Table AR.5.6

80-705

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* ************************************************************************************************
* ************************************************************************************************
*     DATE OF RUN            RUN IDENTIFICATION
*     TEST LIST-DISSCC WORKING LIST FOR OPTION 1(THERMAL EXPANSION FEEDBACK)NC,NCC WITH DECAY OF BPH
*     DCP=        (CAL/GM/YR)
*     BMCL=       (CM)
*     RCW=        (CM)
*     MBFA=3E12   (CU CM/YR)
*     NBPH=2E6    (DYNE/SQ CM)
*     DT=
*     LENGTH=
*     PRTPER=
*     PLTPER=
*     OPTION 1(TEF)FOR NC WITH DECAY OF BPH
*     OPTION 1(TEF)FOR NCC WITH DECAY OF BPH
*     DISSOLUTION WITH AND WITHOUT CRACK CLOSURE (DISSCC WORKING LIST-OPTION 1(TEF)FOR NC AND NCC WITH DECAY OF BPH)
* ************************************************************************************************
* ************************************************************************************************
L     H.K=H.J+DT*(HINR.JK-HOUTR.JK)          HEAT ABOVE 0 TEMPERATURE (CAL/GM)
N     H=5.2000                               INITIAL HEAT; MTEMP=26C (CAL/GM)
R     HINR.KL=DCP*FD.K                       RADIONUCLIDE POWER (CAL/GM/YR)
N     HINR=0                                 HEATING RATE AT START (CAL/GM/YR)
C     DCP=0                                  DIMENSIONAL COEFFICIENT FOR THERMAL POWER (CAL/GM/YR)
A     FD.K=EXP(2.303*LOGFD.K)                RADIONUCLIDE DECAY FRACTION
N     FD=1.                                  INITIAL DECAY FRACTION
A     LOGFD.K=TABLE(FDTAB,LOGT.K,0,8,0.5)    LOGTEN DECAY FRACTION
N     LOGFD=0                                INITIAL LOGFD
T     FDTAB=0/-0.03/-0.11/-0.38/-1.00/-1.80/-2.17/-2.51/-2.80/-3.28/
X     -3.84/-4.0/-4.0/-4.0/-4.0/-4.0/-4.0    TABLE VALUES OF LOGFD
A     LOGT.K=LOGN(TIME.K)/2.303              LOGTEN TIME (YEARS)
N     TIME=1.                                INITIAL VALUE OF TIME (YEARS)
N     LOGT=0                                 INITIAL VALUE OF LOG TIME
R     HOUTR.KL=DELAY3(SHLR.JK,DSHF)          HEAT OUTPUT RATE (CAL/GM/YR)
N     HOUTR=0                                INITIAL HEAT OUTPUT RATE (CAL/GM/YR)
*R    SHLR.KL=(2E-4*(H.K-4.0000)-2.4000E-4)*SHLROM     STEADY HEAT LOSS RATE (CAL/GM/YR)
*C    SHLROM=(as specified)                  MULTIPLIER CONSTANT
C     DSHF=100                               DELAY SURFACE HEAT FLUX (YEARS)
R     TER.KL=UEC*(HINR.JK-HOUTR.JK)/0.2      (LINEAR) THERMAL EXPANSION RATE (CM/YR)
C     UEC=0.9                                UNIT EXPANSION CONSTANT (CM/DEG C)
N     TER=0.423                              INITIAL VALUE OF TER (CM/YR)
L     TE.K=TE.J+DT*(TER.JK)                  (LINEAR) THERMAL EXPANSION (CM)
N     TE=0                                   INITIAL THERMAL EXPANSION STATE (CM)
