-left: 40px;"> <input type="checkbox"/>     Enhancements made<br/><br/> <input type="checkbox"/>     Corrections made<br/><br/> <input checked="" type="checkbox"/>     Change of access code           </div> </div> |       |                          |
| 06. Persons Authorized Access  |       |                          |
| Name   | RO/RW | A/C/D                    |
|  |       |                          |
| 07. Element Manager Approval:  |       | Date:                    |
| 08. Remarks:   |       |                          |

December 14, 1993

MEMORANDUM

TO: A.H. Chowdhury  
FROM: T.J. Ratchford  
SUBJECT: Software Release Notice (SRN)

TOP-18 requires the Element Manager to be notified when a software code has been placed under configuration management. The attached Software Release Notice is to advise you of the placement of UDEC under configuration management and to request a listing of persons authorized access to UDEC. Please complete the form for UDEC and return it to me at your conveniences. If there are any questions please feel free to call me at 3083.

Block 06, Persons Authorized Access.

Under "Name":

Persons name and cray User Name.

Under "RO/RW":

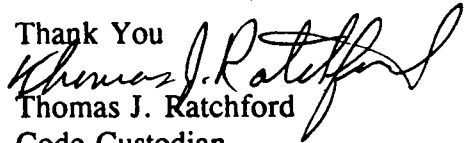
Assign access permission for each person.

RO = Read only access

RW = Read and Write access

Block 07: Element Manager Approval and date.

Thank You

  
Thomas J. Ratchford  
Code Custodian

## SOFTWARE SUMMARY FORM

|   |   |   |  |
|---|---|---|--|
| 01. Summary Date:<br>8/11/93  | 02. Summary prepared by (Name and phone)<br>Mark V. Muller, 522-3222  | 03. Summary Action:<br>New  |  |
| 04. Software Date:<br>June 1992   | 05. Short Title:<br>UDEC, V1.8  |   |  |
| 06. Software Title:<br>UDEC - Universal Distinct Element Code, CNWRA version 1.1  |   | 07. Internal Software ID:<br>none   |  |
| 08. Software Type:<br><br><input type="checkbox"/> Automated Data System<br><input checked="" type="checkbox"/> Computer Program<br><input type="checkbox"/> Subroutine/Module  | 09. Processing Mode:<br><br><input type="checkbox"/> Interactive<br><input type="checkbox"/> Batch<br><input checked="" type="checkbox"/> Combination | 10. APPLICATION AREA<br>a. General:<br><input checked="" type="checkbox"/> Scientific/Engineering <input type="checkbox"/> Bibliographic/Textual<br><input type="checkbox"/> Process Control <input type="checkbox"/> Management Business<br><input type="checkbox"/> Computer Systems Support/Utility <input type="checkbox"/> Other<br>b. Specific: discontinuum modeling |  |
| 11. Submitting Organization and Address:<br>CNWRA   |   | 12. Technical Contact(s) and Phone:<br>Mikko Ahola, (210) 522-5799  |  |
| 13. Narrative:<br><br>The Universal Distinct Element Code (UDEC) is a two-dimensional numerical program based upon the distinct element method for discontinuum modeling. UDEC simulates the response of discontinuous media (such as a jointed rock mass) subjected to either static or dynamic loading. |   |   |  |
| 14. Keywords:<br><br>distinct element method, discontinuum modeling, jointed rock mass, Mohr-Coulomb model, Drucker-Prager model  |   |   |  |
| 15. Computer Model and Manufacturer<br><br>SUN or IBM-PC compatible   | 16. Computer Operating System:<br><br>UNIX (SUN) or DOS/WINDOWS (PC)  | 17. Programming Language(s):<br><br>FORTRAN   | 18. Number of Source Program Statements:<br><br>42,000 (estimated) |
| 19. Computer Memory Requirements:<br><br>2 Mbytes, minimum  | 20. Tape Drives:<br><br>N/A   | 21. Disk/Drum Units:<br><br>N/A   | 22. Terminals:<br><br>X11 (SUN) or EGA/VGA (PC)                    |
| 23. Other Operational Requirements<br><br>More memory will allow models with greater numbers of blocks to be processed; e.g. 8 Mbytes of PC memory allows computation of a 7,500 rigid block model.   |   |   |  |
| 24. Software Availability:<br><input type="checkbox"/> Available <input type="checkbox"/> Limited <input checked="" type="checkbox"/> In-House ONLY<br><input type="checkbox"/> Active <input type="checkbox"/> Inactive  |   | 25. Documentation Availability:<br><input type="checkbox"/> Available <input type="checkbox"/> Inadequate <input checked="" type="checkbox"/> In-House ONLY   |  |
| 26. Submission Package Status:<br>CCB Acceptance Criteria: Met <input checked="" type="checkbox"/> Not Met <input type="checkbox"/> Software QA Assessment: Successful <input checked="" type="checkbox"/> Unsuccessful <input type="checkbox"/>  |   |   |  |
| Code Custodian: <u>Mark V. Muller</u>   |   | Date: <u>8/13/93</u>  |  |