L     CL.K=MCL.J-LPV.J                       COMPACTION LENGTH (CM)
N     CL=0                                   INITIAL VALUE CL (CM)
A     LPV.K=BMCL+PVPS.K-PVDC.K               LINEAR PORE VOLUME (CM)
C     BMCL=0                                 BACKFILL MAXIMUM COMPACTION LENGTH (CM)
L     PVPS.K=PVPS.J+DT*(BDRUA.JK)/DA         (LINEAR) PORE VOLUME PRODUCED BY SOLUTIONING (CM)
N     PVPS=0                                 INITIAL (LINEAR) PORE VOLUME PRODUCED BY SOLUTIONING (CU CM)
R     BDRUA.KL=FIFGE(MBFA,ACDR.K,ACDR.K,MBFA)   BRINE DISCHARGE RATE TO UPPER AQUIFER (CU CM/YR)
C     MBFA=3E12                              MAXIMUM BRINE FLOW IN AQUIFER (CU CM/YR)
A     ACDR.K=DCBPHA.K*NBPH*NC.K/(1.+(DCBPHA.K*DCBPHB.K*NC.K))   (TOTAL) APPARENT CRACK DISCHARGE RATE (CU CM/YR)
A     DCBPHA.K=(3E7*RCW*RCW*RCW*CTL)/(12*BV*CPL)   DIMENSIONAL CONSTANT BRINE PRESSURE HEAD (SQ CM/DYNE)*(CU CM/YR)
A     DCBPHB.K=NBPH/MBFA                     BRINE PRESSURE FLOW RATIO (DYNE/SQ CM)/(CU CM/YR)
C     NBPH=2E6                               INITIAL BRINE PRESSURE HEAD (DYNE/SQ CM)
C     RCW=1E-3                               REFERENCE CRACK WIDTH (CM)
C     CTL=6E5                                CRACK TRACE LENGTH (CM)
C     BV=1E-2                                BRINE VISCOSITY (POISE)
C     CPL=1E4                                CRACK PATH LENGTH (CM)
*A    NC.K=NCN+DA*AVNEC.K/(RCW*CTL*CPL)      NUMBER OF CRACKS FROM VOLUME OF REFERENCE CRACK
*C    NCN=0                                  INITIAL NUMBER OF CRACKS
A     AVNEC.K=MAX(NEC.K,-NEC.K)              ABSOLUTE VALUE OF NEC (CM)
A     NEC.K=TE.K-CL.K                        NET EXPANSION MINUS COMPACTION (CM)
N     NEC=-1.                                INITIAL NEC (CM)
L     PVDC.K=PVDC.J-DT*(LPVCR.JK)            (LINEAR) PORE VOLUME DESTROYED BY COMPACTION (CM)
N     PVDC=0                                 INITIAL VALUE OF PVDC (CM)
R     LPVCR.KL=LPV.K*EXP(-2.303*ELP*3E7*DT/EVISC.K)/DT-LPV.K/DT   LINEAR PORE VOLUME COMPACTION RATE (CM/YR)
C     ELP=1.3E8                              EFFECTIVE LOAD PRESSURE (DYNE/SQ CM)
A     EVISC.K=TABLE(EVTAB,BFTEMP.K,0,250,25)   EFFECTIVE VISCOSITY (POISE)
T     EVTAB=1.15E19,7.08E18,4.47E18,2.81E18,1.78E18,1.26E18,
X     8.91E17,6.61E17,5.01E17,3.80E17,3.02E17  TABLE VALUES OF EVISC (POISE)
A     BFTEMP.K=32+2*(MTEMP.K-26)             BACKFILL TEMPERATURE (DEG C)
N     BFTEMP=32.                             INITIAL VALUE BFTEMP (DEG C)
A     MTEMP.K=(H.K-4.0)/0.2+STEMP            MEAN TEMPERATURE FOR STEMP=20C (DEG C)
N     MTEMP=26.                              INITIAL VALUE OF MTEMP (DEG C)
C     STEMP=20.                              SURFACE TEMPERATURE (DEG C)
A     MCL.K=BMCL+ACLS.K                      MAXIMUM COMPACTION LENGTH (CM)
A     ACLS.K=SO.K/SA.K                       AVERAGE COMPACTION LENGTH FROM SOLUTIONING (CM)