UDEC Software, Version 1.1  
Source Code Files  
SUN/IBM-PC Version

Directory of B:\

|         |     |        |          |        |
|---------|-----|--------|----------|--------|
| INCLUDE | COM | 16599  | 10-31-89 | 9:58a  |
| READS   | ME  | 5113   | 06-17-92 | 2:40p  |
| BE      | FOR | 47848  | 06-08-92 | 3:34p  |
| BESUB   | FOR | 1393   | 01-28-92 | 4:02p  |
| BOUND   | FOR | 68240  | 05-22-92 | 1:03p  |
| CLB     | FOR | 39275  | 04-17-92 | 7:32p  |
| CLJ7    | FOR | 36022  | 06-15-92 | 4:06p  |
| CLZONE  | FOR | 55747  | 06-16-92 | 3:37p  |
| SVSDOS  | FOR | 103    | 06-11-92 | 12:00p |
| FF      | FOR | 14721  | 09-09-91 | 8:41p  |
| FLOW    | FOR | 54142  | 03-28-92 | 10:37a |
| FORD    | FOR | 23745  | 05-12-92 | 2:18p  |
| GEN     | FOR | 72945  | 05-28-92 | 11:38a |
| GRF020  | FOR | 21140  | 06-16-92 | 2:26p  |
| GRF386  | FOR | 26845  | 04-10-92 | 12:51p |
| TUNCHK  | FOR | 40678  | 06-05-92 | 5:47p  |
| GRFDUM  | FOR | 15496  | 06-16-92 | 2:26p  |
| GRFSUN  | FOR | 15277  | 06-19-92 | 3:49p  |
| GRFX11  | FOR | 12287  | 06-19-92 | 3:49p  |
| HIST    | FOR | 34556  | 06-10-92 | 10:33a |
| HPUDEC  | FOR | 15265  | 06-05-92 | 5:44p  |
| INPUT   | FOR | 104098 | 06-10-92 | 10:30a |
| LIBMAN  | FOR | 11989  | 01-20-92 | 4:32p  |
| MAIN    | FOR | 82308  | 06-16-92 | 3:24p  |
| MATCH   | FOR | 12138  | 05-28-92 | 11:26a |
| MOVIE   | FOR | 3503   | 05-28-92 | 11:39a |
| RJOINT  | FOR | 34617  | 05-28-92 | 11:24a |
| SPERRY  | FOR | 26006  | 02-07-92 | 4:51p  |
| STRPRT  | FOR | 11417  | 02-07-92 | 3:47p  |
| TABLE   | FOR | 2566   | 05-28-92 | 12:03p |
| TADD    | FOR | 2017   | 02-14-90 | 4:30p  |
| TFLOW   | FOR | 91     | 06-11-92 | 11:51a |
| THERMAL | FOR | 79809  | 06-01-92 | 4:07p  |
| UTIL    | FOR | 11602  | 05-26-92 | 12:33p |
| V386SYS | FOR | 7662   | 06-16-92 | 9:49a  |
| VONMS   | FOR | 5476   | 02-14-90 | 4:06p  |
| XYCRACK | FOR | 12768  | 12-27-91 | 4:36p  |
| XYZON   | FOR | 67431  | 06-16-92 | 9:51a  |
| NONDOS  | FOR | 2454   | 06-16-92 | 2:23p  |
| SUNDOS  | FOR | 2395   | 06-16-92 | 2:22p  |
| X11DOS  | FOR | 2395   | 06-16-92 | 2:23p  |
| CABLE   | FOR | 20848  | 06-05-92 | 2:12p  |
| DSIDOS  | FOR | 1963   | 06-16-92 | 3:01p  |
| CYCLE   | FOR | 78418  | 06-05-92 | 5:44p  |
| CLJ     | FOR | 19043  | 05-22-92 | 2:32p  |
| BECOM   | INC | 427    | 05-26-92 | 2:04p  |
| GENCOM  | INC | 232    | 11-08-91 | 12:41p |
| IGPCOM  | INC | 969    | 03-06-91 | 11:32a |
| IMPCOM  | INC | 169    | 09-23-88 | 3:07p  |
| MATCOM  | INC | 334    | 02-15-90 | 9:31a  |
| MOVCOM  | INC | 166    | 06-07-91 | 7:27a  |
| PLTCOM  | INC | 1815   | 01-16-92 | 1:54p  |
| UDECOR  | INC | 9496   | 06-05-92 | 10:16a |
| CABCOM  | INC | 806    | 06-03-92 | 4:16p  |
| USER    | INC | 984    | 06-22-92 | 1:49p  |
| DSISYS  | ASM | 1899   | 05-03-91 | 2:38p  |

|            |     |                   |          |        |
|------------|-----|-------------------|----------|--------|
| ASYS386    | ASM | 7230              | 03-23-92 | 3:50p  |
| MEM        | ASM | 1030              | 06-27-91 | 7:51a  |
| U386       | ASM | 13059             | 03-06-91 | 11:55a |
| SUNV       | C   | 3530              | 06-16-92 | 2:23p  |
| X11        | C   | 9257              | 06-16-92 | 2:23p  |
| MAKEFILE   | NGR | 907               | 06-16-92 | 9:50a  |
| MAKEFILE   | SNV | 931               | 06-16-92 | 9:49a  |
| MAKEFILE   | X11 | 969               | 06-16-92 | 9:50a  |
| UDEC387    | LNK | 416               | 06-16-92 | 2:47p  |
| UDECDSI    | LNK | 326               | 06-16-92 | 2:49p  |
| UDECND     | LNK | 392               | 06-15-92 | 3:45p  |
| ASYS386    | OBJ | 1086              | 06-11-92 | 12:00p |
| MEM        | OBJ | 215               | 06-11-92 | 12:00p |
| U386       | OBJ | 1957              | 06-11-92 | 12:00p |
| 70 file(s) |     | 1279053 bytes     |          |        |
|            |     | 163840 bytes free |          |        |

Disk 01 of 02  
Created 08/11/93

UDEC Software, Version 1.1  
Source Code Files  
SUN/IBM-PC Version

Directory of B:\

|         |     |           |                   |        |
|---------|-----|-----------|-------------------|--------|
| PACZP   | FOR | 11454     | 04-30-92          | 3:44a  |
| PCONLY  | FOR | 2755      | 08-02-91          | 11:09a |
| PL1     | FOR | 71340     | 06-10-92          | 2:36p  |
| PL2     | FOR | 98498     | 06-10-92          | 10:47a |
| PL3     | FOR | 74622     | 06-04-92          | 11:18a |
| PL4     | FOR | 30294     | 06-16-92          | 9:48a  |
| PLASCAP | FOR | 8669      | 06-15-92          | 4:04p  |
| PRINT   | FOR | 129962    | 06-22-92          | 12:11p |
| PSCRIPT | FOR | 35036     | 06-10-92          | 10:52a |
|         |     | 9 file(s) | 462630 bytes      |        |
|         |     |           | 991232 bytes free |        |

Disk 02 of 02  
Created 08/11/93

UDEC Software, Version 1.1  
Example/Verify/Utility Files  
SUN/IBM-PC Version

Directory of B:\

|           |       |                   |       |
|-----------|-------|-------------------|-------|
| EXAMPLE   | <DIR> | 08-13-93          | 3:47p |
| UTILITY   | <DIR> | 08-13-93          | 3:47p |
| VERIFY    | <DIR> | 08-13-93          | 3:48p |
| 3 file(s) |       | 0 bytes           |       |
|           |       | 714240 bytes free |       |

Directory of B:\EXAMPLE

|            |       |               |        |
|------------|-------|---------------|--------|
| .          | <DIR> | 08-13-93      | 3:47p  |
| ..         | <DIR> | 08-13-93      | 3:47p  |
| SEISMIC    | DAT   | 3566 05-29-92 | 12:41p |
| STOPE      | DAT   | 1859 05-29-92 | 12:48p |
| TUNNEL     | DAT   | 1655 05-29-92 | 12:52p |
| DAM        | DAT   | 5489 06-11-92 | 1:56p  |
| CY1        | DAT   | 1147 05-29-92 | 1:02p  |
| CY2        | DAT   | 1172 05-29-92 | 1:03p  |
| GROUT      | DAT   | 1285 06-11-92 | 2:00p  |
| DRIFT      | DAT   | 6405 06-11-92 | 2:00p  |
| FILL       | DAT   | 3141 05-29-92 | 1:15p  |
| UDEC       | DAT   | 1967 04-15-92 | 10:11a |
| 12 file(s) |       | 27686 bytes   |        |