L     SO.K=SO.J+DT*BDRUA.JK                  SOLUTION OPENINGS (CU CM)
A     SA.K=DA                                SOLUTIONING AREA (SQ CM)
C     DA=7.9E10                              DEPOSITORY AREA (SQ CM)
N     SO=0                                   INITIAL VALUE OF SO ( CU CM)
A     SCDIA.K=2.0*EXP(LNVFU.K)               SINGLE CAVITY DIAMETER (CM)
L     CLC.K=MCLC.J-LPVC.J                    COMPACTION LENGTH; WITH CLOSURE (CM)
N     CLC=0                                  INITIAL VALUE CLC (CM)
A     LPVC.K=BMCL+PVPSC.K-PVDCC.K            (LINEAR) PORE VOLUME; WITH CLOSURE (CM)
L     PVPSC.K=PVPSC.J+DT*(BDRUAC.JK)/DA      (LINEAR) PORE VOLUME PRODUCED BY SOLUTIONING; WITH CLOSURE (CM)
N     PVPSC=0                                INITIAL VALUE PVPSC (CM)
R     BDRUAC.KL=FIFGE(MBFA,ACDRC.K,ACDRC.K,MBFA)   BRINE DISCHARGE RATE TO UPPER AQUIFER; WITH CLOSURE (CU CM/YR)
A     ACDRC.K=DCBPHA.K*NBPH*ANCC.K/(1.+(DCBPHA.K*DCBPHB.K*ANCC.K))   APPARENT NUMBER OF CRACKS REDUCED BY CLOSURE
*A    NCC.K=NCCN+DA*AVNECC.K/(RCW*CTL*CPL)   NUMBER OF CRACKS FROM VOLUME OF REFERENCE CRACK; WITH CLOSRE
*C    NCCN=0                                 INITIAL NUMBER OF CRACKS; WITH CLOSURE
A     AVNECC.K=MAX(NECC.K,-NECC.K)           ABSOLUTE VALUE OF NEC; WITH CLOSURE (CM)
A     NECC.K=TE.K-CLC.K                      NET EXPANSION MINUS COMPACTION; WITH CLOSURE (CM)
N     NECC=-1.                               INITIAL VALUE NECC (CM)
L     PVDCC.K=PVDCC.J-DT*(LPVCRC.JK)         (LINEAR) PORE VOLUME DESTROYED BY COMPACTION; WITH CLOSURE (CM)
N     PVDCC=0                                INITIAL VALUE PVDCC (CM)
R     LPVCRC.KL=LPVC.K*EXP(-2.303*ELP*3E7*DT/EVISC.K)/DT-LPVC.K/DT   LINEAR PORE VOLUME COMPACTION RATE; WITH CLOSURE (CM/YR)
A     MCLC.K=BMCL+ACLSC.K                    MAXIMUM COMPACTION LENGTH; WITH CLOSURE (CM)
A     ACLSC.K=SOC.K/SA.K                     AVERAGE COMPACTION LENGTH FROM SOLUTIONING;  WITH CLOSURE (CM)
L     SOC.K=SOC.J+DT*BDRUAC.JK               SOLUTION OPENINGS; WITH CLOSURE (CU CM)
N     SOC=0                                  INITIAL VALUE SOC (CU CM)
A     SCDIAC.K=2.0*EXP(LNVFC.K)              SINGLE CAVITY DIAMETER; WITH CLOSURE (CM)
S     BDRAT.K=(1.+BDRUAC.K)/(1.+BDRUA.K)     BRINE DISCHARGE RATE; WITH AND WITHOUT,CLOSURE
NOTE
PRINT H,HINR,HOUTR,SHLR,TER,TE,CL,LPV,PVPS,BDRUA,ACDR,
X     NC,AVNEC,NEC,PVDC,LPVCR,EVISC,BFTEMP,MTEMP,MCL,
X     ACLS,SO,SCDIA,CLC,LPVC,PVPSC,BDRUAC,ACDRC,
X     ANCC,NCC,AVNECC,NECC,PVDCC,LPVCRC,MCLC,ACLSC,SOC,
X     SCDIAC,BDRAT
PLOT  NC=N/ANCC=C/AVNEC=V(0,1.0E4)/AVNECC=A(0,1.0E4)/SCDIA=D(0,1.0E4)/
X     SCDIAC=S(0,1.0E4)/BDRAT=B
SPEC  DT=0.1/LENGTH=1.0E3/PLTPER=10/PRTPER=20
RUN   "DISS WITH AND WITHOUT CC"----"DISSOLUTION WITH AND WITHOUT CRACK CLOSURE"
 EOI ENCOUNTERED.
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