Directory of B:\UTILITY

|            |       |                 |        |
|------------|-------|-----------------|--------|
| .          | <DIR> | 08-13-93        | 3:47p  |
| ..         | <DIR> | 08-13-93        | 3:47p  |
| PLOTTER    | BAT   | 42 05-11-87     | 3:03p  |
| PRINTER    | BAT   | 37 05-11-87     | 3:03p  |
| TWEITEK    | EXE   | 133072 03-09-90 | 12:55p |
| CFG386     | EXE   | 41568 02-13-89  | 10:20a |
| INSTALL    | BAT   | 59 08-29-91     | 11:09a |
| DPRINT     | EXE   | 62331 07-12-88  | 11:08p |
| INTERP     | EXE   | 51856 09-05-90  | 9:18a  |
| INTERP     | INI   | 7 09-05-90      | 10:05a |
| ITLBD      | FNT   | 14776 09-15-86  | 2:07p  |
| NORMAL     | FNT   | 6566 02-24-87   | 4:23p  |
| POP        | BAT   | 687 11-08-91    | 12:32a |
| PRT        | ZIP   | 23141 08-29-91  | 11:10a |
| HP500C     | EXE   | 153565 05-28-92 | 3:35p  |
| HP         | EXE   | 153495 05-28-92 | 9:22a  |
| HP         | DOC   | 1974 06-10-92   | 11:16a |
| 17 file(s) |       | 643176 bytes    |        |



Directory of B:\VERIFY

|            |       |                   |        |
|------------|-------|-------------------|--------|
| .          | <DIR> | 08-13-93          | 3:48p  |
| ..         | <DIR> | 08-13-93          | 3:48p  |
| S1C        | DAT   | 777 05-12-92      | 8:52a  |
| S1B        | DAT   | 2492 06-11-92     | 9:07a  |
| S1A        | DAT   | 2426 06-11-92     | 9:06a  |
| S2         | DAT   | 1183 05-12-92     | 9:05a  |
| S3         | DAT   | 1257 05-12-92     | 9:24a  |
| S4B        | DAT   | 2734 05-18-92     | 12:09p |
| S4A        | DAT   | 2738 05-18-92     | 12:09p |
| S5         | DAT   | 3704 05-18-92     | 12:13p |
| S6         | DAT   | 2021 05-12-92     | 10:07a |
| S7         | DAT   | 663 05-12-92      | 10:24a |
| S8         | DAT   | 557 05-08-92      | 2:21p  |
| S9         | DAT   | 2065 05-18-92     | 12:20p |
| D1A        | DAT   | 2132 05-12-92     | 10:55a |
| D1B        | DAT   | 2340 05-12-92     | 10:56a |
| D1C        | DAT   | 2126 05-12-92     | 10:56a |
| D1D        | DAT   | 2536 05-12-92     | 10:57a |
| D2A        | DAT   | 775 05-12-92      | 11:12a |
| D2B        | DAT   | 773 05-12-92      | 11:12a |
| TH1A       | DAT   | 935 06-11-92      | 10:26a |
| TH1B       | DAT   | 995 06-11-92      | 10:26a |
| TH2A       | DAT   | 545 06-11-92      | 10:27a |
| TH2B       | DAT   | 599 06-11-92      | 10:29a |
| TH3B       | DAT   | 469 06-11-92      | 10:29a |
| TH3A       | DAT   | 428 06-11-92      | 10:29a |
| TH4B       | DAT   | 535 06-11-92      | 10:30a |
| TH4A       | DAT   | 525 06-11-92      | 10:30a |
| TH5A       | DAT   | 3079 06-11-92     | 10:30a |
| TH5B       | DAT   | 3258 06-11-92     | 10:36a |
| TH6A       | DAT   | 738 06-11-92      | 10:37a |
| TH6B       | DAT   | 790 06-11-92      | 10:37a |
| F1         | DAT   | 719 06-11-92      | 10:37a |
| F2         | DAT   | 704 05-12-92      | 12:52p |
| CILVPR     | FOR   | 2533 06-11-92     | 11:20a |
| LSJEM      | FOR   | 3207 06-11-92     | 11:19a |
| 36 file(s) |       | 53358 bytes       |        |
|            |       | 714240 bytes free |        |

Disk 01 of 01  
Created 08/11/93

```

/u1/mmv/udec/ver11
gemstone.69 ~/udec/ver11 => ls -F
code/      example/  utility/   verify/
gemstone.70 ~/udec/ver11 => cd example
gemstone.71 ~/udec/ver11/example => ls -F
s.cyl.dat      s.cy2.dat      s.dam.dat      s.drift.dat      s.fill.dat
s.grout.dat     s.seismic.dat  s.stope.dat     s.tunnel.dat     s.udec.dat
gemstone.72 ~/udec/ver11/example => cd ..
gemstone.73 ~/udec/ver11 => cd utility
gemstone.74 ~/udec/ver11/utility => ls -F
s.cfig386.exe  s.dprint.exe   s.hp.doc        s.hp.exe         s.hp500c.exe
s.install.bat  s.interp.exe   s.interp.ini    s.itlbld.fnt     s.normal.fnt
s.plotter.bat  s.pop.bat      s.printer.bat   s.prt.zip        s.tweitek.exe
gemstone.75 ~/udec/ver11/utility => cd ..
gemstone.76 ~/udec/ver11 => cd verify
gemstone.77 ~/udec/ver11/verify => ls -F
s.cilvpr.for   s.d1a.dat      s.d1b.dat      s.d1c.dat      s.d1d.dat
s.d2a.dat      s.d2b.dat      s.f1.dat       s.f2.dat       s.lsjem.for
s.s1a.dat      s.s1b.dat      s.s1c.dat      s.s2.dat       s.s3.dat
s.s4a.dat      s.s4b.dat      s.s5.dat       s.s6.dat       s.s7.dat
s.s8.dat       s.s9.dat       s.th1a.dat     s.th1b.dat     s.th2a.dat
s.th2b.dat     s.th3a.dat     s.th3b.dat     s.th4a.dat     s.th4b.dat
s.th5a.dat     s.th5b.dat     s.th6a.dat     s.th6b.dat
gemstone.78 ~/udec/ver11/verify =>

```

134.20.1.1 09:27:41

```

gemstone.78 ~/udec/ver11/verify => cd ..
gemstone.79 ~/udec/ver11 => cd code
gemstone.80 ~/udec/ver11/code => ls -F
s.asys386.asm  s.asys386.obj  s.be.for       s.becom.inc
s.besub.for    s.bound.for    s.cabcom.inc   s.cable.for
s.clb.for      s.clj.for      s.clj7.for     s.clzone.for
s.cycle.for    s.dsidos.for   s.dsisys.asm   s.ff.for
s.flow.for     s.ford.for     s.gen.for      s.gencom.inc
s.grf020.for   s.grf386.for   s.grfdum.for   s.grfsun.for
s.grfx11.for   s.hist.for     s.hpudec.for   s.igpcom.inc
s.impcom.inc   s.include.com  s.input.for    s.libman.for
s.main.for     s.makefile.ngr s.makefile.snv s.makefile.x11
s.match.for    s.matcom.inc   s.mem.asm      s.mem.obj
s.movcom.inc   s.movie.for    s.nondos.for   s.paczp.for
s.pconly.for   s.pl1.for      s.pl2.for      s.pl3.for
s.pl4.for      s.plascap.for  s.pltcom.inc   s.print.for
s.pscript.for  s.reads.me     s.rjoint.for   s.sperry.for
s.strprt.for   s.sundos.for   s.sunv.c       s.svsdos.for
s.table.for    s.tadd.for     s.tflow.for    s.thermal.for
s.tunchk.for   s.u386.asm     s.u386.obj     s.udec387.lnk
s.udecdsi.lnk  s.udecnd.lnk   s.udecom.inc   s.user.inc
s.util.for     s.v386sys.for  s.vonms.for    s.x11.c
s.x1ldos.for   s.xycrak.for   s.xyzon.for
gemstone.81 ~/udec/ver11/code =>

```

134.20.1.1 09:27:53



15 February 1994

RECEIVED

FEB 2 1994

C N W R A

Dr. Asad Chowdhury  
CNWRA  
Southwest Research Institute  
P.O. Box 28510  
San Antonio, TX 78228-0510

Dear Asad:

In December 1991, CNWRA purchased the source code of UDEC (serial #216-1-51). In accord with our agreement made at that time, CNWRA is entitled to use the source code on multiple computers providing those computers are at the same location (i.e., in adjacent space within the same facility). If the UDEC code is to be used in separate facilities, thereby increasing the potential for repetitive support inquiries from CNWRA, we would insist that multiple copies of the code be purchased.

Sincerely,

A handwritten signature in dark ink, appearing to read "John J. Markham", with a long horizontal line extending to the right.

John J. Markham  
Executive Officer

jjm/vv  
REF: 216/814

cc. W. Patrick S. Hsiung  
B. Sagar M. Akola  
H. Garcia A. Ghosh  
B. Mabrito G. Ofoegbu  
T. Ratchford - EA



# SOUTHWEST RESEARCH INSTITUTE

P.O. BOX 28510 / 78228-0510  
6220 CULEBRA ROAD / 78238-5166  
SAN ANTONIO, TEXAS  
512/684-5111 • FAX 512/522-3964

5. DEPARTMENT

PURCHASE ORDER

TEXAS SALES TAX EXEMPTION  
ITEMS PURCHASED HEREIN ARE FOR OUR USE AND ARE EXEMPT  
FROM TEXAS SALES AND USE TAX UNDER SECTION 151.310,  
TEXAS TAX CODE SALES TAX PERMIT NO. 1-74-1070544.0. TEXAS  
SALES TAX EXEMPTION CERTIFICATE-SEE REVERSE SIDE HEREOF.

THIS NUMBER MUST APPEAR  
ON ALL CORRESPONDENCE,  
INVOICES AND PACKAGES.

No. 81558

ITASCA CONSULTING GROUP  
1313 FIFTH STREET SE  
SUITE 210  
MINNEAPOLIS, MN 55414

SHIP  
TO:

P.O. DATE

12/18/91

SHIP VIA

BEST WAY

F.O.B. POINT

SHIPPING POINT

TERMS

NET 30

UNLESS OTHERWISE SPECIFIED, SHIP TO ABOVE ADDRESS

DELIVERY IS REQUIRED  
AT DESTINATION  
NO LATER THAN

12/30/91

ATTN:

ROGER HART

015699 \*AP DIRECT\*

GOVT. CONTRACT NO.

This is a rated order certified for national defense use, and you are required to follow all the provisions of the Defense Priorities and Allocations System regulation (15 CFR 350).

| ITEM<br>NO. | QUANTITY ORDERED | UNIT | DESCRIPTION   | ITEM IDENTIFIER | UNIT PRICE | TOTAL PRICE |
|-------------|------------------|------|---|-----------------|------------|-------------|
| A           | 1                | EACH | TWO-DIMENSIONAL DISTINCT ELEMENT CODE<br>UDECODE SOURCE CODE COMPATIBLE WITH SUN<br>WORK STATION  |                 | 10000.00   | 10,000.00   |
| B           | 1                | EACH | BARTON BANDIS MODEL AND SUBROUTINES<br>FOR INPUT PARAMETERS CALCULATION FOR<br>BARTON BANDIS MODEL AND CONTINUOUSLY<br>YIELDING MODEL<br><br>MAIL - DEC 20, 1991<br><br>A/P: ROUTE INVOICE TO A H CHOWDHURY<br><br>*** CONFIRMING ORDER ***<br><br>VVK<br><br>PLEASE MAIL INVOICES IN TRIPLICATE TO ACCOUNTS PAYABLE<br>PLEASE SIGN AND RETURN ACCEPTANCE COPY WITHIN 5 DAYS. |                 | 2500.00    | 2,500.00    |

IF DELIVERY OF COMMODITIES IS UNABLE TO BE COMPLETED BY THE DATE INDICATED ABOVE, PLEASE GIVE REASONS FOR SUCH A DELAY AND PROVIDE SUBSEQUENT DELIVERY DATE.

|                |                                |             |             |        |       |
|----------------|--------------------------------|-------------|-------------|--------|-------|
| TO BE USED FOR | DELIVER TO                     | REQ. NUMBER | BUYER       |        |       |
| CNURA-EDCO     | A CHOWDHURY/A LOPEZ/168. 3RD F | 773330      | V. FRAQUE   |        |       |
| APPROVED BY    | ACCOUNT NO.                    | AMOUNT      | ACCOUNT NO. | AMOUNT | TYPIS |
|                | 20-0212-000                    | 12,500.00   |             |        | 19    |